D.R.W. AUTONOMOUS COLLEGE: GUDUR 110 I B.SC, MATHEMATICS - FIRST SEMESTER Paper I Differential equations (With Effect from 2014 – 2015)

UNIT – I

Differential equations of first order and first degree: Introduction – Equation of some families of curves – Variables separable method- Homogeneous functions –Homogeneous differential equations – Equations reducible to homogeneous form-Exact differential equations, Equations reducible to exact form. Definition-Methods of find integrating factors of Mdx+ Ndy=0 – Bernouli's equation – Change of variables Simultaneous differential equations.

UNIT-II

Differential equations of the first order but not of the first degree:

Equations solvable for p; Equations solvable for x; Equations solvable for y;

Equation that do not contain x (or y); Equations of the degree in x and y-clairaut's equation.

UNIT III:

Higher order linear differential equations (Constant Coefficients)

Solutions of homogeneous linear differential equations of order n with constant coefficients. Solution of the non-homogeneous linear differential equation s with constant coefficients by means of polynomial operators. Method of undetermined coefficients

UNIT IV:

Higher order linear differential equations (Non-Constant Coefficients)

Higher order linear differential equations with non coefficients, method of variation of parameters, The Cauchy-Euler equation, Legender s equations.

System of linear differential equations:

Solution of system of linear equations with constant coefficients: An equivalent triangular system. Degenerate case: $p_1(D) p_4(D)-p_2(D) p_3(D)$.

Prescribed Text book : Scope as in Analytical Solid Geometry by Santhi Narayan and P.K. Mittal, published by S.Chand & Company Ltd. Seventh edition: Sections:- 2.4,2.7,2.9,3.1 to 3.8,6.1 to 6.9,

7.1 to8.1, 8.2,8.6

Reference Book:

1. V.Krishna Murthy &others A text book of Mathematics for BA/ B.Sc VolI S.Chand & Company,New Delhi.

2. P.K Jain and Khallel Ahmed, A text book of Analytical Geometry of

Three Dimentions" Wiley Eastern Ltd., 1999.

Instructions regarding the question bank and practical record. The problems should contain the following:

* Problem Statement

*Methodology

*Problem Solution

*Result

The 60 problems to be recorded during the practical session 60 problems out of 80 are to be decided by the Heads of the Department of the reputed college.

All the students of particular Institution must record the

same solution of 60 problems

I B.SC, MATHEMATICS - SECOND SEMESTER

PAPER II Solid Geometry

(With Effect from 2014 – 2015)

UNIT - I

The plane:

Introduction to co-ordinates, Equation of plane in terms of its intercepts on the axis, Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes Orthogonal projection on a plane. Combined equation of two planes.

UNIT –II

The Line (Right Line)

Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines.

Change of Axes

Translation of Axes, Rotation of Axes

UNIT – III

Spheres:

Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle, Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal, Radical plane. Coaxial system of spheres, Limiting point

UNIT IV :

The Cone

Definitions of a cone, vertex ,Quadric cones with vertex , at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone ,Intersection of two cones with a common vertex.

The Cylinder

Definitions Elliptic cylinder, Hyperbolic, Parabolic, cylinder with base guiding curve, Equation of a cylinder, the right circular cylinder, enveloping cylinder of a Sphere.

Prescribed Text book: Scope as in Analytical Solid Geometry by Santhi Narayan and P.K. Mittal,

published by S.Chand & Company Ltd. Seventh edition: Sections:- 2.4,2.7,2.9,3.1 to 3.8,6.1 to 6.9, 7.1 to 8.1, 8.2,8.6

Reference Book:

1. V.Krishna Murthy &others A text book of Mathematics for BA/ B.Sc Vol 1 S.Chand & Company, New Delhi.

2. P.K Jain and Khallel Ahmed, A text book of Analytical Geometry of

Three Dimentions" Wiley Eastern Ltd., 1999.

Instructions regarding the question bank and practical record. The problems should contain the following

* Problem Statement

*Methodology

*Problem Solution

*Result

The 60 problems to be recorded during the practical session 60 problems out of 80 are to be decided by the Heads of the Department of the reputed college.

All the students of particular Institution must record the same

solution of 60 problems.

Model Question Paper

B.Sc First Year Examination

I&II SemesterS –Mathematics

(With Effect From 2014 – 2015)

Time: 3hrs

Max.70marks

Answer any 7 questions out of 12 questions. choosing at least one question from each unit

(Each question carries 10 Marks)

B.Sc First Year Practical Examination

Question Paper Model

(With Effect From 2014 – 2015)

Time: 3hrs

Max.50M

Answer any **5** questions out of **8** questions Each question carries **6** Marks 5X6 = 30M

For record

= 10 marks

For Viva-Voce

= 10 marks

Total Marks

= 50 Marks

D.R .W. AUTONOMOUS COLLEGE: GUDUR II B.SC, MATHEMATICS, THIRD SEMESTER

PAPER III: REAL ANALYSIS

(With effect from 2014-2015)

UNIT-I

Sequences and Series: Definition of Infinite series, Definition of sequence and Definition of convergent and divergent sequences, Test for convergent problems, Limit comparison test, P-test and their problems

UNIT-II

Limits and Continuity: Definitions of Limit of a function, Left hand limit and Right hand limit, Continuity of a function at a point, Left hand Continuity, Right hand Continuity, Sequence Criterion (or) Heine's Theorem, Discontinuity, Types of Discontinuity, Problems on Continuity and Discontinuity. Properties of Continuous function on a closed interval, Borel's Theorem, Every continuous function is bounded, Absolute Maximum –Minimum Theorem, Intermediate Value Theorem, Uniform continuity (problems & theorems).

UNIT-III

Differentiation: The derivative, The Mean Value theorems, Rolle's Theorem, Lagrange's theorem, Cauchy's theorem and their Applications. Taylor's Theorem with Lagrange's form of remainder, Taylor's theorem with Cauchy's form of remainder, Maclaurin's theorem, Taylor's and Maclaurin's series. $(e^x,sinx,cosx,log(1+x))$.

UNIT-IV

Riemann Integration: Partition of a closed interval, upper and lower Riemann Sums. upper and lower Riemann integrals. Definition of Riemann Integrable Functions:Darboux'theorem,Necessary and sufficient condition for integrability,properties of Riemann Integrable, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value theorem, First mean value theorem and their problems.

Prescribed Textbook:

N.Krishna Murthy & Others "A text book of B.Sc. Mathematics Vol II, S. Chand & Company, New Delhi

Reference books: 1. G.Shankar Rao" A text book of Mathematics for B.Sc Vol II, Himalaya Publishing House. 2. N.Krishna Murthy & Others "A text book of B.Sc. Mathematics Vol II, S. Chand& Company, New Delhi. (Old book).

D.R.W. AUTONOMOUS COLLEGE: GUDUR

II B.SC, MATHEMATICS, FOURTH SEMESTER

PAPER IV: ABSTRACT ALGEBRA

(With effect from 2014-2015)

UNIT-I

Number Theory: Elements of Number Theory: prime and composite numbers, Definition of Euclid's division Algorithm & Divisibility, Fundamental Theroem on arithmetic, Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation, Congruence, linear Congruence problems, Euler's function definition, Theorem of Fermat's and Wilson .

UNIT -II

Groups: Binary operators: Definition and properties, Composition Tables, Elementary properties, Finite Group and Group Composition Tables.

Subgroups: definition of subgroups, their intersectrion and union theorems, properties of Cosets and Lagranges Theorem

UNIT:III

Normal Sub groups: Definition of a Normal sub group, Simple groups, Quotient groups (or) Factor groups. Definitions of Homomorphism, Isomorphism and Automorphism, Properties of Homomorphism, Fundamental theorem on Homomorphism of groups. Definition of Inner and outer automorphisms of a group, Kernel f, Kernel of normal sub groups.

UNIT-IV

Permutation Groups: Definitions of Permutation, Even and Odd permutation. Orbits and cycles of permutation, Disjoint Cycles, even and Odd permutation problems, Inverse permutation, Cayley's theorem.

Cyclic Groups: Definition of cyclic group, Classification of cyclic groups, Order of the cyclic group problems, Find the number of generators problems.

Prescribed Textbook

V.Krishna Murthy & others "A text book of mathematics for BA/B.Sc Vol II.S.Chand & Company, New Delhi.

Reference books: 1.G.Shanker Rao" A text book of mathematics for B.Sc Vol II.Himalaya Publishing House.2.N.Krishna Murthy & others "A text book of B.Sc. Mathematics Vol II, S.Chand& Company, New Delhi.(old book).

B.Sc Second Year Examination

III &IV Semester Mathematics Question Paper Pattern

(With Effect from 2014 – 2015)

Time: 3hrs

Max.70marks

Answer any 7 questions out of 12 questions. Choosing at least one question from each unit

(Each question carries 10 Marks)

B.Sc Second Year Practical Examination

III &IV Semester Mathematics Question Paper Pattern

(With Effect from 2014 – 2015)

Time: 3hrs

Max.50M

Answer any **5** questions out of **8** questions Each question carries **6** Marks 5X6 = 30M

For record For Viva-Voce Total Marks

= 10 marks = 10 marks

= 50 Marks

S

B.Sc II Year Degree Examinations, III Semester Paper III Real Analysis Modal Paper

Time :3 Hours

Max Marks:70

Answer any 7 questions out of 12 questions,

Choosing at least **One question from each unit**. Each question carries **10** marks.

UNIT –I

1. State and prove limit comparison test

2. Test for convergence of (i) (ii)

3. Test for convergence of .+.+.+.+

UNIT –II

4. Discuss the continuity of f(x) = at f(0) = 0.

5. State and prove Borel's theorem.

6. State and prove intermediate value theorem.

UNIT –III

7. State and prove Rolle's Theorem.

- 8. Using Lagrange's theorem, Show that $x > \log(1+x) >$
- 9. Using Maclaurin's theorem, Show that $e^x \sin x = x + x^2 + x^3/3 x^5/30 + \dots$

UNIT IV

- 10.Define Oscillatory sum and find W(P,f) if $f = x^3$ on [0,1] and $P = \{0, 1/4, 2/4, 3/4\}$.
- 11. State and prove Darboux's theorem.
- 12. By considering the interval dx and find the value of log 2.

B.Sc II Year Degree Examinations,

IV Semester Paper IV Abstract Algebra Modal Paper

Time :3 Hours

Max Marks :70

Answer any 7 questions out of 12 questions,

Choosing at least **One question from each unit**. Each question carries **10** marks.

UNIT –I

1.State &Prove the Fundamental theorem of Arithmetic.

2.Find L.C.M &G.C.D of 5040,14850 by using canonical form.

3. State & Prove the Wilson's theorem

UNIT –II

4.Show that the set of all rational numbers form a group under the composition circle defined by a0b = ab/2.

5.prove that the set $G = \{1, 2, 3, 4, 5, 6\}$ is a finite abelian group of order 6 w.r.t. X_{7} .

6. State &Prove the Lagrange's theorem.

UNIT – III

7. State &Prove the Fundamental theorem on Homomorphism.

8. If f is a Homomorphism of a group G into a group G^1 , then Kernel f is a Normal sub group of G.

9.If for a group G,f: $G \rightarrow G$ is given by $f(x) = x^2$, $x \in G$ is a homomorphism ,prove that G is an abelian.

$\mathbf{UNIT} - \mathbf{IV}$

10.Express (1 2 3)(4 5) (1 6 7 8 9) (1 5) as the product of disjoint cycles and find its inverse.

11.State and Prove Cayley's theorem.

12.Show that the group (G = $\{1,2,3,4,5,6\}$, X₇) is cyclic .Also write down all its generators.

D.R.W. AUTONOMOUS COLLEGE: GUDUR

III B.SC, MATHEMATICS, FIFTH SEMESTER

PAPER V - RINGS, FIELDS AND MATRICES

RINGS AND FIELDS

Rings, Integral Domain and Fields: Definition and Basic Properties, Fields, Integral domains, Divisors of zero and Cancellation Laws, Integral domains, The characteristic of a ring, some Non-Commutative Rings, Examples. Boolean Ring.

UNIT-II

Homomorphism of Rings, Maximal and Prime Ideals: Definition of Homomorphism, Definition of Kernel of a Homomorphism, Fundamental theorem of Homomorphism , Maximal and Prime Ideals ,Prime fields.

UNIT-III

Rings of Polynomials: Algebra Polynomials, Degree of Polynomial, Evaluation of Homomorphism. Factorization of Polynomials over a Field, Irreducible Polynomials, Uniqueness of Factorization in F[x].

MATRICES

UNIT-IV

System of Linear Equations: Elementary Transformation on Matrices ,The Rank of a Matrices and Inverse of Matrices by using Elementary operations, System of Homogeneous and Non –Homogeneous Linear Equations .

UNIT-V

Determinants and Diagonalization: Determinants, properties of Determinants (without proofs)

Eigen values and Eigen vectors, Diagonalizability, Cayley - Hamilton theorem, Inverse of Matrices by using Cayley - Hamilton theorem.

Prescribed Textbook:N.Krishna Murthy & others"A text book of B.Sc. Mathematics Vol II & Vol III S.chand & Company, New Delhi

Reference books:

G.Shankar Rao a text book of B.Sc. Mathematics Vol III.Himalaya Publishing House.

D.R.W. AUTONOMOUS COLLEGE :GUDUR

III B.SC, MATHEMATICS

FIFTH SEMESTER

PAPER VI-(A) OPTIONAL

LAPLACE TRANSFORMS AND ITS APPLICATIONS

Definition of Laplace Transforms,Linearity property, piece wise continous function,Existance of Laplace Transforms,function of exponential orders and of class A.Frist and Second shifting theorem of Laplace Transforms,change of scale property.

UNIT - II

Laplace Transforms of derivatives ,Intial value and Final value theorems and Problems,Laplace Transforms of integrals ,Multiplication by t ,division by t,evaluation of integrals transforms of periodic functions , Bessel functions.

UNIT-III

Inverse Laplace Transforms : Definition of Inverse Laplace Transforms, Linearity property, First and Second Shifting theorem of Inverse Laplace Transforms, change of scale property, Division by p, Convolution theorem, Heaviside's expansion formula and applications.

UNIT-IV

Applications of differential equations with constant co-efficients and variable

co-efficients, Partial differential equations

UNIT - V

Applications of Integral equations of Laplace Transforms.

Prescribed Text books:

Scope as in Integral transforms by J.K. Goyal & R.K.Gupta published by Pragathi Prakashan Publishers , Ltd.Meerut.

Reference Book:

Operational Mathematics by R.V.Churchil,McGraw Hill Company.

D.R.W. AUTONOMOUS COLLEGE :GUDUR

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER-VIII(A) OPTIONAL

NUMERICAL ANALYSIS

UNIT-I

Errors in Numerical Computations: Numbers and their Accuracy , Errors and their Computation - Absoulte Relative and percentage errors. A General Error formulae, Error in a series approximation. Fundamental theorem of the difference calculus Properties of two operators E and Δ .

UNIT – II

Interpolation with Equal and Unequal Intervals: Forward Differences, Backward Differences, Newton's divided Differences formula ,Legrange's interpolation formula and problems.

UNIT – III

Central Difference Interpolation Formulae : Gauss's Interpolation formula(Forward formula& Backward formula), .Gauss forward formulae and backward formulae ,.Stirling's central difference formulae ,Bessel's formulae.

UNIT – IV

Solution of Algebraic and Trancendental Equation

The Bisection method, The Method of False Position, Newton-Rapshon method. Generalized Newton's method.

UNIT-V

Linear systems of equations : Solution of linear systems-Direct methods, Matrix inversion method, Method of factorization .Iterative methods:Jacob's method, Gauss-siedal method.

Prescribed text book: Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry,prentice Hall India(4 th Edition),Chapter-1(1.2,1.4,1,1.5,1.6); Chapter-2(2.2-2.7);Chapter-3(3.2,3.3,3.72,3.91,3.92,3.10.1,3.10.2);Chapter-6(6.3.2,6.3.4,6.3.7,6.4);&C aculus of Finite Difference and Numericaql Analysis by P.P.Gupta &G.S.Malik , Krishna Prakashan Media (P)Ltd.Meerut.

Reference books: 1.G.Shankar Rao New Age International Publishers, New-Hyderabad.

2. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

D.R.W. AUTONOMOUS COLLEGE: GUDUR

III B.SC, MATHEMATICS , SIXTH SEMESTER

PAPER VII: LINEAR ALGEBRA

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, Linear sum of two subspaces, Linear independence and dependence of vectors.

UNIT-II

Linear Transformation: Vector space homomorphism, Linear Transformation, Zero

transformation, properties of linear Transformations, Sum of Linear Transformations, Scalar multiplication of a Linear Transformations, Product of Linear Transformations, Transformations as vectors, Range and Null space of a linear Transformation, solved problems.

UNIT-III

Vector space Isomorphism : Definitions of Vector space Isomorphism,Fundamental theorem of homomorphism,Direct sums,Direct sum of two subspaces,Disjoint subspaces,Singular and non-singular transformations,Inverse function,Uniqueness of inverse .

UNIT-IV

Inner product spces: Definition of Inner product spaces,Norm of Length of a vector, Cauchy-Schwartz's inequality,special cases of schwartz's inequality,Triangle inequality,Parallelogram law,Normed vector space and distance,sloved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram-Schmidit Orthogonalisation process, Working method for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "Atext book of B.Sc mathematics Vol III.chand & company, New Delhi.

Reference books:

G.Shankar Rao A text book of mathematics for B.Sc Vol III. Himalaya publishing House.

D.R .W. AUTONOMOUS COLLEGE: GUDUR

6102

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER-VIII (A) OPTIONAL

NUMERICAL ANALYSIS

UNIT-I

Errors in	Numerical	Computations :	Numbers	and	their	Accuracy,	Errors
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their Computation - Absoulte Relative and percentage errors. A General Error formulae, Error in a series approximation, Fundamental theorem of the difference calculus Properties of two operators E and Δ .

UNIT – II

Interpolation with Equal and Unequal Intervals: Forward Differences, Backward Differences, Newton's divided Differences formula ,Legrange's interpolation formula and problems.

UNIT – III

Central Difference Interpolation Formulae : Gauss's Interpolation formula(Forward formula& Backward formula), Gauss forward formulae and backward formulae ,.Stirling's central difference formulae ,Bessel's formulae.

UNIT – IV

Solution of Algebraic and Trancendental Equation

The Bisection method, The Method of False Position, Newton-Rapshon method. GeneralizedNewton'sMethod.

UNIT-V

Linear systems of equations: Solution of linear systems, Direct methods, Matrix inversion method, Method of factorization .Iterative methods, Jacobi's method, Gauss-Siedal method.

Prescribed text book: Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry,prentice Hall India(4 th Edition),Chapter-1(1.2,1.4,1,1.5,1.6); Chapter-2(2.2-2.7);Chapter-3(3.2,3.3,3.72,3.91,3.92,3.10.1,3.10.2);Chapter-6(6.3.2,6.3.4,6.3.7,6.4);&C aculus of Finite Difference and Numerical Analysis by P.P.Gupta &G.S.Malik , Krishna Prakashan Media (P)Ltd.Meerut.

Reference books: 1.G.Shankar Rao New Age International Publishers, New-Hyderabad.

2. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

D.R.W. AUTONOMOUS COLLEGE: GUDUR

6101

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER VII: LINEAR ALGEBRA

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, linear sum of two subspaces, Linear independence and

dependence of vectors.

UNIT-II

Linear Transformation: Vector space homomorphism, Linear Transformation, Zero transformation, properties of linear Transformations,Sum of Linear Transformations,Scalar multiplication of a Linear Transformations,Product of Linear Transformations, Range and Null space of a linear Transformation,solved problems.

UNIT-III

Vector space Isomorphism : Definition of Vector space Isomorphism,Fundamental theorem of homomorphism,Direct sums,Direct sum of two subspaces,Disjoint subspaces,Singular and non-singular transformations,Inverse function,Uniqueness of inverse .

UNIT-IV

Inner product spaces: Definition of Inner product spaces, Norm of Length of a vector, Cauchy-Schwartz's inequality, special cases of Schwartz's inequality, Triangle inequality, Parallelogram law,Normed vector space and distance, solved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram-Schmidit Orthogonalisation process, Working method for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "A text book of B.Sc mathematics Vol III S.Chand & company, New Delhi.

Reference books:

G.Shankar Rao A text book of mathematics for B.Sc Vol III. Himalaya publishing House

D.R.W. AUTONOMOUS COLLEGE: GUDUR 1110

I B.SC, MATHEMATICS, FIRST SEMESTER

PAPER I – Differential Equations

(With effect from 2015-2016)

UNIT – I: Differential equations of first order and first degree: Introduction, Homogeneous functions, Homogeneous differential equations, Equations reducible to homogeneous form, Exact differential equations, Orthogonal trajectories.

UNIT-II: Integrating factors: Equations reducible to exact form, Definition-Methods of find integrating factors of Mdx+ Ndy=0; Linear Differential Equations; Bernouli's equation; Change of variables Simultaneous differential equations.

UNIT-III: Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x Equation that do not contain x (or y); Equations of the degree in x and y-Clairaut's equation.

UNIT-IV: Higher order linear differential equations: Solutions of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators, Method of undetermined coefficients: method of variation of parameters.

UNIT -V: Partial Differential equations: Formation of partial differential

equations-Equation of first order – Lagranges Linear equation- Charpit's method-standard types of first order non linear partial differential equations.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, New Delhi.

Reference Books:

- 1. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- 2. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- **3.** G.Shankar Rao" A text book of Mathematics for B.Sc Vol I, Himalaya Publishing House.
- 4. Differential equations with applications and programs- S.Balachandra Rao & H.R.Anuradha, universities press.

D.R .W. AUTONOMOUS COLLEGE: GUDUR 2210 I B.SC, MATHEMATICS SECOND SEMESTER

PAPER II - Solid Geometry

(With effect from 2015-2016)

UNIT-I: The plane: Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT-II: The Lines: Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines.

UNIT-III: Sphere -I: Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle

UNIT -IV: Sphere -II: Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal, Radical plane. Coaxical system of spheres, Limiting points.

UNIT-V: Cone& Cylinder: Definitions of a cone, vertex, Quadric cones with vertex at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone.

Definitions, Elliptic cylinder, Hyperbolic, Parabolic, cylinder with base guiding curve, Equation of a cylinder, the right circular cylinder, Enveloping cylinder.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, S.Chand & Company, and New Delhi.

Reference Books:

1. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II,

Deepthi Publication.

- 2. V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year second semester, S.Chand & Company, New Delhi.
- **3.** P.K Jain and Khallel Ahmed, "A text book of Analytical Geometry of Three Dimentions" Wiley Eastern Ltd., 1999.

I B.Sc Mathematics Examination Question Paper Pattern

(With Effect from 2015 – 2016)

Time: 3hrs

Max.70 Marks

PART-A

Answer any FIVE out of EIGHT questions. 5x4 = 20M

Each question carries **4** marks.

PART-B

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

MODEL PAPER

B.Sc. I Year Degree Examinations – 2015

I Semester - Part – II: Mathematics

PAPER – I: DIFFERENTIAL EQUATIONS

Time: 3 Hours

Max.Marks: 70 marks

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

1. Solve: $= + \tan$.

- 2. Solve: $(1+e^{x/y}) dx + e^{x/y} (1-) dy = 0$.
- 3. Solve: $(1+y^2) dx = (\tan^{-1}y x) dy$.
- 4. Solve: .
- 5. Solve: (y-xp)(p-1) = p.
- 6. Solve: $(D^2-5D+6) y = xe^{4x}$.
- 7. Solve: $(D^2+1) y = Secx$.

8. Solve: Form a partial differential equation by eliminating the arbitrary functions form: $z = f(x^2+y^2)$.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

9. Solve: (x+y-1) = (x-y+2).

10. Show that the family of Confocal conics + = 1 is self orthogonal, where is parameter.

<u>UNIT-II</u>

11. Solve: $x^2y dx - (x^3+y^3) dy = 0$.

12. Solve: $(y^4+2y) dx + (xy^3+2y^4+4x) dy=0$.

<u>UNIT-III</u>

13. Solve: $y^2 \log y = xpy + p^2$.

14. Solve: p²+2pycotx=y², where p= ·

UNIT-IV

15. Solve: (D²+4) y=+sin2x+cos3x.

16. Solve: $(D^2-2D+2) y=e^x \tan x$.

UNIT-V

17. (a). Solve: px+qy=z.

(b). Solve: $z=p^2+q^2$.

18. Find the complete integral of the equation $p^2x+q^2y=z$ by Charpit's method.

MODEL PAPER

2210

B.Sc. I Year Degree Examinations – 2015 II Semester - Part – II: Mathematics

PAPER – II: SOLID GEOMETRY

Time: 3 Hours

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

- 1. Find the equation of plane through (4, 4, 0) and perpendicular to the planes x+2y+2z= 5 and 3x+3y+2z-8= 0.
- 2. Find the equation of the planes through the intersection of the planes x+3y+6=0 and 3x-y-4z=0 s.t. the perpendicular distances of each from the origin is unity.
- 3. Find the image of the point (2, -1, 3) in the plane 3x-2y+z=9.
- 4. Find the equation of plane through z-axis and is perpendicular to the line z-7=0.
- 5. Find the centre and radius of the sphere $x^2+y^2+z^2-6x+2y-4z+14=0$.
- 6. Find the equation of the tangent plane to the sphere $x^2+y^2+z^2-2x-4y+2z-3=0$ at (-1, 4, -2).
- 7. Find the enveloping cone of the sphere x²+y²+z²+2x-2y-2=0 with its vertex at (1, 1, 1).
- 8. Find the equation to the right circular cylinder whose axis is x=2y=-z and having the radius 4.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

(P.T.O)

<u>UNIT-I</u>

- 9. Determine the planes through the intersection of the planes 2x+3y-z+4=0, x+y+z-1=0 and which are parallel to the co-ordinate axes.
- 10. A variable plane at a constant distance p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of the tetrahedron OABC is $x^{-2}+y^{-2}+z^2=16p^{-2}$.

<u>UNIT-II</u>

- 11. Prove that the lines and x+2y+3z-8=0=2x+3y+4z-11 are intersecting and find the point of their intersection. Find also the equation to the plane containing them.
- 12. Find the S.D between the lines find also the equation and the points in which the S.D meets the given lines.

UNIT-III

- 13. Find the equation of the sphere through the points (1, 0, 0), (0, 1, 0), (0, 0, 1) and having the least radius.
- 14. Find the equation of the sphere if the circle is $x^2+y^2+z^2=9$, x-2y+2z-5=0 is great circle and also find its centre and radius.

UNIT-IV

- 15. Show that the plane 2x-2y+z=12=0 touches the sphere x²+y²+z²-2x-4y+2z-3=0 and find the point of contact.
- 16. Find the limiting points of the coaxial system defined by the spheres $x^2+y^2+z^2+4x+2y+2z+6=0$ and $x^2+y^2+z^2+2x-4y-2z+6=0$.

<u>UNIT-V</u>

- 17. Find the vertex of the cone $7x^2+2y^2+2z^2-10zx+10xy+26x-2y+2z-17=0$.
- 18. Find the equation of the enveloping cylinder of the sphere x²+y²+z²-2x+4y-1=0 having its generators parallel to the line x=y=z.

310

D.R.W. AUTONOMOUS COLLEGE: GUDUR

II B.Sc, MATHEMATICS, THIRD SEMESTER

PAPER III: REAL ANALYSIS

(With effect from 2015-2016)

UNIT-I: Sequences and Series:-

Sequences: Definition of sequences and sub sequences, Range and Boundedness of sequences,

Definitions of convergent and divergent, limit point of a sequence and theorems, Bolzano –weier strass theorem, monotone subsequence theorem.

Series: Introduction to series, convergens of series, Cauchy's general principle for convergence (Cauchy's criterion theorem), series of non negative terms (p-test, Cauchy's nth root test, D'Alembert's test (or) ratio test).

UNIT-II: **Limits and Continuity**: Definitions of Limit of a function, Left hand limit and Right hand limit, Continuity of a function at a point, Left hand Continuity, Right hand Continuity, Sequence Criterion (or) Heine's Theorem, Discontinuity, Types of Discontinuity, Problems on Continuity and Discontinuity. Properties of Continuous function on a closed interval, Borel's Theorem, Every continuous function is bounded, Absolute Maximum –Minimum Theorem, Intermediate Value Theorem, Uniform continuity (problems & theorems).

UNIT-III: Differentiation: The derivative, The Mean Value theorems, Rolle's Theorem, Lagrange's theorem, Cauchy's theorem and their Applications. Taylor's Theorem with Lagrange's form of remainder, Taylor's theorem with Cauchy's form of remainder, Maclaurin's theorem, Taylor's and Maclaurin's series. $(e^x, sinx, cosx, log(1+x))$.

UNIT-IV: **Riemann Integration:** Partition of a closed interval, upper and lower Riemann Sums. Upper and lower Riemann integrals. Definition of Riemann Integrable Functions, Darboux theorem, Necessary and sufficient condition for integrability, properties of Riemann Integrable, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value theorem, First mean value theorem and their problems.

Prescribed Textbook: N.Krishna Murthy &Others''A text book of B.Sc. Mathematics Volume-II, S.Chand & Company, New Delhi''.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

D.R.W. AUTONOMOUS COLLEGE: GUDUR 410

II B.SC, MATHEMATICS, FOURTH SEMESTER

PAPER IV: ABSTRACT ALGEBRA

(With effect from 2015-2016)

UNIT-I

Number Theory: Elements of Number Theory: prime and composite numbers, Definition of Euclid's division Algorithm & Divisibility, Fundamental Theorem on arithmetic, Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation, Congruence, linear Congruence problems,

Euler's function definition, Theorem of Fermat's and Wilson .

UNIT -II Groups: Binary operators: Definition and properties, Composition Tables, Elementary properties, Finite Group and Group Composition Tables.

Subgroups: definition of subgroups, their intersection and union theorems, properties of Cosets and Lagranges Theorem

UNIT-III

Normal Sub groups: Definition of a Normal sub group, Simple groups, Quotient groups (or) Factor groups. Definitions of Homomorphism, Isomorphism and Automorphism, Properties of Homomorphism, Fundamental theorem on Homomorphism of groups. Definition of Inner and outer automorphisms of a group, Kernel f, Kernel of normal sub groups.

UNIT-IV

Permutation Groups: Definitions of Permutation Even and Odd permutation. Orbits and cycles of permutation, Disjoint Cycles, even and Odd permutation problems, Inverse permutation, Cayley's theorem.

Cyclic Groups: Definition of cyclic group, Classification of cyclic groups, Order of the cyclic group problems, Find the number of generators problems.

Prescribed Textbook

N.Krishna Murthy & others "A text book of Mathematics for B.Sc Volume-II, S.Chand & Company, New Delhi.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

II B.Sc DEGREE EXAMINATIONS 310

BRANCH: MATHEMATICS - III SEMESTER

PAPER III – REAL ANALYSIS

Time: 3 Hours Max Marks: 70

Answer any 7 questions out of 12 questions,

Choosing at least one question from each unit. Each question carries 10 marks.

UNIT –I

- 1. State and prove Monotone subsequence theorem.
- 2. Using cauchy's principle prove that is divergent.
- 3. State and prove Ratio test

UNIT –II

- 4. Discuss the continuity of f(x) = at f(0) = 0.
- 5. State and prove Borel's theorem.
- 6. State and prove intermediate value theorem.

UNIT –III

- 7. State and prove Rolle's Theorem.
- 8. Using Lagrange's theorem, Show that $x > \log(1+x) >$
- 9. Using Maclaurin's theorem, Show that $e^x \sin x = x + x^2 + x^3/3 x^5/30 + \dots$

UNIT IV

- 10. Define Oscillatory sum and find W (P,f) if $f = x^3$ on [0,1] and $P = \{0, 1/4, 2/4, 3/4\}$.
- 11. State and prove Darboux's theorem.
- 12. By considering the interval dx and find the value of log 2.

II B.Sc DEGREE EXAMINATIONS 410

BRANCH: MATHEMATICS – IV SEMESTER

Paper IV - ABSTRACT ALGEBRA

Time: 3 Hours Max Marks: 70

Answer any 7 questions out of 12 questions,

Choosing at least One question from each unit. Each question carries 10 marks.

UNIT –I

1. State &Prove the Fundamental theorem of Arithmetic.

2. Find L.C.M &G.C.D of 5040,14850 by using canonical form.

3. State &Prove the Wilson's theorem

UNIT –II

4. Show that the set of all rational numbers form a group under the composition circle defined by a0b = ab/2.

5.prove that the set $G = \{1, 2, 3, 4, 5, 6\}$ is a finite abelian group of order 6 w.r.t. X_{7} .

6. State &Prove the Lagrange's theorem.

UNIT – III

7. State &Prove the Fundamental theorem on Homomorphism.

8. If f is a Homomorphism of a group G into a group G^1 , then Kernel f is a Normal sub group of G.

9. If for a group G,f: $G \rightarrow G$ is given by $f(x) = x^2$, $x \in G$ is a homomorphism ,prove that G is an abelian.

$\mathbf{UNIT} - \mathbf{IV}$

10.Express (1 2 3)(4 5) (1 6 7 8 9) (1 5) as the product of disjoint cycles and find its inverse.

11.State and Prove Cayley's theorem.

12.Show that the group ($G = \{1, 2, 3, 4, 5, 6\}$, X₇) is cyclic .Also write down all its generators.

D.R .W. AUTONOMOUS COLLEGE: GUDUR III B.SC, MATHEMATICS ,FIFTH SEMESTER PAPER V - RINGS, FIELDS AND MATRICES

RINGS AND FIELDS

UNIT - I

Rings, Integral Domain and Fields: Definition and Basic Properties, Fields, Integral domains, Divisors of zero and Cancellation Laws, Integral domains, The characteristic of a ring, some Non-Commutative Rings, Examples. Boolean Ring.

UNIT-II

Homomorphism of Rings, Maximal and Prime Ideals: Definition of Homomorphism, Definition of Kernel of a Homomorphism, Fundamental theorem of Homomorphism , Maximal and Prime Ideals , Prime fields.

UNIT-III

Rings of Polynomials: Algebra Polynomials, Degree of Polynomial, Evaluation of Homomorphism. Factorization of Polynomials over a Field, Irreducible Polynomials, Uniqueness of Factorization in F[x].

MATRICES

UNIT-IV

System of Linear Equations: Elementary Transformation on Matrices ,The Rank of a Matrices and Inverse of Matrices by using Elementary operations, System of Homogeneous and Non –Homogeneous Linear Equations .

UNIT-V

Determinants and Diagonalization: Determinants, properties of Determinants (without proofs)

Eigen values and Eigen vectors, Diagonalizability, Cayley - Hamilton theorem, Inverse of Matrices by using Cayley - Hamilton theorem.

Prescribed Textbook:N.Krishna Murthy & others"A text book of B.Sc. Mathematics Vol II & Vol III S.chand & Company, New Delhi

Reference books:

G.Shankar Rao a text book of B.Sc. Mathematics Vol III.Himalaya Publishing House.

D.R.W. AUTONOMOUS COLLEGE: GUDUR

III B.SC, MATHEMATICS - FIFTH SEMESTER

PAPER VI-(A) OPTIONAL

LAPLACE TRANSFORMS AND ITS APPLICATIONS

UNIT-I

Definition of Laplace Transforms,Linearity property, piece wise continous function,Existance of Laplace Transforms,function of exponential orders and of class A.Frist and Second shifting theorem of Laplace Transforms,change of scale property.

UNIT - II

Laplace Transforms of derivatives ,Intial value and Final value theorems and Problems,Laplace Transforms of integrals ,Multiplication by t ,division by t,evaluation of integrals transforms of periodic functions , Bessel functions.

UNIT-III

Inverse Laplace Transforms : Definition of Inverse Laplace Transforms, Linearity property, First and Second Shifting theorem of Inverse Laplace Transforms, change of scale property, Division by p, Convolution theorem, Heaviside's expansion formula and applications.

UNIT-IV

Applications of differential equations with constant co-efficients and variable

co-efficients, Partial differential equations

UNIT - V

Applications of Integral equations of Laplace Transforms.

Prescribed Text books:

Scope as in Integral transforms by J.K. Goyal & R.K.Gupta published by Pragathi Prakashan Publishers , Ltd.Meerut.

Reference Book:

Operational Mathematics by R.V.Churchil,McGraw Hill Company.

D.R.W. AUTONOMOUS COLLEGE :GUDUR

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER-VIII(A) OPTIONAL

NUMERICAL ANALYSIS

UNIT-I

Errors in Numerical Computations: Numbers and their Accuracy , Errors and their Computation - Absoulte Relative and percentage errors. A General Error formulae, Error in a series approximation. Fundamental theorem of the difference calculus Properties of two operators E and Δ .

UNIT – II

Interpolation with Equal and Unequal Intervals: Forward Differences, Backward Differences, Newton's

divided Differences formula ,Legrange's interpolation formula and problems.

UNIT – III

Central Difference Interpolation Formulae : Gauss's Interpolation formula(Forward formula& Backward formula), .Gauss forward formulae and backward formulae ,.Stirling's central difference formulae ,Bessel's formulae.

UNIT – IV

Solution of Algebraic and Trancendental Equation

The Bisection method, The Method of False Position, Newton-Rapshon method. Generalized Newton's method.

UNIT-V

Linear systems of equations : Solution of linear systems-Direct methods, Matrix inversion method, Method of factorization .Iterative methods: Jacob's method, Gauss-siedal method.

Prescribed text book: Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry,prentice Hall India(4 th Edition),Chapter-1(1.2,1.4,1,1.5,1.6); Chapter-2(2.2-2.7);Chapter-3(3.2,3.3,3.72,3.91,3.92,3.10.1,3.10.2);Chapter-6(6.3.2,6.3.4,6.3.7,6.4);&C aculus of Finite Difference and Numericaql Analysis by P.P.Gupta &G.S.Malik , Krishna Prakashan Media (P)Ltd.Meerut.

Reference books: 1.G.Shankar Rao New Age International Publishers, New-Hyderabad.

2. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

D.R.W. AUTONOMOUS COLLEGE: GUDUR

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER VII: LINEAR ALGEBRA

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, Linear sum of two subspaces, Linear independence and dependence of vectors.

UNIT-II

Linear Transformation: Vector space homomorphism,Linear Transformation,Zero transformation,properties of linear Transformations,Sum of Linear Transformations,Scalar

multiplication of a Linear Transformations, Product of Linear Transformations, Transformations as vectors, Range and Null space of a linear Transformation, solved problems.

UNIT-III

Vector space Isomorphism : Definitions of Vector space Isomorphism,Fundamental theorem of homomorphism,Direct sums,Direct sum of two subspaces,Disjoint subspaces,Singular and non-singular transformations,Inverse function,Uniqueness of inverse .

UNIT-IV

Inner product spces: Definition of Inner product spaces,Norm of Length of a vector, Cauchy-Schwartz's inequality,special cases of schwartz's inequality,Triangle inequality,Parallelogram law,Normed vector space and distance,sloved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram-Schmidit Orthogonalisation process, Working method for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "Atext book of B.Sc mathematics Vol III.chand & company, New Delhi.

Reference books:

G.Shankar Rao A text book of mathematics for B.Sc Vol III. Himalaya publishing House.

Model Question Paper pattern

B.Sc First Year Examination

I &II Semester – Mathematics – Paper - II

(With Effect from 2014 – 2015)

Time: 3hrs

Max.70marks

Answer any 7 questions out of 12 questions. choosing at least one question from each unit

(Each question carries 10 Marks)

B.Sc First Year Practical Examination

Question Paper Model

(With Effect From 2014 – 2015)

Time: 3hrs

Max.50M

Answer any **5** questions out of **8** questions Each question carries **6** Marks 5X6 = 30M

For record

= 10 marks

For Viva-Voce

Total Marks

= 50 Marks

= 10 marks

D.R.W. AUTONOMOUS COLLEGE: GUDUR 1110

I B.SC, MATHEMATICS, FIRST SEMESTER

PAPER I – Differential Equations

(With effect from 2016-2017)

UNIT – I: Differential equations of first order and first degree: Linear Differential equations, Differential equations reduced to Linear form, Exact differential equations, Integrating factors, Change of Variables, Orthogonal trajectories.

UNIT-II: Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x ,Equation that do not contain x (or y); Equations of the first degree in x and y- Clairaut's equation.

UNIT-III: Higher order linear differential equations - I: Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D)y = Q when Q is a function of x

is Expressed as partial fractions.

P.I of f(D)y = Q when Q = b

P.I of f(D)y = Q when Q is b or b

UNIT - IV Higher order Linear Differential Equations - II:

Solution of the non homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q = b

P.I. of f(D)y = Q when Q = V

P.I. of f(D)y = Q when Q = xV

P.I. of f(D)y = Q when Q =

UNIT – V Higher order Linear Differential Equations – III:

Method of variation of parameters, Linear differential equations with non constant coefficients, the Cauchy - Euler equation

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester ,S.Chand & Company, and New Delhi.

Reference Books:

- 1. Differential equations and their applications by Jafar Ashan ,Published by prentice –Hall of India Learning Pvt.Ltd New Delhi Second edition.
- 2. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- **3.** Ordinary and partial differential equations Raisinghania published by S.Chand & Company, New Delhi
- **4.** Differential equations with applications and programs S.Balachandra Rao & HR Anuradha universities press.

I B.Sc Mathematics Examination Question Paper Pattern

Time: 3hrs

Max.70 Marks

PART-A

Answer any FIVE out of EIGHT questions. 5x4 = 20M

Each question carries **4** marks.

<u>PART-B</u>

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.
B.Sc. I Year Degree Examinations – 2016

I Semester – Branch : Mathematics

PAPER – I: DIFFERENTIAL EQUATIONS

Time: 3 Hours

Max.Marks: 70 marks

is

<u>PART-A</u>

Answer any FIVE out of EIGHT Questions. 5x4=20M

Each question carries 4 marks.

1.Solve: $x^2y dx - (x^3+y^3) dy = 0$.

2. Solve: .

3. Solve: $(1+y^2) dx = (\tan^{-1}y - x) dy$.

4.Solve: +6 - 4D + 1) y = 0.

5.Solve : - =

6.Solve: (D²-5D+6) $y = e^{4x}$.

7. Solve: $(D^2+1) y=$.

8. Solve : Solve : (by the method of variation of parameter.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

9. Solve: =

10. Show that the family of Confocal conics + = 1 is self orthogonal, where parameter.

UNIT-II

11. Solve: $y^2 \log y = xpy + p^2$

12. Solve : p²+2pycotx=y², where p=

<u>UNIT-III</u>

13. Solve: $(D^2+4) y = +\sin 2x + \cos 3x$.

14. Solve : (-4D + 3) y =

UNIT-IV

15. Solve: $(D^2-2D+2) y=e^x \tan x$.

16.Solve : (- 4D +4) y =

<u>UNIT-V</u>

17.Solve : +3x

18.Solve : (+2xD - 20)y =

I B.SC, MATHEMATICS, SECOND SEMESTER

PAPER II - Solid Geometry

(With effect from 2016-2017)

UNIT-I: The plane: Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes, Combined equation

of two planes, Orthogonal projection on a plane.

UNIT-II: The Lines: Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines.

UNIT-III: Sphere -I: Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle

UNIT -IV: Sphere -II: Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal, Radical plane. Coaxical system of spheres, Limiting points.

UNIT-V: Cone& Cylinder: Definitions of a cone, vertex, Quadric cones with vertex at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone.

Definitions, Elliptic cylinder, Hyperbolic, Parabolic, cylinder with base guiding curve, Equation of a cylinder, the right circular cylinder, Enveloping cylinder.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, S.Chand & Company, and New Delhi.

Reference Books:

- 1. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 2. V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year second semester, S.Chand & Company, New Delhi.
- **3.** P.K Jain and Khallel Ahmed, "A text book of Analytical Geometry of Three Dimentions" Wiley Eastern Ltd., 1999.

PART-A

Answer any FIVE out of EIGHT questions. 5x4 = 20M

Each question carries 4 marks.

<u>PART-B</u>

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

MODEL PAPER

2210

B.Sc. I Year Degree Examinations – 2015

II Semester - Part - II: Mathematics

PAPER – II: SOLID GEOMETRY

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

- 1. Find the equation of plane through (4, 4, 0) and perpendicular to the planes x+2y+2z= 5 and 3x+3y+2z-8= 0.
- 2. Find the equation of the planes through the intersection of the planes x+3y+6=0 and 3x-y-4z=0 s.t. the perpendicular distances of each from the origin is unity.
- 3. Find the image of the point (2, -1, 3) in the plane 3x-2y+z=9.
- 4. Find the equation of plane through z-axis and is perpendicular to the line z-7=0.
- 5. Find the centre and radius of the sphere $x^2+y^2+z^2-6x+2y-4z+14=0$.
- 6. Find the equation of the tangent plane to the sphere $x^2+y^2+z^2-2x-4y+2z-3=0$ at (-1, 4, -2).
- 7. Find the enveloping cone of the sphere $x^2+y^2+z^2+2x-2y-2=0$ with its vertex at (1, 1, 1).
- Find the equation to the right circular cylinder whose axis is x=2y=-z and having the radius 4.

PART-B 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

(P.T.O)

<u>UNIT-I</u>

- 9. Determine the planes through the intersection of the planes 2x+3y-z+4=0, x+y+z-1=0 and which are parallel to the co-ordinate axes.
- 10. A variable plane at a constant distance p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of the tetrahedron OABC is x⁻²+y⁻²+z²=16p⁻².

UNIT-II

- 11. Prove that the lines and x+2y+3z-8=0=2x+3y+4z-11 are intersecting and find the point of their intersection. Find also the equation to the plane containing them.
- 12. Find the S.D between the lines find also the equation and the points in which the S.D meets the given lines.

UNIT-III

- 13. Find the equation of the sphere through the points (1, 0, 0), (0, 1, 0), (0, 0, 1) and having the least radius.
- 14. Find the equation of the sphere if the circle is $x^2+y^2+z^2=9$, x-2y+2z-5=0 is great circle and

also find its centre and radius.

UNIT-IV

- 15. Show that the plane 2x-2y+z=12=0 touches the sphere x²+y²+z²-2x-4y+2z-3=0 and find the point of contact.
- 16. Find the limiting points of the coaxial system defined by the spheres $x^2+y^2+z^2+4x+2y+2z+6=0$ and $x^2+y^2+z^2+2x-4y-2z+6=0$.

UNIT-V

- 17. Find the vertex of the cone $7x^2+2y^2+2z^2-10zx+10xy+26x-2y+2z-17=0$.
- 18. Find the equation of the enveloping cylinder of the sphere x²+y²+z²-2x+4y-1=0 having its generators parallel to the line x=y=z.

D.R.W. AUTONOMOUS COLLEGE: GUDUR

II B.Sc, MATHEMATICS, THIRD SEMESTER

PAPER III: REAL ANALYSIS (With effect from 2016-2017)

UNIT - I: **REAL NUMBERS**: The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Definition of Sequences, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence, properly divergent sequences, Definition of Monotone

sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchey's general principle of convergence theorem.

Series : Introduction to series, convergence of series. Cauchey's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

- 1. P-test
- 2. Cauchey"s nth root test or Root Test.
- 3. D"-Alemberts" Test or Ratio Test.
- 4. Alternating Series Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III : CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion. *Continuous functions* : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV : DIFFERENTIATION AND MEAN VALUE THEORMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchhy's Mean value Theorem

UNIT - V (12 hrs) : RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First Mean value Theorem.

Prescribed Textbook:N.Krishna Murthy &Others"A text book of B.Sc.MathematicsVol -II,(old book) S.Chand & Company, New Delhi".

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

II B.Sc Mathematics Examination Question Paper Pattern

(With Effect from 2016 – 2017)

Time: 3hrs

Max.70 Marks

PART-A

Answer any FIVE out of EIGHT questions. 5x4 = 20M

Each question carries 4 marks.

PART-B

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

II B.Sc DEGREE EXAMINATIONS - 2016

BRANCH: MATHEMATICS - III SEMESTER

PAPER III – REAL ANALYSIS

Time: 3 Hours Max Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. carries 4 marks

5x4=20M Each question

1. Every bounded sequence has at least one limit point.

2. Using Cauchy's principle prove that is divergent.

3. Prove that is not convergent.

4.Discuss the continuity of $f(x) = \cos(1/x)$ if x and f(x) = 0 if x = 0 at the point x = 0.

5. Prove that f(x) = and f(o) is continuity at x = 0.

6.Discuss the derivability f(x) = -1 if x f(x) = 1 - x, if x < 1

7.Prove that where K

8.Show that

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

UNIT –I

9. State and prove Monotone subsequence theorem.

10.State and Prove Bolzano Weierstrass theorem for sequence

UNIT –II

11.State and Prove P-test

12.State and prove D'Alembert's ratio test

UNIT –III

13. Discuss the continuity of f(x) = -if x f(0) = 0 at the origin.

14. State and prove intermediate value theorem.

UNIT –IV

15. State and prove Rolle's Theorem.

16. Using Lagrange's theorem, Show that $x > \log(1+x) >$

UNIT V

17. Define Oscillatory sum and find W (P,f) if $f = x^3$ on [0,1] and $P = \{0, 1/4, 2/4, 3/4\}$.

18. State and prove Darboux's theorem.

D.R.W. AUTONOMOUS COLLEGE: GUDUR

II B.SC, MATHEMATICS, FOURTH SEMESTER

PAPER IV: ABSTRACT ALGEBRA

(With effect from 2016-2017)

UNIT-I: Number Theory

Elements of Number Theory - prime and composite numbers- Definition of Euclid's division Algorithm & Divisibility - Fundamental Theorem on arithmetic - Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation-Congruence,linear Congruence problems -Euler's function definition - Theorem of Fermat's and Wilson .

UNIT – II : Groups and Subgroups

Groups: Binary operation-Algebraic structure- Semi group –Definition of Monoid - Group definition and Elementary properties- Order of a Group - Composition Tables with examples.

Subgroups: Complex definition – multiplication of two complexes inverse of a complex-Definition of subgroup-examples-criterion for a complex to be a sub groups-Criterion for the product of two subgroups to be a subgroup-union and intersection of subgroups.

UNIT-III: Cosets and lagranges theorem&Normal subgroups

Cosets and lagranges theorem: Cosets definition – properties of cosets- Index of a subgroups of a finite groups-Lagrange's theorem

Normal Sub groups: Definition of Normal sub group - Simple groups- Quotient groups (or) Factor groups.

UNIT-IV Homomorphism

Definitions of Homomorphism - Isomorphism and Automorphism - Properties of Homomorphism-Fundamental theorem on Homomorphism of groups - Definition of Inner and outer Automorphisms of a group, Kernel of a homomorphism .

UNIT-V Permutation Groups& Cyclic Groups

Permutation Groups: Definitions of Permutation - Orbits and cycles of permutation, Disjoint Cycles, Even and Odd permutation problems, Inverse permutation, Cayley's theorem.

Cyclic Groups: Definition of cyclic group - Classification of cyclic groups - Order of the cyclic group problems - Find the number of generators problems.

Prescribed Textbook

N.Krishna Murthy & others "A text book of Mathematics for B.Sc Volume-II, S.Chand & Company, New Delhi.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

II B.Sc DEGREE EXAMINATIONS 4410

BRANCH: MATHEMATICS – IV SEMESTER

Paper IV - ABSTRACT ALGEBRA

Time: 3 Hours Max Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

1.Find L.C.M & G.C.D of 5040 by using canonical form.

2.If p is a prime and a,b then $p|ab \Rightarrow p|a \text{ or } p|b$

3. If a,b are any two elements of a group (G, .) which commutate such that

- i) and b are commutate
- ii) and are commutate. and are commutate.

4) If H is any group of G then = H

5) If a,b are any two elements of a group (G) and H any sub group of G then Ha = Hb <=> a and = b

6) If G is a group and H is a sub group of index 2 in G then H is a normal subgroup of G

7) If H and K are two sub groups of a group G then HK is a sub group of G iff HK = KH

8) If f = (25 4) (1 4 3) (2 1) find the disjoint cycles and find inverse of its cycle.

PART-B5x10=50MAnswer any FIVE Questions, Choosing at least ONE Question from each unit. Each
Question carries 10 marks.

UNIT –I

9. State &Prove the Fundamental theorem of Arithmetic.

10. State & Prove the Wilson's theorem

UNIT –II

11. Show that the set of all rational numbers form a group under the composition circle defined by

12. If and are two subgroups of G then is also a sub group of G

UNIT – III

13. State &Prove the Lagrange's theorem.

14. A sub group H of G is normal sub group of G iff each left coset of H in G is a right coset of H in G .

UNIT – IV

15. State &Prove the Fundamental theorem on Homomorphism.

16. If f is a homomorphism of a group G into a group G then the kernel of f is a normal sub group of G.

UNIT – V

17. State and Prove Cayley's theorem.

18. Every sub group of a cyclic group is a cyclic.

II B.Sc Mathematics Examination Question Paper Pattern

(With Effect from 2016 – 2017)

Time: 3hrs

Max.70 Marks

<u>PART-A</u>

Answer any **FIVE** out of **EIGHT** questions.

5x4 =20M

Each question carries **4** marks.

PART-B

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

D.R .W. AUTONOMOUS COLLEGE: GUDUR III B.SC, MATHEMATICS, FIFTH SEMESTER PAPER V - RINGS, FIELDS AND MATRICES

RINGS AND FIELDS

UNIT - I

Rings, Integral Domain and Fields: Definition and Basic Properties, Fields, Integral domains, Divisors of zero and Cancellation Laws, Integral domains, The characteristic of a ring, some Non-Commutative Rings, Examples. Boolean Ring.

UNIT-II

Homomorphism of Rings, Maximal and Prime Ideals: Definition of Homomorphism, Definition of Kernel of a Homomorphism, Fundamental theorem of Homomorphism , Maximal and Prime Ideals ,Prime fields.

UNIT-III

Rings of Polynomials: Algebra Polynomials, Degree of Polynomial, Evaluation of Homomorphism. Factorization of Polynomials over a Field, Irreducible Polynomials, Uniqueness of Factorization in F[x].

MATRICES

UNIT-IV

System of Linear Equations: Elementary Transformation on Matrices ,The Rank of a Matrices and Inverse of Matrices by using Elementary operations, System of Homogeneous and Non –Homogeneous Linear Equations .

Determinants and Diagonalization:Determinants, properties of Determinants (without proofs),Eigen values and Eigen vectors, Diagonalizability,Cayley - Hamilton theorem , Inverse of Matrices by using Cayley - Hamilton theorem.

Prescribed Textbook:N.Krishna Murthy & others"A text book of B.Sc. Mathematics Vol II & Vol III S.chand & Company, New Delhi.

Reference books:G.Shankar Rao a text book of B.Sc. Mathematics Vol III.Himalaya Publishing House.

D.R.W. AUTONOMOUS COLLEGE: GUDUR

III B.SC, MATHEMATICS, FIFTH SEMESTER

PAPER VI-(A) OPTIONAL

LAPLACE TRANSFORMS AND ITS APPLICATIONS

UNIT-I

Definition of Laplace Transforms, Linearity property, piece wise continous function, Existance of Laplace Transforms, function of exponential orders and function of class A, Frist and Second shifting theorems of Laplace Transforms, change of scale property.

UNIT - II

Laplace Transforms of derivatives ,Intial value and Final value theorems and Problems,Laplace Transforms of integrals ,Multiplication by t ,division by t,evaluation of integrals transforms of periodic functions , Bessel functions.

UNIT-III

Inverse Laplace Transforms : Definition of Inverse Laplace Transforms, Linearity property, First and Second Shifting theorem of Inverse Laplace Transforms, change of scale property, Division by p, Convolution theorem, Heaviside's expansion formula and applications.

UNIT - IV

Applications of Laplace Transforms

Applications of differential equations with constant co-efficients and variable

co-efficients, Partial differential equations, Applications of Integral equations of Laplace Transforms.

Prescribed Text books:

Scope as in Integral transforms by J.K. Goyal & R.K.Gupta published by Pragathi Prakashan Publishers , Ltd.Meerut.

Reference Book:

Operational Mathematics by R.V.Churchil,McGraw Hill Company.

Model Question Paper Pattern

B.Sc Third Year Examination

V Semester : Mathematics Model Question Paper Pattern

Time: 3hrs

Max.70marks

Answer any 7 questions out of 12 questions. choosing at least <u>one</u> question from each unit

(Each question carries **10** Marks)

DRW COLLEGE (AUTONOMOUS) :: GUDUR - 2016

III B.SC, MATHEMATICS, FIFTH SEMESTER

PAPER- V: RINGS, FIELDS&MATRICES

Time: 3 hrs

Max.Marks: 70 marks

PART-A

Answer any SEVEN Questions7x10=70Mchoosing at least ONE questions from each unit. Each question carries 10 marks

UNIT-I

1. Every finite Integral domain is a field

2. P.T [Q] = { a+b/a,b is a field with respect to addition to ordinary addition and multiplication of numbers .

3. If R is a Boolean ring then (i) a + a = 0 (ii) $a + b = 0 \Rightarrow a = b$

(iii) R is a Commutative under multiplication.

UNIT-II

4. The Homomorphic image of a ring is a ring

5. Every quotient ring of a ring is a homomorphic image of the ring R.

6. If M is a maximal ideal of the ring of integers Z then M is generated by prime integer

UNIT-III

7. State and prove Division Algorithm .

8. Find the sum and product of $f(x) = 5 + 4x + 2x^2 + 2x^3$, $g(x) = 1 + 4x + 5x^2 + 3x^3$ over the ring Z₆. Also find deg(f(x) + g(x)) and deg(f(x).g(x)).

9.Let F be a field and f(x) [20] x] be a non constant polynomial then f(x) can be written as a

product of irreducible polynomials in F[x] in a unique way except for order and for unit factors in F

UNIT – IV

- 10. Find the Eigen roots and the corresponding Eigen vectors of the matrix A =
- 11. Find the inverse of the matrix

12. Show that the given matrix A = is diagonal and find P-1AP is diagonal

III B.Sc Mathematics Examination Question Paper Pattern

Time: 3hrs

Max.70 Marks

<u>PART-A</u>

Answer any **FIVE** out of **EIGHT** questions. **5x4**

5x4 =20M

Each question carries **4** marks.

<u>PART-B</u>

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

III B.Sc DEGREE EXAMINATIONS

BRANCH: MATHEMATICS - V SEMESTER

PAPER- VI: Laplace Transform's & It's Applications

Time: 3 hrs

Max.Marks: 70 marks

PART-A

Answer any SEVEN Questions

7x10=70M

choosing at least ONE questions from each unit. Each question carries 10 marks

UNIT - I

1. (a) State and prove Second shifting theorem

(b) $F(t) = find the L{F(t)}.$

2. Find L { Sinh at cos at} and L{Sinh at sin at}.

3. (a) Find L{ by using first shifting theorem.

(b) Find L{ cos 3t } by using change of scale property .

UNIT – II

4. (a) State and prove laplace transform of integral

(b) S.T sint dt =

5. (a) State and prove division by 't'

(b) Find L.

6. Find $L{J_0(t)}$ and also find $L{t J_0(at)}$

UNIT – III

7.(a)Find by using inverse laplace transform of derivative.

(b)Find is by using inverse laplace transform of division by p

8. Find by using Heavi sides expansion formula.

9.State and prove convolution theorem.

UNIT – IV

10.Solve the differential equations + where k is constant.

11. Solve = 2 if y(0,t) = 0 = y(5,t), y(x,0) = 10

12.Solve F(t) = 4t - 3

D.R.W. AUTONOMOUS COLLEGE: GUDUR 6102

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER-VIII (A) OPTIONAL

NUMERICAL ANALYSIS

UNIT-I

Errors in Numerical Computations: Numbers and their Accuracy, Errors their Computation - Absoulte Relative and percentage errors. A General Error formulae, Error in a series approximation, Fundamental theorem of the difference calculus Properties of two operators E and Δ .

UNIT – II

Interpolation with Equal and Unequal Intervals: Forward Differences, Backward Differences, Newton's divided Differences formula ,Legrange's interpolation formula and problems.

UNIT – III

Central Difference Interpolation Formulae : Gauss's Interpolation formula(Forward formula& Backward formula), Gauss forward formulae and backward formulae ,.Stirling's central difference formulae ,Bessel's formulae.

UNIT - IV

Solution of Algebraic and Trancendental Equation

The Bisection method, The Method of False Position, Newton-Rapshon method. GeneralizedNewton'sMethod.

UNIT-V

Linear systems of equations: Solution of linear systems, Direct methods, Matrix inversion method,

Method of factorization .Iterative methods, Jacobi's method, Gauss-Siedal method.

Prescribed text book: Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry,prentice Hall India(4 th Edition),Chapter-1(1.2,1.4,1,1.5,1.6); Chapter-2(2.2-2.7);Chapter-3(3.2,3.3,3.72,3.91,3.92,3.10.1,3.10.2);Chapter-6(6.3.2,6.3.4,6.3.7,6.4);&C aculus of Finite Difference and Numerical Analysis by P.P.Gupta &G.S.Malik , Krishna Prakashan Media (P)Ltd.Meerut.

Reference books: 1.G.Shankar Rao New Age International Publishers, New-Hyderabad.

2. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

D.R .W. AUTONOMOUS COLLEGE: GUDUR

6101

III B.SC, MATHEMATICS, SIXTH SEMESTER

PAPER VII: LINEAR ALGEBRA

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, linear sum of two subspaces, Linear independence and dependence of vectors.

UNIT-II

Linear Transformation: Vector space homomorphism, Linear Transformation, Zero transformation, properties of linear Transformations,Sum of Linear Transformations,Scalar multiplication of a Linear Transformations,Product of Linear Transformations, Range and Null space of a linear Transformation,solved problems.

UNIT-III

Vector space Isomorphism : Definition of Vector space Isomorphism,Fundamental theorem of homomorphism,Direct sums,Direct sum of two subspaces,Disjoint subspaces,Singular and non-singular transformations,Inverse function,Uniqueness of inverse .

UNIT-IV

Inner product spaces: Definition of Inner product spaces, Norm of Length of a vector, Cauchy-Schwartz's inequality, special cases of Schwartz's inequality, Triangle inequality, Parallelogram law,Normed vector space and distance, solved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram-Schmidit Orthogonalisation process, Working method

for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "A text book of B.Sc mathematics Vol III S.Chand & company, New Delhi.

Reference books:

G.Shankar Rao A text book of mathematics for B.Sc Vol III. Himalaya publishing House.

B.Sc(CSH) First & Second Year (Mathematics Generic Elective papers) Syllabus and Model Question Papers

Generic Elective 1: Semester I

Elementary Mathematics 60 Hrs

Unit-I: Matrix Algebra

Introduction-Basic definitions- Matrix operations –Symmetric Matrix- Skew symmetric matrix –Cofactors matrix - Transpose of a matrix - The Inverse of a Matrix (order 2).

Unit-II: Linear Equations: (3 order only)

Ad joint of a square matrix - Inverse of square matrix by using Adj A - Rank of Matrix.

Unit-III: Solution of Linear Systems:

Direct Methods-Matrix Inversion Method- Gaussain Elimination Method-Method of Factorization.

Unit-IV: Numerical Methods:

Introduction- Solution of algebraic and transcendental equations:

Bisection method - Method of false position - Newton- Raphson method- Generalized Newton's method.

Unit – V: Finite Differences and Interpolation:

Finite Differences - Forward differences - Backward differences – Newton's forward interpolation formula – Newton's backward interpolation formula and problems.

Note: 1. Proofs of theorems and derivations of Expressions are omitted.

Prescribed text book: Scope as in "Introductory Methods of Numerical Analysis" by S.S.Sastry, Prentice Hall India (4thEdition)

Reference Books:

- 1. "A Text Book of Matrices" by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Numerical Methods by P. Kandaswamy, K. Thilagavathy, K. Gunavathy by S.Chand.
- 3. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company,New Delhi
- 4. Mathematical Methods By Dr. T.K.V. Ivengar, Dr. B.Krishna Gandhi, Dr. S. Ranganatham, Dr. M.V.S.S.N. Prasad by S. Chand publications 6th revised edition 2011.

Generic Elective 2: Semester II

Differential Equations 60 Hrs

Unit-I: Differential equations of first order and first degree (12 Lectures)

Introduction, Homogeneous functions, Homogeneous differential equations, Equations reducible to homogeneous form, Exact differential equations, Orthogonal trajectories.

Unit-II: Integrating factors (12 Lectures)

Equations reducible to exact form, Definition-Methods of find integrating factors of Mdx+ Ndy=0; Linear Differential Equations; Bernouli's equation.

Unit-III: Differential equations of the first order but not of the first degree (12 Lectures) Equations solvable for p; Equations solvable for y; Equations solvable for x Equation that do not contain x (or y); Equations of the degree in x and y-Clairaut's equation.

Unit-IV: Higher order linear differential equations – I (12 Lectures)

Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D)y = Q when Q is a function of x

is Expressed as partial fractions.

P.I of f(D)y = Q when Q = b

P.I of f(D)y = Q when Q is b or b

Unit-V: Higher order Linear Differential Equations – II (12 Lectures)

Solution of the non homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q = b

P.I. of f(D)y = Q when Q = V

P.I. of f(D)y = Q when Q = xV

P.I. of f(D)y = Q when Q =

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, New Delhi.

Reference Books:

- 1. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- 2. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 3. G.Shankar Rao" A text book of Mathematics for B.Sc Vol I, Himalaya Publishing House.
- 4. Differential equations with applications and programs- S.Balachandra Rao & H.R.Anuradha, universities press.

Core Paper 4: Semester II

Discrete Structures

60 Hrs

Unit–I: Set Theory (12 Lectures)

Introduction-Basic Concepts of Set Theory - finite and Infinite sets, uncountable Infinite Sets; Functions, Relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting.

Unit–II: Mathematical Logic (12 Lectures)

Connectives: Negation-Conjunction- Disjunction-Statement Formulas and Truth Tables- Conditional and Biconditional -Well-formed Formulas, Tautologies- Equivalences Formulas-Duality Law.

Unit-III: Normal forms (12 Lectures)

Disjunctive Normal Forms – Conjunctive Normal Forms - Principal Disjunctive Normal Forms - Principal Conjunctive Normal Forms-Ordering and Uniqueness of Normal Forms.

Unit-IV: The Theory of Inference for the Statement Calculus: (12 Lectures)

Validity Using Truth Tables-Rules of Inferences-Consistency of Premises and Indirect Method of Proof–Automatic theorem proving.

Unit–V: Graph Theory (12 Lectures)

Basic Concepts of Graph Theory–Basic definitions- Paths, Reachability and Connectedness –Matrix representation of Graphs-Trees.

Prescribed Text books:

Scope and standard as in the book" Discrete Mathematical structures with applications to computer science" by Tremblay, J.P and Manohar, R-Published by McGraw-Hill International Edition 1987 edition.

Recommended Books:

1. C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill

2. Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006

3. M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms 1988 Johnwiley Publication15

4. J. L. Hein, Discrete Structures, Logic, and Computability, Jones and Bartlett Publishers, 3rd Edition, 2009

COMPUTER SCIENCE LAB (C-IV): Discrete Structures Practicals Practicals based on the theory

Note: Total-150Marks (Theory -70Marks, Practicals -50Marks&Internal assessment -30Marks)

Generic Elective 3: Semester III

Vector Calculus

60 Hrs

Unit–I: Derivative of Vector function (12 Lectures)

Definitions: Vector function of a scalar variable, interval, limit of vector function, continuity of vector function, Derivative-Higher order derivatives- Derivative of Constant Vector-Vector with constant magnitude- Composite Vector function- Partial Differentiation.

Unit–II: Differential Operators (12 Lectures)

Definitions: Scalar point function, Vector point function, Delta neighborhood, Limit, Continuity-Directional derivative at a point- Level surface- Operators- Gradient, Divergence, Curloperators-Formulae Involving these operators- Divergence of a vector.

Unit–III: Vector Identities (12 Lectures)

Solenoidal vector- Curl of a vector- Irrotational vector- Vector identities- Theorems based on vector identies.

Unit–IV: Vector Integration (12 Lectures)

Line Integral, Surface Integral and Volume integral with examples.

Unit–V: Integral Transformations (12 Lectures)

Gauss's divergence theorem- Deductions from Gauss's theorem- Green's theorem in a plane- Stokes theorem in a plane.

Prescribed Text books:

Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol III, S.Chand & Company, New Delhi.

Reference Books:

- 1. Dr.A.Anjaneyulu "III B.Sc. A Text book of Mathematics", Deepthi Publication.
- 2. G.Shankar Rao" A text book of Mathematics for B.Sc Vol III, Himalaya Publishing House.
- 3. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 4. Vector Calculus by R. Gupta, Published by Laxmi Publications.

Generic Elective 4: Semester IV

Fundamentals of Mathematical Statistics 60Hrs

Unit–I: Introduction (12 Lectures)

Scope and limitations of statistical methods – classification of data - Tabulation of data - Diagrammatic and Graphical representation of data- Graphical determination of percentiles and quartiles.

Unit–II: Measures of location (12 Lectures)

Arithmetic Mean- Median- Mode- Geometric Mean and Harmonic Mean and their properties.

Unit-III: Measures of dispersion (12 Lectures)

Range- Quartile deviation- Mean deviation- Standard deviation- Co

-efficient of variation.

Unit–IV: Skewness (12 Lectures)

Measures of Skewness Karl Pearson's-Bowley's, Kelly's and co-efficient of Skewness and kurtosis based on moments.

Unit-V: Correlation and Regression (12 Lectures)

Correlation - Karl Pearson - spearman's rank correlation - concurrent deviation methods. Regression Analysis: Simple Regression Equations.

Prescribed Text books:

Fundamental of Mathematical Statistics by V.K. Kapoor & S.C. Gupta, Sultan Chand.

Reference Books:

- 1. Statistical Methods Snedecor G.W. & Cochran W.G. oxford & +DII
- 2. Elements of Statistics Mode . E.B. Prentice Hall
- 3. Statistical Methods Dr. S.P. Gupta Sultan Chand & Sons

4.BA/BSC I Year Statistics -descriptive statistics, Probability Distribution : telugu Academy

B.Sc (CSH) First&Second Year Mathematics Generic Elective Papers Examination Question Paper Pattern

Time: 3hrs

Max.70 Marks

PART-A

Answer any FIVE out of EIGHT questions. 5x4 = 20M

Each question carries 4 marks.

<u>PART-B</u>

Answer any **ONE** question from each unit. 5x10 = 50M

Each question carries **10** marks.

Foundation Course - 8

ANALYTICAL SKILLS Syllabus,for all Degree Programmes. w.e.f. 2015-16 (Revised in April, 2016) Semester – IV (Total 30 Hrs)

UNIT – 1

Data Analysis:-The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT – 2

Sequence and Series:- Analogies of numbers and alphabets completion of blank spaces following the pattern in A:b::C: d relationship odd thing out; Missing number in a sequence or a series.

UNIT - 3

Arithmetic ability:-Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF).

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

UNIT - 4

Quantitative aptitude:- Averages, Ration and proportion, Problems on ages, Time-distance – speed.

UNIT – 5

Business computations:- Percentages, Profit &loss, Partnership, simple compound interest.

Reference Books:

1. Quantitative Aptitude for Competitive Examination by R S Agrawal, S.Chand publications.

2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.

3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers

4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.

5. Old question Paper of the exams conducted by (Wipro, TCS, Infosys, Etc) at their recruitment process, source-Internet.

Note : The teachers/students are expected to teach /learn the contents by not converting them to the problems of algebra at the maximum possible extent, but to use analytical thinking to solve the exercises related to those topics. This is the main aim of the course.

B.A.,B.Com.,B.Sc., II Year Degree Examinations-2017 IV Semester Foundation Course - 8: Analytical Skills

Time: 2 Hours Max Marks: 50

Section –A 5x1 =5 M I. Answer ALL the questions. Each Question carry <u>One</u> mark

Section –B 5x2 =10 M II.Answer any <u>Five</u> questions out of 7 Questions. Each Question carry <u>Two</u> marks

Section – C 5x3 =15 M III.Answer any <u>Five questions out of 7 Questions</u>. Each Question carry <u>Three</u> marks.

Section – D 4x5 = 20MIV.Answer any <u>Four questions out of 6 Questions</u>. Each Question carry <u>Five</u> marks

D.R.W. AUTONOMOUS COLLEGE: GUDUR 1110-B

I B.SC, MATHEMATICS, FIRST SEMESTER

PAPER I – Differential Equations

(With effect from 2017-2018)

UNIT – I:

Differential equations of first order and first degree: Linear Differential equations, Differential equations reduced to Linear form, Exact differential equations, Integrating factors, Change of Variables, Orthogonal trajectories.

UNIT-II:

Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x, Equation that do not contain x (or y); Equations of the first degree in x and y- Clairaut's equation.

UNIT-III:

Higher order linear differential equations - I: Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D)y = Q when Q is a function of x

is Expressed as partial fractions.

P.I of f(D)y = Q when Q = b

P.I of f(D)y = Q when Q is b or b

UNIT – IV:

Higher order Linear Differential Equations – II:

Solution of the non homogeneous linear differential equations with constant coefficients

P.I. of f(D)y = Q when Q = b

P.I. of f(D)y = Q when Q = V

P.I. of f(D)y = Q when Q = x V

P.I. of f(D)y = Q when Q =

UNIT – V:

Higher order Linear Differential Equations – III:

Method of variation of parameters, linear differential equations with non constant coefficients, the Cauchy - Euler equation

Prescribed Text books:

Scope as in V. Venkateswara Rao &others "A text book of B.Sc. Mathematics Vol I, First year first semester, S. Chand & Company, and New Delhi.

Reference Books:

- 1. Differential equations and their applications by Jafar Ashan ,Published by prentice –Hall of India Learning Pvt.Ltd New Delhi Second edition.
- 2. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- **3.** Ordinary and partial differential equations Raisinghania published by S.Chand & Company, New Delhi
- **4.** Differential equations with applications and programs S.Balachandra Rao & HR Anuradha universities press.

I and II SEMESTER

CBCS B.Sc.MATHEMATICS

w.e.f. 2017-18 (Revised in September 2017)

MODEL QUESTION PAPER

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 60

<u>PART-A</u> Answer any TWO out of FIVE questions.

2x5=10M

Each question carries 5 marks.

- 1. 2. 3. 4.
- 5.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

- 6.
- 7.
- 8.
- 9. 10.

11.

12.

13.

14.

15.

Instruction to Paper Setter:

Two questions must be given from each unit in Part-B
MODEL PAPER

1110-B

B.Sc. I Year Degree Examinations – 2017

I Semester – Branch: Mathematics

PAPER – I: DIFFERENTIAL EQUATIONS

Time: 3 Hours

Max.Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x5=10M

Each question carries 5 marks.

1. Solve: x dy-y dx=x.

సాధించండి: x dy- y dx=x

2. Solve: y+ px =.

సాధించండి: y+ px =

3. Solve: (+1) y= 0.

సాధించండి: (+1) y= 0

4. Solve: (D²+1) $y = \frac{secx}{2}$.

సాధించండి: (D²+1) y= ^{secx}

5. Solve: $(D^2 - 2D)y = e^x sinx$ by the method of variation of parameter.

పరామేతుల మార్1పుపద్ధతినుపయోగంషి $(D^2 - 2D)y = e^x sinx$ ను సాధించండి.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

UNIT-I

6. Solve: $x^2y dx - (x^3+y^3) dy = 0$.

సాధించండి:
$$x^2y dx - (x^3 + y^3) dy = 0$$

7. Show that the family of Confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$ is self orthogonal, where is parameter.

పరామేతిగా ఉన్న ఏకనాభియ శాంకవాల కుటుంబము $rac{x^2}{a^2+\lambda}+rac{y^2}{b^2+\lambda}=1$ న్వలంబకోణియ వక్రాతుటుంబమని చూపండి.

UNIT-II

8. Solve: $y^2 \log y = xpy + p^2$

సాధించండి: $y^2 \log y = xpy + p^2$

9. Solve: $p^2+2pycotx=y^2$, where p=dx.

సాధించండి: p²+2pycotx=y², ఇక్కడ p = $\frac{dy}{dx}$.

UNIT-III

- 10. Solve: (D²+4) y= e^{x} +sin2x+cos3x. సాధించండి: (D²+4) y= e^{x} +sin2x+cos3x.
- 11. Solve: $(D^2 4D + 3) y = \frac{\sin 3x \cos 2x}{2}$.

సాధించండి: ($D^2 - 4D + 3$) y = $\frac{\sin 3x \cos 2x}{2}$

UNIT-IV

12. Solve:

సాధించండి:

13. Solve: (
$$^{D^2} - 4D + 4$$
) y = x^3 .
నాధించండి: ($^{D^2} - 4D + 4$) y = x^3

<u>UNIT-V</u>

- 14. Solve: $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$ సాధించండి: $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$
- 15. Solve: () y=tan ax, by the method of variation parameter.
 పరామేతుల మార్¹పుపద్ధతనుపయోగంచి() y=tan ax ను సాధించండి.

D.R.W. (Autonomous) College: Gudur

I B.SC, MATHEMATICS, SECOND SEMESTER 2210-A

PAPER II - Solid Geometry

(With effect from 2017-2018)

UNIT-I: The plane: Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT-II: The Lines: Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines.

UNIT-III: Sphere -I: Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle 0`

UNIT -IV: Sphere -II: Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal,Radical plane. Coaxical system of spheres, Limiting points.

UNIT-V: Cone& Cylinder: Definitions of a cone, vertex, Quadric cones with vertex at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone.

Definitions, Elliptic cylinder, Hyperbolic, Parabolic, cylinder with base guiding curve, Equation of a cylinder, the right circular cylinder, Enveloping cylinder.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, S.Chand & Company, and New Delhi.

Reference Books:

- 1. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 2. V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year second semester, S.Chand & Company, New Delhi.

3. P.K Jain and Khallel Ahmed, "A text book of Analytical Geometry of Three Dimentions" Wiley Eastern Ltd., 1999.

MODEL PAPER 2210-A

B.Sc., I Year Degree Examinations - 2018

II Semester, DSE: Mathematics

PAPER – II - SOLID GEOMETRY

(With effect from 2017-2018)

Time: 3 hours

Max. Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x 5 =10M

Each question carries 5 marks.

1. Find the equation of plane through (4, 4, 0) and perpendicular to the planes x+2y+2z= 5 and 3x+3y+2z-8= 0.

(4, 4, 0) బిందుమ గుండా పోతూ , x+2y+2z= 5 మరియు 3x+3y+2z-8= 0 తలాసికి లంబంగా ఉన్నతలాసికి

సమీకరణం కనుక్కోండి.

- 2. Find the image of the point (2, -1, 3) in the plane 3x-2y+z=9. 3x-2y+z=9 అను తలంలో (2, -1, 3) **ఓందుమ యోక్ ప్**రతిటింబమునుకనుకేకోండి.
- Find the centre and radius of the sphere x²+y²+z²-6x+2y-4z+14=0.
 x²+y²+z²-6x+2y-4z+14=0. గోళాలకు కేంద్ మరియు వ్యాసార్**షానుకోకండ.**
- 4. Find the enveloping cone of the sphere x²+y²+z²+2x-2y-2=0with its vertex at (1, 1, 1).
 *ర్షము(1,1,1) గా ఉండి x²+y²+z²+2x-2y-2=0 అన గోళమునకు స్పర్శశంఖమ యొక్క సమీకరణం

కనుకేకోండి .

5. Find the equation to the right circular cylinder whose axis is x= 2y= -z and having the radius 4. x= 2y= -z అక్షంగాను4 వ్**యా**నార్**థముమేడుపర్**తుణ్**తూపకుచుకరణం కనుక్**రిండి .

PART-B 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

6. Determine the planes through the intersection of the planes 2x+3y-z+4=0, x+y+z-1=0 and which

are parallel to the co-ordinate axes.

2x+3y-z+4=0, x+y+z-1=0 అన తలాల చదన రక గుండా పోతూ సిరూపకాకలను సమాంతరంగా ఉండి

తలాలను **కనుకోకోండి**.

7. A variable plane at a constant distance p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of the tetrahedron OABC is $x^{-2}+y^{-2}+z^2=16p^{-2}$.

ఒక చరతలము మూలబిందుమ నుండి ఎల్లప్ ముథుదూరంలో ఉండి సిరుపకాకలను A,B,C. ల

వద్**డుండించుచున్నది.** OABC చతు కేంద్**రా**బాసముయోక్ కి బిందుపదము x⁻²+y⁻²+z²=16p⁻².

అసి చూపండి.

<u>UNIT-II</u>

8. Prove that the lines and x+2y+3z-8=0=2x+3y+4z-11 are intersecting and find the point of their intersection. Find also the equation to the plane containing them.

మరియు x+2y+3z-8=0=2x+3y+4z-11 అను రే**ఖలు ఖండించుకుంటయాసి రుజుమచేయండి మరియు**

ఖండన బిందుమను కనుక్కోండి. ఇంకా ఆ రేఖలనుకలిగిన ఉన్నతలాసి కనుక్కోండి.

9. Find the S.D between the lines find also the equation and the points in which the S.D meets the given lines.

అను రేఖల మధ్యుల్పతమదూరాన్ ని కనుకోకోండి. ఇంకా అల్పతమరేఖ సమీకరణములు మరియు ఈ

రేఖ ఇచేచిన రేఖను ఖండించు బిందుమలను కనుక్కోండి.

<u>UNIT-III</u>

10. Find the equation of the sphere through the points (1, 0, 0), (0, 1, 0), (0, 0, 1) and having the least radius.

(1, 0, 0), (0, 1, 0), (0, 0, 1) **ఓందుమల గుండా పోతూ కసెష్**టుయానార్ఱుిి న గోళము సమీకరణాన్సి

కనుకేకోండి .

11. Find the equation of the sphere if the circle is $x^2+y^2+z^2=9$, x-2y+2z-5=0 is great circle and also find its centre and radius.

 $x^{2}+y^{2}+z^{2}=9$, x-2y+2z-5=0 అనే వృతం గురువృతంగా గల గోళము సమీకరణము కనుకోకోండి.

ఇoకా దాసి కేంద్రంవ్యాసార్ధకుతుక్కోండి.

UNIT-IV

12. Show that the plane 2x-2y+z=12=0 touches the sphere x²+y²+z²-2x-4y+2z-3=0 and find the point of contact.

x²+y²+z²-2x-4y+2z-3=0 అనే గోళాన్సి2x-2y+z=12=0 తలము స్పృశిస్తుంజిని చూపి మరియు దాసి స్పర్

బిందుమ కనుక్కోండి.

13. Find the limiting points of the coaxial system defined by the spheres x²+y²+z²+4x+2y+2z+6=0 and x²+y²+z²+2x-4y-2z+6=0. x²+y²+z²+4x+2y+2z+6=0 **మరియు** x²+y²+z²+2x-4y-2z+6=0 సమీకరణాలు సూచించే గోళాలతో సిర్**ది**చ్ఛటమయ్యే

సహతల గోళ సరణి అవధి బిందుమలు కనుక్కోండి.

<u>UNIT-V</u>

- 14. Find the vertex of the cone 7x²+2y²+2z²-10zx+10xy+26x-2y+2z-17=0. 7x²+2y²+2z²-10zx+10xy+26x-2y+2z-17=0 అను **శంఖమనకు శిర్**థ కనుకోకోండి.
- 15. Find the equation of the enveloping cylinder of the sphere x²+y²+z²-2x+4y-1=0 having its generators parallel to the line x=y=z. జనకరేఖలు x=y=z అను రేఖకు సమాంతరంగా ఉంటు x²+y²+z²-2x+4y-1=0 అను గోళమునకు

స్పర్ శిందుమ కనుక్ కోండి .

D.R.W. AUTONOMOUS COLLEGE: GUDUR 3310

II B.Sc, MATHEMATICS, THIRD SEMESTER

PAPER III: REAL ANALYSIS

(With effect from 2017-2018)

UNIT - I: **REAL NUMBERS**: The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Definition of Sequences, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence, properly divergent sequences, Definition of Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano- weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II: INFINITIE SERIES:

Series: Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test

- 2. Cauchy's nth root test or Root Test.
- 3. D'- Alembert's Test or Ratio Test.
- 4. Alternating Series Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III: CONTINUITY:

Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion. *Continuous functions:* Continuous functions, Combinations of continuous functions, Continuous Functions, uniform continuity.

UNIT – IV: DIFFERENTIATION AND MEAN VALUE THEORMS:

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT - V: RIEMANN INTEGRATION:

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First Mean value Theorem.

Prescribed Textbook:N.Krishna Murthy &Others''A text book of B.Sc.MathematicsVol -II,(old book) S.Chand & Company, New Delhi''.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi

publications.

D.R.W. AUTONOMOUS COLLEGE: GUDUR 3310

II B.Sc DEGREE EXAMINATIONS - 2017

Branch: Mathematics, Semester-III

PAPER III – REAL ANALYSIS

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions 5x4=20M

Each question carries 4 marks

- Every bounded sequence has at least one limit point.
 ప్రతురబద్యనుక్రమానికునీసం ఒక అవధి బిందుమ ఉంటుంది.
- Using Cauchy's principle proves that is divergent.
 కోషి సార్వతోరజయమాన్ ఉపయోగంచి అభిసరిస్తూడి అసి రుజుమచేయండి.
- Prove that is not convergent.
 లభిసరించదు అసి రుజుమచేయండి.
- 4. Discuss the continuity of f(x) = cos (1/x) if xand f(x) = 0 if x = 0 at the point x = 0. f(x) = cos (1/x)) అయితే xమరియు f(x) = 0 అయితే x = 0 *వదేథ* ప్రమేయుఱిపిచేఫిన్నం

అసి చూపండి.

- 5. Prove that f(x) = and f (o) is continuity at x = 0. f(x)= అయితే మరియు x = 0 వద్ద(o) ప్రమేయఱపిఫిన్నం అసి చూపండి.
- 6. Discuss the derivability f(x) = -1 if x f(x) = 1 x if x<1. f(x) = -1 මಯೆන් x , f(x) = 1 - x මಯೆන් x < 1 මಯೆನಬ್**ඩා**යා f **ධ්**රක්රාං ឈීక්క

అవకలసీయతను చర్**చించం**డి

7. Prove that where K.

అసి చూపండి. ఇచ్చటK.

8. Show that. **అసి చూపండి.**

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT –I</u>

9. (a) {} is bounded increasing sequence \Leftrightarrow lim=sup {/n \mathbb{N} }

{} అనుక్రమతరిబద్దఆరోహణం ⇔ lim= క.ఎ.హ {/n〗\\

(b) {} is bounded decreasing sequence \Leftrightarrow lim=inf {/n \mathbb{N} }.

{} అనుక్రమతరిబద్దఅవరోహణం ⇔ lim= గ.ది.హ {/nথী.

10. State and Prove Bolzano Weierstrass theorem for sequence. బీల్జానోపియనేట్రా**ష్**ద్*యాం ను సిర్*వచించి సిరూపిoచండి.

<u>UNIT –II</u>

11. State and Prove P-test. **P- శ్**రేజురీకేషినపిర్వచించినిరూపించండి. 12. State and prove D'Alembert's ratio test.

డి ఆలంబర్ట్ మేరక్షన్ర సిర్వపించిని రూపించండి.

<u>UNIT –III</u>

13. Discuss the continuity of f(x) = if x f(0) = 0 at the origin. f(x) = అయితే x f(0) = 0 వద్దు పిఫిన్ నం ను చర్టించిండి.

14. If a function f is continuous on [a, b], then it is uniformly continuous on [a, b] [a, b] మీద f ప్రమేయఱపిఫిన్నం అయితే అప్పుడుఅది [a, b] ఏకరూప అపిఫిన్నం.

<u>UNIT –IV</u>

- 15. State and prove Rolle's Theorem. రోలే సిద్దాంతమ సిర్వచించి సిరూపించండి.
- 16. Using Lagrange's theorem, Show that x > log (1+x) > . లెగ్రాంజీసిద్దాంతమ ఉపయోగంచి x > log (1+x) > అసి చూపండి.

UNIT V

- 17. Define Oscillatory sum and find W (P, f) if $f(x) = x^3$ on [0, 1] and P = {0, 1/4, 2/4, 3/4}.
 - $f(x) = x^3$ ప్రమేయం(0,1] వద్ $dtarrow = \{0, 1/4, 2/4, 3/4\}$ అయితే W(P, f) పిలువను

కనుక్**కోండి**.

18. State and prove Darboux's theorem. డార్బూసిద్**ధాంతాన్సెర్**వచించి సిరూపించండి.

D.R.W. Autonomous College: Gudur

II B.Sc. Mathematics, FOURTH SEMESTER

PAPER IV: ABSTRACT ALGEBRA

(With effect from 2016-2017)

UNIT-I: Number Theory

Elements of Number Theory - prime and composite numbers- Definition of Euclid's division Algorithm & Divisibility - Fundamental Theorem on arithmetic - Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation- Congruence, linear Congruence problems -Euler's function definition - Theorem of Fermat's and Wilson .

UNIT – II: Groups and Subgroups

Groups: Binary operation-Algebraic structure- Semi group –Definition of Monoid - Group definition and Elementary properties- Order of a Group - Composition Tables with examples.

Subgroups: Complex definition – multiplication of two complexes inverse of a complex-Definition of subgroup-examples-criterion for a complex to be a sub groups-Criterion for the product of two subgroups to be a subgroup-union and intersection of subgroups.

UNIT-III: Cosets and lagranges theorem&Normal subgroups

Cosets and lagranges theorem: Cosets definition – properties of cosets- Index of a subgroups of a finite groups-Lagrange's theorem.

Normal Sub groups: Definition of Normal sub group - Simple groups- Quotient groups (or) Factor groups.

UNIT-IV : Homomorphism -Definitions of Homomorphism - Isomorphism and Automorphism - Properties of Homomorphism- Fundamental theorem on Homomorphism of groups - Definition of Inner and outer Automorphisms of a group, Kernel of a homomorphism .

UNIT-V Permutation Groups& Cyclic Groups

Permutation Groups: Definitions of Permutation - Orbits and cycles of permutation, Disjoint Cycles, Even and Odd permutation problems, Inverse permutation, Cayley's theorem.

Cyclic Groups: Definition of cyclic group - Classification of cyclic groups - Order of the cyclic group problems - Find the number of generators problems.

Prescribed Textbook: N.Krishna Murthy & others "A text book of Mathematics for B.Sc Volume-II, S.Chand & Company, New Delhi.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

MODEL PAPER	4410

B.Sc., II Year Degree Examinations - 2018

IV Semester, DSE: Mathematics

Paper IV - ABSTRACT ALGEBRA

(With effect from 2016-2017)

Time: 3 hours

Max. Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. 5x 4=20M Each question carries 4 marks.

- Find L.C.M .& G.C.D. of 5040 by using canonical form.
 5040 కు ప్రధానపిఘటన ద్వారాగ.సా.భా. మరియు క.సా.గు. లను కనుకోకోండి.
- If p is a prime and a, b then p|ab => p|a or p|b
 P ప్oధానుంఖ్యూరయు a ,b అయితే p|ab => p|a లేక p|b అని చూపండి.
- 3. Let G be a group. a, bG=>(a=. G ఒక సమూహము అనుకోండి . a, bG=>(a=.
- If H is any subgroup of G then = H.
 ఒక సమూహము G లో H ఉప సమూహము అయితే = H.
- 5. If a, b are any two elements of a group (G,o) and H any sub group of G then

```
Ha = Hb \leq a and = b
```

```
ఒక సమూహము (G,o) లో a, b లు ఏవయినా రెండు మూలకాలు మరియు G లో H ఉపసమూహము అయితే
```

 $Ha = Hb \leq a = b$.

6. If G is a group and H is a sub group of index 2 in G then H is a normal subgroup of G G ఒక సమూహము G లో H ఉప సమూహము. H యొక్కసూచిక 2 అయితే G లో H అటలంబ ఉప

సమూహము.

7. If H and K are two sub groups of a group G then HK is a sub group of G iff HK = KH ఒక సమూహము G లో H, K లు ఉప సమూహము అయితే, HK కూడ G లో ఉప సమూహము

కావలేనన అవశేయు తర్యా ప్రేతు మము HK = KH.

8. If f = (2 5 4) (1 4 3) (2 1) find the disjoint cycles and find inverse of its cycle.

f = (2 5 4) (1 4 3) (2 1) అనే లాబ్దసిపియుక్ఈచక్రాల**మి**రయు పిలీమచక్రాలను కనుక్రోండి.

<u>PART-B</u> 5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

UNIT –I

- 9. State &Prove the Fundamental theorem of Arithmetic. ప్**రాధమి**ఆంకగణిత సిద్**దాంతంనపిర్**వచించి సిరూపించండి
- 10. State &Prove the Wilson's theorem పిల్సన్ సుదదాంతంనపిర్ వటించి నిరూపించండి

UNIT –II

11. Show that the set of all rational numbers form a group under the composition circle defined by $\,$, for a, b $_{+}$

ధనఅకరణీయ సంఖ్యమేతి పై 'o' పరికోరయా,b+ కు గా సిర్వేచించపబడిన (+ , o) ఒక సమూహము అసి

చూపండి.

12. If and are two subgroups of G then is also a sub group of G ఒక సమూహము G లో లు ఉప సమూహములు అయితే కూడా G లోఉప సమూహము అవుతుంది.

UNIT – III

13. State & Prove the Lagrange's theorem.

లెగ్రంజేస్

సిద్**దాంతంనుసిర్**వచించి సిరూపించండి

14. A sub group H of G is normal sub group of G iff each left coset of H in G is a right coset of H in G G లో H అభిలంబ ఉప సమూహము కావడానికి అవశేయు రేయాపేతునుము G లో H యొక్క ప్రతి

ఎడమ సహసమితి ఒక కుడి సహసమితి.

UNIT – IV

- State & Prove the Fundamental theorem on Homomorphism.
 సమూహాలయొక్క సమరూపత మూల సిద్దదాంతంనుసిరీవటించి సిరూపించండి.
- 16. If f is a homomorphism of a group G into a group G then the kernel of f is a normal sub group of G.

సమూహము G నుండి సమూహము G'కు f ఒక సమరూపత అయితే కెర్ f అనేది Gలో అభిలంబఉప

సమూహము అమతుంది.

UNIT – V

17. State and Prove Cayley's theorem. కెయిలీ సిద్**దాంతంనుసిర్**వచించి సిరూపించండి. Every sub group of a cyclic group is a cyclic.
 చకోరయుమూహము యొకీక ప్రతిజప సమూహము చకోరయము

D.R.W. AUTONOMOUS COLLEGE: GUDUR 55101

B.Sc. THIRD YEAR MATHEMATICS SYLLABUS Branch: Mathematics, Semester-V

PAPER- V: RING THEORY & MATRICES

(With effect from 2017-2018)

UNIT – I: Rings-I : Definition of Ring and basic properties, Boolean Rings, Zero Divisors of Ring - Cancellation laws in a Rings - Integral Domain Division Ring – Fields Examples.

UNIT-II: Rings-II: Characteristic of Ring, Characteristic of an Integral Domain – Characteristic of Field Characteristic of Boolean Ring. Sub Ring Definition – Sub ring test – Union and Intersection of sub rings – Ideal Right and left Ideals – Union and Intersection of Ideals -- Excluding Principal, prime and maximal Ideals.

UNIT –III: Rings-III: Definition of Homomorphism – Homomorphism Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

UNIT – IV: Matrix-I: Rank of a Matrix – Elementary operations – Normal form of a matrix Echelon from of a Matrix - Solutions of Linear Equations System of homogenous Linear equations – System of non Homogenous Linear Equations method of consistency.

UNIT – V : Matrix-II : Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

Prescribed Text books:

A text Book of B.Sc.Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

Reference Books:

- 1. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.
- 2. Matrices by Shanti Narayana, published by S.Chand Publications.
- 3. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.

MODEL PAPER

55101

III B.Sc DEGREE EXAMINATIONS - 2017

BRANCH: MATHEMATICS- V SEMESTER

PAPER-V: RING THEORY AND MATRICES

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 70

Part-A

Answer any FIVE out of EIGHT questions. 5x4=20M

Each question carries 4 marks.

- Define a ring, integral domain and field సిరీవచించండి వలయం పూర్ణాంకురదేశయరయు క్షేత్రము
- 2. A field has no zero divisors క్షోత్రవయ్ శూన్యభాజకాలు లేమ
- 3. If R is a non zero ring so that $a^2=a$, . Prove that the characteristic of a ring is two R ఒక శూన్యాతథలయం అయి $a^2=a$, అయితే R యొక్క లాక్షోణకం 2 అసి సిరూపించండి.
- The characteristic of an integral domain is either prime or zero పూర్ణాంఖ్రదేశయొక్ లాక్షణికఅభాజ్యంఖ్యాసి లేక సున్నకాసి అమతుంది.
- The homomorphic image of a ring is ring ఒక వలయం యొక్క సమరూపత ప్రతిటింబయరల వలయమే అమతుంది.
- 6. If f is a homomorphism of a ring R in to the ring R^1 then f is an in to Isomorphism iff kerf= $\{0\}$

f: R \rightarrow R¹ వలయ సమరూపత అయితే అనేవేకసమరూపత కావడాసికి Ker f = {o}

అవడం, ఆవశ్యకముమిరియు పర్యాప్తమూ

7. Solve the following system of linear equations by using Cramer's rule $x_1+2x_2+3x_3=2$, $x_1+x_3=3$, $x_1+x_2-x_3=1$

దిగువ సమీకరణాలను క్రామథుద్దదతిశుపయోగంచి నాధించండి

 $x_1+2x_2+3x_3=2$, $x_1+x_3=3$, $x_1+x_2-x_3=1$

8. If A= express $A^{6}-4A^{5}+8A^{4}-12A^{3}+14A^{2}$ as a linear polynomial of A.

 $A = eodities A^{6} - 4A^{5} + 8A^{4} - 12A^{3} + 14A^{2}$ ను A లో ఋజుబహుపదిగా రాయండి.

<u>Part -B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

UNIT-I

9. If R is a Boolean ring then (i) a+ a = o a R

(ii) a+ b=o => a=b and

(iii) R is commutative under multiplication

R బూలీయన్ వలయం అయితే (i) ప్**రతి** కు a+ a =o

(ii) **ప్**రతు, b R లకు a+ b=o => a=b మరియు

(iii) గుణకార పరికోరయదృష్**ట్**యాపిసిమయం లేదా ప్**రికిటూలియన్ వలయము** .

పిసిమయం.

10. Every finite integral domain is a field

ప్రతురిమేత పూర్ణాంఖ్రదేశ్ ఇేత్రమతుంది.

UNIT-II

11. Let S be a non empty subset of a ring R. Then S is a sub ring of R iff a-b S and ab S, a, b S

ఒక వలయం R లో S ఒక శూన్ $rtilde{S}$ as శూన్ $rtilde{S}$ as $rtilde{S}$ and $rtilde{S}$ as $rtilde{S}$ as $rtilde{S}$ and $rtilde{S}$ a

పర్^{యా}ప్ తినియమా(ల్రీ abs bs) (ii) absbs

12. An ideal in Z is a maximal ideal iff it is generated by a prime integer మార్గణాంకులయం Z లోని ఒక ఐడియల్ అధికతమం కావడాసికి ఆవశ్యుతర్యాప్తసియమం

ఐడియల్ ఒక అభాజ్యంఖ్యజీసితం కావడం.

<u>UNIT-III</u>

13. State and prove Fundamental theorem of homomorphism సమరూపత మూలసిద్**దాంతమునుమ్**రవచించినిరూపించండి 14. Every quotient ring of a ring is a homomorphism image of the ring . ఒక వలయం యొక్క ఏ వ్యుత్పనేశుయం అయిన దత్తవలయాసికుమరూపత

ప్రతిటింబం

UNIT-IV

15. Show that the equation x+y+z-3=0, 3x-5y+2z-8=0, 5x-3y+4z-14=0 are consistent and solve them.

దిగువ సమీకరణాలకు నాధన కలదు(పొంతన సియమం హటించును) అసి చూపండి, మరియు

సాదించండి.

16. Compute the inverse of A= పిలేమ మాతొరకనుకనుగొనండి

UNIT-V

- 17. Find the characteristic roots and vectors of the matrix మాతోరకయొక్క లాక్షణకమూలాలు, లాక్షణకుదిశలు కనుగోనండి.
- 18. Find the inverse of the matrix by using cayley Hamilton theorem. ఈ మాతోరకకుకేల్-హేమిల్టనేపద్దాంతమునుపరిశీలించండి తద్వారాకనుగొనండి .

D.R.W. AUTONOMOUS COLLEGE: GUDUR 55102

B.Sc. THIRD YEAR MATHEMATICS SYLLABUS Branch: Mathematics, Semester-V

PAPER- VI: LINEAR ALGEBRA

(With effect from 2017-2018)

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, Linear sum of two subspaces, Linear independence and dependence of vectors.

UNIT-II

Linear Transformation-I: Vector space homomorphism, Linear Transformation, Range and Null space of a linear Transformation, problems

UNIT-III

Linear Transformation-II: Definitions of Vector space Isomorphism, Fundamental theorem of homomorphism, Singular and non-singular transformations, Inverse function, Uniqueness of inverse

UNIT-IV

Inner product spaces: Definition of Inner product spaces, Norm of Length of a vector, Cauchy-Schwartz's inequality, Triangle inequality, Parallelogram law, Normed vector space and distance, solved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram-Schmidt Orthogonalisation process, Working method for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "A text book of B.Sc mathematics Vol III.chand & company, New Delhi.

Reference books:

G.Shankar Rao a text book of mathematics for B.Sc Vol III. Himalaya Publishing House.

MODEL PAPER

55102

III B.Sc DEGREE EXAMINATIONS - 2017

BRANCH: MATHEMATICS- V SEMESTER

PAPER-VI: LINEAR ALGEBRA

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 70

<u>Part-A</u>

Answer any FIVE out of EIGHT questions. 5x4=20M

Each question carries 4 marks.

The set W of ordered triads (x, y, 0) where x, y EF is a subspace of V₃ (F).
 అనేసిx, y E F నకు (x, y, 0)అను కీరవతోరకములుంటితే V₃ (F) నకు ఒక ఉహంతరాళం అసి

చూపండి.

- Express the vector (1,-2, 5) as a linear combination of the vectors. e1 =(1,1,1) , e2 = (1,2,3) , e3= (2,-1,1).
 అను సదిశను సదిశల ఋజుసంయోగంగా రాయండి.
- 3. The mapping T: V₃(R) V₁(R) is defined by T (a, b, c) = a²+ b²+c² then T is a Linear Transformation.
 T: V₃(R) V₁(R) ప్రమేయి (a, b, c) =గా సిర్వపిస్టేటుజుపోరవర్తనఅవుతుందా?

4. Let T: R³ R² and H: R²R³ is defined by T(x, y, z) = (x-3y-2z, y-4z) and H(x, y) = (2x, 4x-y, 2x+ 3y) compute HT and TH. Is product Commutative. T: R³ మిరియు H: R²అనేపి రెండు ఋజుపరివ**్**తనాలు

T(x, y, z) = (x-3y-2z, y-4z), H(x, y) = (2x, 4x-y, 2x+ 3y) గా సిర్వచిసోత్⊺ మరియు TH లను

రాబట్టండుబ్దదిపిసిమయమా?

- 5. If the linear operator T is defined by T(x, y, z) = (x+y+z, y+z, z) then find T⁻¹.
 T: పరివర్తనం (x, y, z) = (x+y+z, y+z, z) పరికిరియనిపిర్వచిస్తే¹ను కనుక్ కోండి.
- 6. Let T: U→V be a non singular linear transformation then prove that (=T. T: U→V **నాదారణ ఋజుపరివర్**తనఅయితే (=T అసి చూపండి.
- 7. If are two vectors in an inner product space V(F) then prove that $|| \alpha + \beta || || \alpha || + || \beta ||$.

```
V(F) అంతరలబ్దాంతరళంలే⁄/ అయితే || \alpha +\beta || || \alpha || + || \beta || అసి చూపండి.
```

8. Find a unit vector orthogonal to (4, 2, 3) in R³(R). R³(R) అంతరాళంలో (4, 2, 3) సదిశకు లంబంగా మండే యూసిట్ సదిశ ను కనుక్**కోండి.**

<u>Part -B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

- 9. If W₁ and W₂ are two subspaces of vector space V(F) then L (W₁W₂) = W₁ + W₂. V (F) నకు W₁, W₂ ఉహంతరళాలు అయితే L (W₁W₂) = W₁ + W₂
- 10. S.T the system of vectors are L.I or L.D{(1,2,-1,1),(0,1,-1,2),(2,1,0,3),(1,1,0,0)} . {(1,2,-1,1),(0,1,-1,2),(2,1,0,3),(1,1,0,0)} అను సదిశా సమితీ ఋజు స్వాతంత్రేయమోక

ఋజుపరాదీనమో కనుక్కోండి.

<u>UNIT-II</u>

11. Let T: V₃(R)V₃(R) be defined by T (a, b, c)=(3a, a-b,2a+b+c). Prove that $(T^2-I)(T-3I) = 0$.

T: V₃(R)V₃(R) **ప్రమేయ** (a, b, c)=(3a, a-b,2a+b+c) అసి సిర్వచిన్ తే

(T²-I)(T-3I) = 0 **అసి చూపండి.**

12. Prove that Kernel is a subspace of vector space V (F).

V(F) సదిశాంతరాళానికి శూన్యాంతరాళఉపాంతరాళం అవుతుంది అని చూపండి.

<u>UNIT-III</u>

- 13. State and prove Fundamental theorem of Homomorphism. సమరూప పరివర్త యొక్క పోరాధా మికిుద్ దాంతం ను మారిపించిండి.
- 14. If T is linear operator on a vector space V (F) such that $T^2-T+I=0$ then show that T is invertible.

 $T^2-T+I=0$ అగునట్లు/ (F) పై T ఋజుపరికొరయాలయితే T పిలేమం అసి చూపండి.

<u>UNIT-IV</u>

15. If u,v are two vectors in complex inner product space then prove that $4 < \mathbf{u}, \mathbf{v} > = || \mathbf{u} + \mathbf{v} ||^2 - ||\mathbf{u} - \mathbf{v}||^2 + \mathbf{i} ||\mathbf{u} + \mathbf{i}\mathbf{v}||^2 - \mathbf{i} ||\mathbf{u} - \mathbf{i}\mathbf{v}||^2$

సంకీర్ణుంతర లబ్**దాంతాళంలో u,v లు రెండు సదిశలు అయితే** పరమణ అంతర లబ్**దందృష్**ట్యా

 $4 < \mathbf{u}, \mathbf{v} > = || \mathbf{u} + \mathbf{v} ||^2 - || \mathbf{u} - \mathbf{v} ||^2 + \mathbf{i} || \mathbf{u} + \mathbf{i} \mathbf{v} ||^2 - \mathbf{i}$ అసి చూపండి.

16. State and prove Cauchy's Schwarz's inequality. "కోషి కేహరేటేఊానతలు" సిరీవచించిసిరూపించండి.

<u>UNIT-V</u>

- 17. Define distance of **α**, **β** and if are two Orthogonal vectors in an inner product space V (F) and ||**α** ||=||**β** ||= **1**. Then prove that || **α**-**β** || = **d**<**α**, **β** =. V (F) **මංජරාජාවේ α**, **β ຍා రెండు లంబ సడిశలైతే** ||**α**||=||**β**||=1 මෙయితే || **α**-**β** || = **d**<**α**,
- β>=.
- 18. If { (2,1,3) , (1,2,3), (1,1,1) } is a basis of R³ Construct an Orthonormal basis. R³ అంతర లబ్దాంతరాళాసికి((2,1,3) , (1,2,3), (1,1,1) } ఒక ఆధారం అయితే ఒక

లంభాభిలంభ ఆధారం సిర్మించండి

D.R.W. (Autonomous) College: Gudur

III B.SC, MATHEMATICS, SIXTH SEMESTER 610EL01

Elective Paper VII: VECTOR CALCULUS

(With effect from 2017-2018)

UNIT - I: Vector Differentiation – I: Vector Function of Scalar Variable continuity of a vector function partial differentiation scalar point Function vector point faction – Gradient of a scalar point Function – Unit normal – Directional Derivative at a Point – Angle between two surfaces.

UNIT – II: Vector Differentiation – II: Vector differential Operator – Scalar Differential Operator – Divergence of a vector – Solenoidal vector – Laplacian operator – curl of a vector – Irrotational Vector – Vector identities.

UNIT – III: Vector Integration – I : Definition – Integration of a vector – simple problems – smooth curve – Line integral – Tangential Integral – circulation Problems on line Integral. Surface Integral.

UNIT – IV: Vector Integration - II: Volume Integrals – Gauss Divergence Theorem statement and proof – Applications of Gauss Divergence theorem.

UNIT – V: Vector Integration - III: Green's Theorem in a plane Statement and proof – Application of Green's Theorem. Statement and Proof of Stoke Theorem – Application of stoke Theorem.

Prescribed Text books:

A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

Reference Books:

- 1. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Vector Calculus by R. Gupta, Published by Laxmi Publications.

MODEL PAPER 610EL01 B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018 VI Semester, DSE: Mathematics

Elective Paper –VII: Vector Calculus

(With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

<u>PART-A</u> Answer any FIVE out of EIGHT Questions.

5x 4=20M

Each question carries 4 marks.

1. If $A = (A \times B)^1$ at t = 1.

A = అయితే t =1 నకు (AxB)¹

- 2. Find the directional derivative of the function in the direction of the vector+2j+2k at the point (1, 2, 0).
 +2j+2k దశలో (1, 2, 0) టిందుమ వద్యిక్ దేశక వ్యుత్పన్నం
- 3. Prove that grad(.a) = a

grad(.a) = a అసి చూపండి.

- 4. If f=(x+3)i+(y-2z)j+(x+pz)k is a solenoidal find p. f=(x+3)i+(y-2z)j+(x+pz)k solenoidal అయితే p ఎంత .
- 5. If A= and B=. Find . A= మిరియు B= ను రాబట్**టం**డి
- 6. If F = y i + z j + x k find the circulation of F round the curve C, where C is the circle . F = y i + z j + x k මෙරා C න් හිරිස් රිකා හි කොරොස්සාංසී
- 7. Show that A = (a+b+c), where S is the surface of the sphere.

అను గోళ తలం S పై . N ds = (a+b+c) అని చూపండి.

8. If F= yi +(x-2xz)j -xy k evaluate x F).N ds where S is the surface of the sphere xy తలపై భాగములోని అర్ధగోళము F= yi +(x-2xz)j -xy k అయినప్**పుడు x** F).N ds

రాబట్టండి

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

<u>UNIT – I</u>

- 9. If r=xi+yj+zk and x=2sin3t,y=2cos3t,z=8t then prove that ||=10 and ||=18. r=xi+yj+zk మీరయు x=2sin3t,y=2cos3t,z=8t ||=10, ||=18 అసి చూపండి.
- 10. If ; prove that

,

[grad a, grad b, grad c]=0.

[grad a, grad b ,grad c]=0.అసి రుజుమచేయండి

<u>UNIT – II</u>

- 11. If is a constant Vector, prove that curl = + (a.) నోథీథుదిశ అయితే = + (a.) అని చూపండి
- 12. grad (A.B) = (B.A + (A.B + B x curl A + A x curl B).
- $\operatorname{grad}(A.B) = (B.A + (A.B + B \times \operatorname{curl} A + A \times \operatorname{curl} B)$ అసి చూపండి.

<u>UNIT – III</u>

13. If F=4xzi -j+yzk, evaluate where S is the surface of the cube bounded by x=0,x=a, y=0,y=a, z=0,z=a.

F=4xzi -j+ yzk అయి x=0, x=a, y=0, y=a, z=0, z=a గణించండి

14. Evaluate. dr where $F=x^2y^2i+yj$ and the curve C isy²=4x in the xy plane from (0,0)to(4,4)

 $F=x^2y^2i+yj xy$ లో (0,0) నుండి(4,4)వరకు $y^2=4x$ అనువక్fరము పై. dr గణించండి.

$\underline{UNIT} - IV$

15.State and prove Gauss divergence theorem.

గాస్ అపసరణ సిద్దదాంతముఖ్రవచించినరూపించండి.

16. Verify Gauss's divergence theorem to Evaluate

Over the surface of a cube bounded by the

Co-ordinate planes x=y=z=a

x=y=z=a తలాలచే పరివృతమై ఘనతలముపై 👘 పిలువను గాన్ అపసరణ సిద్**దాంతముతో**

సరిచూడండి.

UNIT –V

17. State and prove stokes theorem.

స్ట్ రో కి సిట్ దాంతమును ప్రవిషించిన రాపించండి

18. Verify Greens theorem in the plane for, where c is the region bounded by and y =

, y = , నకు గోరన్ సిద్**దాంతమునపరిచూడం**డి.

D.R.W. (Autonomous) College: Gudur

III B.SC, MATHEMATICS, SIXTH SEMESTER610CLA1

Cluster Elective –VIII: LAPLACE TRANSFORMS (With effect from 2017-2018)

60 Hrs

UNIT-I:

Laplace Transform I: Definition of - Integral Transform – Laplace Transform Linearity, Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A. Linear property, First Shifting Theorem.

UNIT-II:

Laplace Transform II: Second Shifting Theorem, Change of Scale Property, Laplace

Transform of the derivative of f(t), Initial Value theorem and Final Value theorem.

UNIT-III:

Laplace Transform III: Laplace Transform of Integrals – Multiplication by t, Multiplication by t^n – Division by t. Laplace transform of Bessel Function Only.

UNIT-IV:

Inverse Laplace Transform I: Definition of Inverse Laplace Transform. Linearity, Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions, Examples.

UNIT-V: Inverse Laplace Transform II: Inverse Laplace transforms of Derivatives–Inverse Laplace Transforms of Integrals – Multiplication by Powers of "P'– Division by powers of "P'– Convolution Definition – Convolution Theorem – proof and Applications – Heaviside's Expansion theorem and its Applications.

Prescribed Text Books:

"Laplace and Fourier Transforms" by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.

Reference Books:

- 1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
- 2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi
- 3. Integral Transforms by M.D. Raising hania, H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.

MODEL PAPER610CLA1B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018
VI Semester, DSE: Mathematics

Cluster Elective –VIII: LAPLACE TRANSFORMS (With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. Each question carries 4 marks.

5x 4=20M

- 1. State and prove Second shifting theorem
- 2. F(t) =find the L{F(t)}.
- 3. State and prove laplace transform of integral

- 4. S.T sint dt =
- 5. Find L and also find dt.
- 6. Find
- 7. Prove that dx =
- 8. Apply the convolution theorem to show that du = (t sint).

<u>PART-B</u>

5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

<u>UNIT – I</u>

- 9. Find L{ Sinh at $\cos at$ } and L{Sinh at $\sin at$ }.
- 10. (a) Find L{ by using first shifting theorem.(b) Find L{ cos 3t } by using change of scale property.

<u>UNIT – II</u>

11. (a) State and prove division by 't'

(b) Find L.

12. Find $L{J_0(t)}$ and also find $L{t J_0(at)}$

UNIT-III

- 13. Find the Laplace Transform of (i) and (ii)
- 14. Find $L{J_0(t)}$ and also Find $L{t J_0(at)}$.

UNIT-IV

15. (a) Find by using inverse Laplace transform of derivative.(b) Find is by using inverse Laplace transform of division

 $By \ p$

16. State and prove Second shifting theorem of inverse Laplace transform.

<u>UNIT – V</u>

- 17. Find by using Heavi sides expansion formula.
- 18. State and prove convolution theorem.

D.R.W. (Autonomous) College: Gudur

III B.SC, MATHEMATICS, SIXTH SEMESTER610CLA2

Cluster Elective- IX: INTEGRAL TRANSFORMS

(With effect from 2017-2018)

60 Hrs

UNIT-I

Application of Laplace Transform to solutions of Differential Equations: Solutions of ordinary Differential Equations. Solutions of Differential Equations with constants co-efficient Solutions of Differential Equations with Variable co-efficient

UNIT-II

Application of Laplace Transform: Solutions of partial Differential Equations.

UNIT-III

Application of Laplace Transforms to Integral Equations: Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integral Differential Equations. Application of L.T. to Integral Equations.

UNIT-IV

Fourier Transforms-I: Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT-V

Fourier Transform-II: Convolution Definition – Convolution Theorem for Fourier transform – parseval's Indentify – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Prescribed Text Books:

Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.

Reference Books:

- 1. Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
- 2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi.
- 3. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.

MODEL PAPER

610CLA2

B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018 VI Semester, DSE: Mathematics

Cluster Elective- IX: INTEGRAL TRANSFORMS (With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. Each question carries 4 marks

5x 4=20M

- 1. Using Laplace Transforms, find solution of $y''+25y = 10 \cos 5t$, where y(0) = 2, y'(0) = 0.
- 2. Apply Laplace Transforms to solve $+y = 6 \cos 2t$ given that y = 3, =1 when t=0.
- 3. Show that $\phi(x) = is$ a solution of integral equation =1.
- 4. Using Laplace Transforms, find solution of y''(t)+y(t) = t given that y'(0) = 1, $y(\pi) = 0$.
- 5. If f(s) is the Fourier transform of F(x), then is the Fourier transform of F(ax)
- 6. Find the Fourier transform of f(x) =
- 7. Prove that the finite Fourier sine transform of the function f(x) = 2x, 0 < x < 4 is
- 8. Find the finite cosine transform of f(x) if

(i)
$$f(x) = -x +$$
 (ii) $f(x) = sin(nx)$

PART-B

5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

<u>UNIT – I</u>

9. Using laplace's transform solve ther equation +t - y = 0 if y(0) = 0, =1, if t=0. 10. Solve $(D+2)^2 y = 4e^{-2t}$ with y(0) = -1, y'(0)=4.

<u>UNIT-II</u>

11. Find the bounded solution of = 2 + y if $(y,0) = 6e^{-3x}$

12. Solve = 3, y(= $0,y(x,0) = 30\cos 5x$ (x=0 = 0

UNIT-III

- 13. Solve the integral equation F(t) = 1 + and verify your solution.
- 14. Convert the integral equation $F(t) = t^2-3t+4-3 (t-u)^2 du$ into differential equation and associated conditions.

UNIT-IV

- 15. Find the Fourier transform of f(x) =
- 16. Find the sine transform of

UNIT-V

- 17. Find the finite cosine transform of $(1-)^2$
- 18. State and prove Parsevel's theorem

D.R.W. (Autonomous) College: Gudur 1124

B.Sc. Mathematics (Hons.) First Year Degree Syllabus

Branch: Mathematics, Semester-I

Paper-I: Calculus

(With effect from 2017-2018)

Unit- I: Introduction

Hyperbolic functions, Higher order derivatives, Calculation of the nth

Derivative, same standard results, Determination of nth derivative of rational

Functions, The nth derivatives of the products of the powers of sines and cosines, Leibnitz's Theorem, The nth derivative of the product of two functions.

Unit- II: Vector Differentiation I

Definition- Vector function of scalar Variable-Continuity of a Vector function, Limit of a vector function, Derivative of Constant vector- Theorems

Scalar point function- Vector point function- Directional Derivative at a point- Gradient of a scalar point function- Unit normal-Angle between two surfaces.

Unit- III: Vector Differentiation II

Vector differential Operator – Scalar differential Operator – Divergence of a Vector – Solenoidal Vector – Laplacian Operator – Curl of a Vector – Irrotational Vector – Vector Identities – theorems.

Unit- IV: Vector Integration I

Definition- Integration of a vector- Simple problem- smooth curve- Line Integral-Tangential

Integral- circulation Problems on line Integral- Surface Integral- Volume Integral.

Unit- V: Vector Integration II

Gauss Divergence Theorem Statement and Proof – Application of Gauss Divergence theorem-Green's Theorem in a plane Statement and Proof – Application of Green's Theorem. Statement and proof of Stoke Theorem – Application of stoke Theorem.

Prescribed Text books:

- 1. Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol III, Old book, S.Chand & Company, and New Delhi
- 2. "Differential Calculus" by Santhi Narayana& Miteal, S.Chand Publications

Reference Books:

- 1. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Vector Calculus by R. Gupta, Published by Laxmi Publications.
- 3. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications.
- 4 Dr.A.Anjaneyulu, "A text book of B.Sc Mathematics", Deepthi Publications.

Model Paper

D.R.W. (Autonomous) College: Gudur

B.Sc. Mathematics (Hons.) First Year Degree Examinations-2017

Branch: Mathematics, Semester-I

Paper-I: <u>Calculus</u>

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 60

1124

PART-A

Answer any TWO out of FIVE Questions.2x 5=10MEach question carries 5 marks.

1. If r = xi + yj + zk and x = 2sin3t, y = 2cos3t, z = 8t then prove that ||=10 and ||=18.

2. If $Y = (A \operatorname{Cosx} + B \operatorname{Sinx})$. Prove that +2 + 2y = 0.

3. Find the directional derivative of the function in the direction of the vector +2j+2k at the point (1, 2, 0).

- 4. Find **div f** and **curl f** where).
- 5. Find dr where F = xyi+yzj+zxk and the curve C is $r = ti+t^2j+t^3k$, t varying from -1

to1.

PART-B

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit.

Each Question carries 10 marks.

<u>UNIT-I</u>

6. State and Prove Leibnitz's theorem

7. If $Y = Cos (m Sin^{-1}x)$. Show that (1-x²) Y_{n+2} -(2n+1) xY_{n+1} +(m²-n²) Y_n =0 and hence find $Y_n(0)$

<u>UNIT-II</u>

8. If r=2t i + j + /3 k. Prove that $[]/|x|^2 = |x|/|]^3$ at t=1

9. If r=a cost I +a sint j +at tan k find and.

UNIT-III

10. Evaluate where $F=Zi+Xj-3Y^2Z$ k and S is the surface $x^2+y^2=16$ include in the first octant between Z=0 and Z=5.

11. If $F = (2x^2-3z)i-2xyj-4xk$ evaluate (a) .Fdv and (b) X Fdv where V is the closed region bounded by x=0, y=0, z=0

UNIT-IV

12. By transforming into triple integral, evaluate

³ dy dz + x^2y dz dx + x^2z dx dy) where S is the closed surface consisting of the

Cylinder $x^2+y^2=a^2$ and the circular discs z=0 and z=b.

13. State and prove Gauss Divergence Theorem.

UNIT-V

- 14. State and prove Green's Theorem.
- 15. State and prove Stroke's Theorem.
D.R.W. (Autonomous) College: Gudur 1125

B.Sc. Mathematics (Hons.) First Year Degree Syllabus

Branch: Mathematics, Semester-I

Paper-II: Algebra

(With effect from 2017-2018)

Unit-I: Integers

Sets – Some basic properties of integers – Mathematical Induction – Divisibility of integers – Representation of Positive Integers - Prime numbers and Euclid's division Algorithm -Fundamental Theorem on arithmetic.

Unit-II: Number Theory

Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation-Congruence, linear Congruence problems -Euler's function definition - Theorem of Fermat's and Wilson.

Unit- III: Matrix Algebra-I

Introduction-- Types of Matrix-- Operations - Cofactor matrix -- Transpose of a matrix --

Ad joint matrix -- The Inverse of a Matrix-- Rank of a Matrix – Elementary operations, Normal form of a matrix, Echelon from of a Matrix

Unit-IV: Matrix Algebra-II

Characteristic Roots -- Characteristic Values and Characteristic Vectors of square Matrix –Cayley-Hamilton Theorem. Unit–V: System of Linear Equations:

Direct Methods- Matrix Inversion Method -- Gaussian Elimination Method -- Method of Factorization.

Prescribed Text books:

- 1. "Introduction to Discrete Mathematics" by Dr.M.K.Sen& Dr.B.Chakraboety, Books and Allied (P) Ltd.
- 2. **"A Competitive Approach to Linear Algebra"** by **Dr.Sudhir Kumar Pundir**, Pundir Published by Pragathi Prakashan.
- 3. **"A text Book of B.Sc., Mathematics"** by **B.V.S.S.Sarma and other** Published by S. Chand & Company Pvt. Ltd., New Delhi.

<u>Reference Books</u>:

- 1. Dr.A.Anjaneyulu, "A text book of B.Sc Mathematics", Deepthi Publications.
- 2. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
- 3. Matrices by Shanti Narayana, published by S.Chand Publications.

Model Paper

D.R.W. (Autonomous) College: Gudur

B.Sc. Mathematics (Hons.) First Year Degree Examinations-2017

Branch: Mathematics, Semester-I

Paper-II: Algebra

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x5=10M Each question carries 5 marks.

- 1. Use mathematical induction to show that $1+2+3+\ldots+n=$, for all non-negative integer n.
- 2. Find L.C.M & G.C.D of 5040 by using canonical form.
- 3. Given that A = . Verify that $-4A + 5 \square \boxdot 0$.
- 4. If A= express $A^{6}-4A^{5}+8A^{4}-12A^{3}+14A^{2}$ as a linear polynomial of A.
- 5. Show that the equation x+y+z-3=0, 3x-5y+2z-8=0, 5x-3y+4z-14=0 are consistent and solve them.

PART-B

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

1125

- 6. Let A, B, C be any three sets. Then prove that $A \cap (BUC) = (A \cap B)U(A \cap C)$.
- 7. Convert these integers from hexadecimal to binary notation:
 - (i) (2FB5)₁₆ (ii) (3DE9)₁₆

<u>UNIT-II</u>

- 8. State & Prove the Fundamental theorem of Arithmetic.
- 9. State &Prove the Wilson's theorem.

UNIT-III

- 10. Find the rank of the matrix
- 11. Find the inverse of the matrix

UNIT-IV

	$A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \end{bmatrix}$	
12. Find the chara	teristic roots and vectors to the matrix $\begin{bmatrix} 0 & 0 & 2 \end{bmatrix}$.	
2 1	2	
$A = \begin{bmatrix} 5 & 3 \end{bmatrix}$	3	
13. If [-1 0	-2 verify cayley – Hamilton theorem. Hence find A^{-1}	1.
	<u>UNIT-V</u>	

- 14. Solve the following system by the method of Factorization: 2x-3y+10z=3; x+4y+2z=20; 5x+2y+z=-12.
- 15. Solve the following system: 8x+y+z=8; 2x+4y+z=4; x+3y+5z=5.

D.R.W. (Autonomous) College: Gudur	2231
I B.Sc. Mathematics (Hons.) Syllabus	
Semester-II, Core Paper 3: Real Analysis	60 Hrs
(With effect from 2017-2018)	

UNIT –I

Real Numbers: The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Definition of Sequences, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence, properly divergent sequences, Definition of Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II: Infinite Series: Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms. P-test, Cauchy's nth root test or Root Test, 'D-Alembert's" Test or Ratio Test, Alternating Series – Leibnitz Test. Absolute convergence and conditional convergence, semi convergence.

UNIT – III

Continuity: Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion.

Continuous functions: Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV: Differentiation and Mean Value Theorems: The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – V: Riemann integration: Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable

functions, Fundamental theorem of integral calculus, First Mean value Theorem **Prescribed Textbook:**

N.Krishna Murthy &Others "A text book of B.Sc.MathematicsVol–II",(old book) S.Chand & Company, New Delhi".

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi

publications

MODEL PAPER

2231

B.Sc. Mathematics (Hons.)., I Year Degree Examinations - 2018

II Semester, DSE: Mathematics

Paper III: Real Analysis

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

PART-A

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

- 1. Every bounded sequence has at least one limit point.
- 2. Using Cauchy's principle proves that is divergent.
- 3. Prove that f(x) = and f(o) is continuity at x = 0.
- 4. Discuss the derivability f(x) = -1 if x f(x) = 1 x if x < 1.
- 5. Prove that where K.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT –I</u>

6. (a) {} is bounded increasing sequence ⇔ lim=sup {/n 202}

(b) {} is bounded decreasing sequence \Leftrightarrow lim=inf {/n \mathbb{N} }.

- 7. State and Prove Bolzano Weierstrass theorem for sequence. UNIT –II
- 8. State and Prove P-test.
- 9. State and prove D'Alembert's ratio test.

<u>UNIT –III</u>

- 10. Discuss the continuity of f(x) = if x f(0) = 0 at the origin.
- 11. If a function f is continuous on [a, b], then it is uniformly continuous on [a, b].

<u>UNIT –IV</u>

- 12. State and prove Rolle's Theorem.
- 13. Using Lagrange's theorem, Show that $x > \log (1+x) >$.

<u>UNIT V</u>

- 14. Define Oscillatory sum and find W(P, f) if $f(x) = x^3$ on [0, 1] and P = {0, 1/4, 2/4, 3/4}.
- 15. State and prove Darboux's theorem.

D.R.W. (Autonomous) College: Gudur	2232
I B.Sc. Mathematics (Hons.) Syllabus	
Semester-II, Core Paper 4: Differential Equations	60 Hrs
(With effect from 2017-2018)	

UNIT –I

Differential equations of first order and first degree: Linear Differential equations, Differential equations reduced to linear form, exact differential equations, Integrating factors, orthogonal trajectories.

UNIT –II

Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x, Equation that do not contain x (or y); Equations of the first degree in x and y- Clairaut's equation.

UNIT –III

Higher order linear differential equations – **I:** Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D)y = Q when Q is a function of x

is Expressed as partial fractions.

P.I of f(D)y = Q when Q = b

P.I of f(D)y = Q when Q is b or b

UNIT –IV

Higher order Linear Differential Equations – II: Solution of the non homogeneous linear differential equations with constant co-efficient.

P.I. of f(D)y = Q when Q = bP.I. of f(D)y = Q when Q = VP.I. of f(D)y = Q when Q = xV

P.I. of f(D)y = Q when Q =

UNIT-V

Higher order Linear Differential Equations – III: Method of variation of parameters, linear differential equations with non constant coefficients, the Cauchy - Euler equation.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, and New Delhi.

Reference Books:

- 1. Differential equations and their applications by Jafar Ashan , Published by prentice –Hall of India Learning Pvt.Ltd New Delhi Second edition.
- 2. Ordinary and partial differential equations Raisinghania published by S.Chand & Company, New Delhi
- 3. Differential equations with applications and programs S.Balachandra Rao & HR Anuradha universities press.

Practical: As for theory

MODEL PAPER

B.Sc. Mathematics (Honos.)., I Year Degree Examinations - 2018

II Semester – Branch: Mathematics

PAPER IV: DIFFERENTIAL EQUATIONS

(With effect from 2017-2018)

Time: 3 Hours

Max. Marks: 60

2232

<u>PART-A</u>

Answer any TWO out of FIVE Questions. 2x5=10M

Each question carries 5 marks.

- 13. Solve: x dy y dx = x.
- 14. Solve: y+ px =.
- 15. Solve: (+1) y= 0.
- 16. Solve: (D²+1) y=^{secx}.

17. Solve: $(D^2 - 2D)y = e^x sinx$ by the method of variation of parameter.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

UNIT-I

18. Solve: $x^2y dx - (x^3+y^3) dy = 0$.

19. Show that the family of Confocal conics $\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1$ is self orthogonal, where λ is

parameter.

<u>UNIT-II</u>

20. Solve: $y^2 \log y = xpy + p^2$

21. Solve: $p^2+2pycotx=y^2$, where $p=\frac{dy}{dx}$

UNIT-III

22. Solve: $(D^2+4) y = e^x + \sin 2x + \cos 3x$. 23. Solve: $(D^2 - 4D + 3) y = \frac{\sin 3x \cos 2x}{2}$.

UNIT-IV

- 24. Solve:
- 13. Solve: $(D^2 4D + 4) y = x^3$.

UNIT-V

14. Solve: $x^2 \frac{d^2 y}{dx^2 + 3x} \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$

15. Solve: () y=tan ax, by the method of variation parameter.

Matrix Algebra: Introduction-Basic definitions- Matrix operations –Symmetric Matrix- Skew symmetric matrix –Cofactors matrix - Transpose of a matrix - The Inverse of a Matrix (order 2).

Unit-II:

Linear Equations: (3 order only)

Ad joint of a square matrix - Inverse of square matrix by using Adj A - Rank of Matrix.

Unit-III: Solution of Linear Systems:

Direct Methods-Matrix Inversion Method- Gaussain Elimination Method-Method of Factorization.

Unit-IV: Numerical Methods:

Introduction- Solution of algebraic and transcendental equations:

Bisection method - Method of false position - Newton- Raphson method.

Unit – V: Finite Differences and Interpolation:

Finite Differences - Forward differences - Backward differences – Newton's forward interpolation formula – Newton's backward interpolation formula - Lagrange's Interpolation formula and problems.

Note: 1. Proofs of theorems and derivations of Expressions are omitted.

Prescribed text book: Scope as in "Introductory Methods of Numerical Analysis" by S.S.Sastry, Prentice Hall India (4thEdition)

Reference Books:

- 1. "A Text Book of Matrices" by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Numerical Methods by P. Kandaswamy, K. Thilagavathy, K. Gunavathy by S.Chand.
- 3. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

MODEL PAPER

B.Sc.Computer Science (Hons.) First Year Degree Examinations - 2017

I Semester –Generic Elective-I

PAPER – VI: ELEMENTARY MATHEMATICS

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 60 marks

PART-A

Answer any TWO out of FIVE Questions. 2x5=10M Each question carries 5 marks.

- 1. If A = , B = compute AB and BA?
- 2. Find the ad-joint of the matrix
- 3. Solve the equations 3x+y+2z=3; 2x-3y-z=-3; x+2y+z=4 by the inversion method.
- 4. Find a real root of the equation $x=e^{-x}$ by using Newton Raphson Method.
- 5. Construct a Newton's divided differences for the function x^3+5x-7 for x = -1, 0, 1, 2, 3, 4, 5

<u>PART-B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

- 6. Given that A = .Verify that $-4A + 5 \square \blacksquare 0$.
- 7. Solve the following system x + 2y = 1, 2x 3y = 4

<u>UNIT –II</u>

- 8. Find the rank of the matrix .
- 9. Find the inverse of the matrix

<u>UNIT –III</u>

- 10. Solve the following system by the method of Factorization: 2x-3y+10z=3; x+4y+2z=20; 5x+2y+z=-12.
- 11. Solve the following system: 8x+y+z=8; 2x+4y+z=4; x+3y+5z=5.

<u>UNIT –IV</u>

- 12. Find a real root of the equation $f(x) = x^3-2x-5$ by using Regular Flasi Method.
- 13. Find a real root of the equation x^3-x-1 by using Bisection Method.

<u>UNIT –V</u>

14. Construct the forward and backward differences tables from the following data

Х	10	15	20	25	30	35
Y	19.97	21.51	22.47	23.52	24.65	25.89

15. Using Lagranges formula , Calculate f(3) from the following table

х	0	1	2	4	5	6
f(x)	1	14	15	5	6	19

B.Sc. (Honors) COMPUTER SCIENCE 2223-A

Generic Elective 2: Semester II

Differential Equations 60 Hrs

Unit-I: Differential equations of first order and first degree (12 Lectures)

Introduction, Homogeneous functions, Homogeneous differential equations, Equations reducible to homogeneous form, exact differential equations and orthogonal trajectories.

Unit-II: Integrating factors (12 Lectures)

Equations reducible to exact form, Definition-Methods of find integrating factors of Mdx+ Ndy=0; Linear Differential Equations; Bernoulli's equation.

Unit-III: Differential equations of the first order but not of the first degree (12 Lectures)

Equations solvable for p; Equations solvable for y; Equations solvable for x Equation that do not contain x (or y); Equations of the degree in x and y- Clairaut's equation.

Unit-IV: Higher order linear differential equations – I (12 Lectures)

Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D) y = Q when Q is a function of x

is expressed as partial fractions.

P.I of f(D) y = Q when Q = b

P.I of f(D) y = Q when Q is b or b

Unit-V: Higher order Linear Differential Equations – II (12 Lectures)

Solution of the non homogeneous linear differential equations with constant coefficients.

P.I. of
$$f(D) y = Q$$
 when $Q = b$

P.I. of f(D) y = Q when Q = V

P.I. of f(D) y = Q when Q = xV

P.I. of f(D) y = Q when Q =

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, New Delhi.

Reference Books:

- 1. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- 2. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 3. G.Shankar Rao" A text book of Mathematics for B.Sc Vol I, Himalaya Publishing House.
- 4. Differential equations with applications and programs- S.Balachandra Rao & H.R.Anuradha, universities press.

MODEL PAPER

B.Sc. Computer Science (Hons.)., I Year Degree Examinations - 2018

II Semester, GE 2: Mathematics

GE Paper 2: Differential Equations

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

PART-A

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

- 1. Solve: $x^2y dx (x^3+y^3) dy = 0$.
- 2. Solve: $(x^2+y^2+x) dx +xy dy=0$
- 3. Solve: y + px =
- 4. Solve: =
- 5. Solve: $(D^2-5D+6) y = e^{4x}$.

PART-B

5x10=50M

Answer any FIVE Questions. Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

6. Solve:

7. Show that the family of Confocal conics + = 1 is self orthogonal, where \times is parameter.

UNIT-III

- 8. Solve (1+xy) x dy + (1-xy) y dx = 0
- 9. Solve $+ = x^2y^6$

UNIT-III

- 10. Solve: $y^2 \log y = xpy + p^2$
- 11. Solve: $p^2+2pycotx=y^2$, where p=

UNIT-IV

- 12. Solve: $(D^2+4) y=+\sin 2x+\cos 3x$.
- 13. Solve: (- 4D +3) y =

<u>UNIT-V</u>

- 14. Solve: $(D^2-2D+2) y=e^x tanx.$
- 15. Solve: (- 4D +4) y =

I B.Sc. (Honors) COMPUTER SCIENCE 2222 -A

Core Paper 4: Semester II

Discrete Structures 60 Hrs

Unit–I: Set Theory (12 Lectures)

Introduction-Basic Concepts of Set Theory - finite and infinite sets, uncountable Infinite Sets; Functions-Inverse function, Composite function, Relations-Properties of Binary Relations, Closure, Partial Ordering Relations.

Unit–II: Mathematical Logic (12 Lectures)

Connectives: Negation-Conjunction- Disjunction-Statement Formulas and Truth Tables-Conditional and Bi conditional -Well-formed Formulas, Tautologies- Equivalences Formulas-Duality Law. **Unit-III: Normal forms** (12 Lectures)

Disjunctive Normal Forms – Conjunctive Normal Forms- Principal Disjunctive Normal Forms - Principal Conjunctive Normal Forms- Ordering and Uniqueness of Normal Forms.

Unit-IV: The Theory of Inference for the Statement Calculus: (12 Lectures)

Validity Using Truth Tables- Rules of Inferences- Consistency of Premises and Indirect Method of Proof– Automatic theorem proving.

Unit–V: Graph Theory (12 Lectures)

Basic Concepts of Graph Theory– Basic definitions- Paths, Reachability and Connectedness –Matrix representation of Graphs-Trees.

Prescribed Text books:

Scope and standard as in the book" Discrete Mathematical structures with applications to computer science" by Tremblay, J.P and Manohar.R-Published by McGraw-Hill International Edition 1987 edition.

Recommended Books:

 C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill
Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006
COMPUTER SCIENCE LAB (C-IV): Discrete Structures Practical

Practicals based on the theory

Note: Total-150Marks

Theory- 60Marks, Practicals- 50Marks, Internal assessment- 40Marks

MODEL PAPER

B.Sc. Computer Science (Hons.)., I Year Degree Examinations - 2018

II Semester, DSE: Mathematics

Paper IV: Discrete Structures

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

<u>PART-A</u>

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

1. Prove that = .

- 2. Explain Disjunction & Conjunction with truth table.
- 3. Construct the truth table for $(P \lor Q) \lor \neg P$.
- 4. Obtain disjunctive normal form of $(P \lor Q) \Leftrightarrow P \land Q$.
- 5. Determine whether the conclusion C follows logically from the premises H_1 and H_2 .
 - (i) H₁: $P \rightarrow Q$, H₂: P, C: Q
 - (ii) $H_1: P \rightarrow Q, H_2: Q \rightarrow R, C: P \rightarrow R.$

<u>PART-B</u> 5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

$\underline{UNIT} - \underline{I}$

6. Prove that A B)

7. Let f(x) = x + 2, g(x) = x - 2 and h(x) = 3x, then find gof, fog, fof, gog, foh, hog, hof and fogoh.

<u>UNIT – II</u>

8. Explain Conditional and Bi-Conditional.

9. Show that $((\mathbb{P} \lor \mathbb{Q}) \land \widehat{(\mathbb{P} \land (\mathbb{Q} \lor \mathbb{R}))}) \lor (\mathbb{P} \land \mathbb{Q}) \lor (\mathbb{P} \land \mathbb{R})$ is tautology.

<u>UNIT – III</u>

10. Explain PCNF and PDNF

11. Obtain the product sums canonical form of $(P \land Q \land R) \lor (\neg P \land R \land Q) \lor (\neg P \land \neg Q \land \neg R)$.

$\underline{UNIT} - IV$

12. Show that $R \land (P \lor Q)$ is valid conclusion from the premises

 $P \lor Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\rceil M$

13. Show that the following premises are inconsistent:

(i) If Jack misses many classes through illness then he fails high school.

(ii) If Jack fails high school, then he is uneducated.

(iii) If Jack reads a lot of books, then he is not uneducated.

(iv) If Jack misses many classes through illness and reads a lot of books.

$\underline{UNIT - V}$

14. (a). Explain Warshall's algorithm.

(b). Draw the 6 non-isomorphic trees with 6 vertices.

15. Explain tree traversals.

II B.Sc.Computer Science (Hons.) 3324

Generic Elective 3: Semester III

Vector Calculus

Unit–I: Derivative of Vector function (12 Lectures)

Definitions: Vector function of a scalar variable, interval, limit of vector function, continuity of vector function, Derivative-Higher order derivatives- Derivative of Constant Vector-Vector with constant magnitude- Composite Vector function- Partial Differentiation.

Unit-II: Differential Operators (12 Lectures)

Definitions: Scalar point function, Vector point function, Delta neighborhood, Limit, Continuity-Directional derivative at a point- Level surface- Operators- Gradient, Divergence, Curl operators-Formulae Involving these operators- Divergence of a vector.

Unit–III: Vector Identities (12 Lectures)

Solenoidal vector- Curl of a vector- Irrotational vector- Vector identities- Theorems based on vector identies.

Unit–IV: Vector Integration (12 Lectures)

Line Integral, Surface Integral and Volume integral with examples.

Unit–V: Integral Transformations (12 Lectures)

Gauss's divergence theorem- Deductions from Gauss's theorem- Green's theorem in a plane-Stokes theorem- Stokes theorem in a plane.

Prescribed Text books:

Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol III, S.Chand & Company, New Delhi.

Reference Books:

- 1. Dr.A.Anjaneyulu "III B.Sc. A Text book of Mathematics", Deepthi Publication.
- 2. G.Shankar Rao" A text book of Mathematics for B.Sc Vol III, Himalaya Publishing House.
- 3. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 4. Vector Calculus by R. Gupta, Published by Laxmi Publications.

MODEL PAPER

B.Sc.Computer Science (Hons.) Second Year Degree Examinations – 2017

II Semester – Generic Elective-3

Vector Calculus

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

1. If r=xi+yj+zk and x=2sin3t,y=2cos3t,z=8t then prove that $\parallel=10$ and $\parallel=18$.

2. If A =.

3. Find the directional derivative of the function in the direction of the vector+2j+2k at the point (1, 2, 0).

4. Find grad f at the point (1, 1, -2), where.

5. If f=(x+3)i+(y-2z)j+(x+pz)k is a solenoidal find p.

- 6. Prove that curl (AB)=A divB –B div A +(B.)A (A.)B
- 7. If A= and B=. Find .
- 8. Compute dv over the sphere = 1.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

<u>UNIT – I</u>

9. If $r=a \cot i + a \sin j + at \tan k$, find and.

10. If and "a" is constant vector prove that.

(i) (a.r)k =

(ii)(ar).k=0

$\underline{UNIT - II}$

11. If ; prove that

[grad a, grad b, grad c]=0.

12. Find the directional derivative of the function along the tangent to the curve x = t, y =, z = at the point (1,1,1)

<u>UNIT – III</u>

13. If is a constant Vector, prove that curl = + (a.)

14. (a) Prove that div (A.

(b) If A= and find .

$\underline{UNIT - IV}$

15. If F=4xzi -j+yzk, evaluate where S is the surface of the cube bounded by x=0,x=a, y=0,y=a, z=0,z=a.

16. If F=2xzi-xj+k Evaluate .dv where v is the region bounded by the surface x=0,x=2,y=0,y=6,z=,z=4.

UNIT –V

17. State and prove stokes theorem.

18. Verify Gauss's divergence theorem to Evaluate

Over the surface of a cube bounded by the

Co-ordinate planes x=y=z=a

II B.Sc.Computer Science (Hons.) 4424-A Generic Elective 4: Semester IV Fundamentals of Mathematical Statistics

Unit–I

Introduction: Scope and limitations of statistical methods – classification of data - Tabulation of data - Diagrammatic and Graphical representation of data- Graphical determination of percentiles and quartiles.

Unit–II

Measures of location: Arithmetic Mean- Median- Mode- Geometric Mean and Harmonic Mean and their properties.

Unit–III

Measures of dispersion: Range- Quartile deviation- Mean deviation- Standard deviation-Combined standard deviation- Co-efficient of variation and Simple problems.

Unit-IV

Skewness: Measures of Skewness Karl Pearson's-Bowley's, Kelly's and co-efficient of Skewness and kurtosis based on moments. And simple problems.

Unit-V

Correlation and Regression: Correlation definition, types of correlation . Karl Pearson - spearman's rank correlation - concurrent deviation methods. Regression Analysis: Simple Regression Equations.

Prescribed Text books:

Fundamental of Mathematical Statistics by V.K. Kapoor & S.C. Gupta, Sultan Chand.

Reference Books:

1. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII

- 2. Elements of Statistics Mode . E.B. Prentice Hall
- 3. Statistical Methods Dr. S.P. Gupta Sultan Chand & Sons

4.BA/BSC I Year Statistics -descriptive statistics, Probability Distribution : telugu Academy

MODEL PAPER

B.Sc.(computer Honors), II Year Degree Examinations

IV-SEMESTER, DSC: Mathematics

G.E - Paper-IV: Fundamental Mathematical Statistics

(w.e.f: 2018-2019)

TIME: 3 Hrs Max marks:60

Answer any TEN questions, choosing at least TWO from each unit.

Each question carries SIX marks.

UNIT-I

- 1. Define Statistics, scope and limitations of Statistics?
- 2. Explain about tabulation of data?
- 3. Explain about bar diagram briefly ?
- 4. Draw a histogram and frequency polygon?

Wages	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of	7	10	12	15	18	12	9	3
workers								

UNIT-II

- 5. What is measures of central tendency and write its characteristics ?
- 6. Define median ?Also write its merits and demerits?
- 7. Calculate mode to the following data.

C.I	10-20	20-30	30-40	40-50	50-60	60-70
Frequencies	10	3	23	20	12	11

8. Calculate harmonic mean to the following data.

C.I	10-15	15-20	20-25	25-30	30-35	35-40
Frequencies	3	9	13	22	12	11

UNIT-III

- 9. Define Standard deviation .Also write its merits and demerits?
- 10. Calculate mean deviation about mean to the following data.

C.I	20-30	30-40	40-50	50-60	60-70
Frequencies	5	12	21	8	2

11. Define Quartile deviation . What are the advantages and disadvantages ?

12. Calculate co-efficient of variance to the following data

C.I 0-	-10	10-20	20-30	30-40
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UNIT-IV

13. Explain about Skewness ?

14. Show that .

15. Calculate Karl person coefficient of skewness to the following data.

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
frequency	2	6	11	20	40	75	45	25	18	8

16. Explain about Kurtosis.

UNIT-V

17. Explain Fitting of regression line X on Y.

18. Distinguish between correlation and regression.

19. Define Correlation. And their types with examples.

20. The data is given below is marks in two subjects mathematics and statistics of B.Sc.

Students.

	mathematics	statistics
Average marks	39.5	49.5
Standard deviation	10.8	16.8

The correlation coefficient between marks in two subjects is 0.4 .Estimate the marks in statistics if the marks in mathematics is 52.

D.R.W. (Autonomous) College: Gudur 1130

B.Sc. Food Technology and Management First Year Degree Syllabus

Branch: Mathematics, Semester-I

Paper: APPLIED MATHEMATICS-1

(With effect from 2017-2018)

<u>Matrix</u>

Unit – I

Matrices: Introduction to matrices, types of matrices, addition, subtraction and multiplication of matrices, transpose, cofactor, ad joint of matrices.

Unit - II

Inverse of 3×3 -matices, solutions of simultaneous equations in 2 and 3 unknown's variables by using matrix inversion methods.

Differentiation

Unit- III

Differential calculus: Introduction to differentiation, evaluation of derivatives of Xⁿ, U+V,

U-V, U+V+W, UV, U/V.

Unit – IV

Growth rates for exponential and logarithmic and periodic (trigonometrically) functions, Function of a function role.

Unit- V

Differentiation of a function w.r.to another function- logarithmic differentiation-implicit differentiation- parametric differentiation.

Prescribed Book:

Intermediate mathematics Telugu Academic Mathematics IA&IB Text books

References:

- 1. Intermediate mathematics S. Chand & Co. New Delhi volume -I & II
- 2. A Text book of Matrices: Shanthi Narayan 1990 S.Chand & Co. New Delhi.
- 3. Differential calculus: Shanthi Narayan 1990 S.Chand & Co. New Delhi.

Model Paper

D.R.W. (Autonomous) College: Gudur

1130

B.Sc. Food Technology and Management First Year Degree Syllabus

Branch: Mathematics, Semester-I, 2017

Paper: APPLIED MATHEMATICS-1

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 60

PART-A

Answer any TWO out of FIVE questions.

2x5=10M

Each question carries 5 marks.

16. Given that A = . Verify that $-4A + 5 \square \blacksquare 0$.

- 17. Find the co-factor matrix of the matrix A=
- 18. Find , if y =
- 19. Find the derivative of log(
- 20. If $x = a \cos^3 t$, $y = a \sin^3 t$ then find

<u>PART-B</u> 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit.

Each Question carries 10 marks.

<u>UNIT-I</u>

- **21.** Find the ad-joint of the matrix
- **22.** If $A = \text{ then find } (A')^{-1}$

<u>UNIT-II</u>

23. Find the inverse of the matrix

24. Solve 3x+4y+5z=18; 2x-y+8z=13 and 5x-2y+7z=20 by using Matrix inversion method.

UNIT-III

- 25. Find the derivative of by using first principal derivative.
- 26. Find derivative:

UNIT-IV

- 27. Find , if y=
- 28. If then prove that =

UNIT-V

- 29. If = a(x-y) then show that
- 30. If x=, y= then find

D.R.W. (Autonomous) College: Gudur

B.Sc. Food Technology and Management, I Year Degree 2254

II Semester – GE 2: Mathematics

Paper: Applied Mathematics- II

(With effect from 2017-2018)

UNIT-I

Trigonometry: Measurement of angle, trigonometric rations of compound angles.

UNIT-II

Increasing and decreasing function, maxima and minima of functions, applications of maxima& minima.

UNIT-III

Quadratic equations: The quadratic formula, sum, product of roots, nature of roots of $ax^{2}+bx+c=0$.

UNIT-IV

Sign of quadratic expressions, change in signs and maximum minimum values, quadratic inequality.

UNIT-V

Integration- introduction- integration as the inverse process of differentiation- standard form-Method of substitution-integration of algebraic- exponential, logarithmic, trigonometric and inverse trigonometric functions.

<u>Prescribed Text Books:</u> Intermediate telugu academic books volume I&II

Reference Books:

Intermediate telugu academic books papers IA&B, IIA&B text books Intermediate IA&B, IIA&B text books, Chand Publications

MODEL PAPER

2254

B.Sc. Food Technology and Management, I Year Degree Examinations - 2018

II Semester – GE 2: Mathematics

Paper: Applied Mathematics- II

(With effect from 2017-2018)

Time: 3 Hours

Max. Marks: 60

<u>PART-A</u>

Answer any TWO out of FIVE Questions. 2x5=10M

Each question carries 5 marks.

1. Find $sin^2 82 - sin^2 22$

2. Find two positive integers x and y such that x + y = 60 and xy^3 is maximum.

- 3. Find the nature of the roots $x^2-7x+12=0$
- 4. Find the value of x at which the expression have maximum or minimum x^2+5x+6
- 5. dx on I⊂ [2nπ, (2n+1)π], n⊠⁄Ω

<u>PART-B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

UNIT –I

- 6. Let ABC be a triangle such that + =
- 7. If tan 20° = p then prove that =

UNIT –II

- 8. A window is in the shape of a rectangle surmounted by a semi- circle. If the perimeter of the window be 20 feet then find maximum area?
- 9. If the curved surface of right circular cylinder inscribed in a sphere of radius r is maximum, show that the height of the cylinder is r.

UNIT –III

- 10. Find the values of m for x^2 -15- m (2x- 8) = 0 equations have equal roots.
- 11. If x is real, prove that lies between 1 and

UNIT –IV

- 12. Find the maximum value of the function over R.
- 13. Prove that+-does not lie between 1 and 4, if x is real.

UNIT –V

- 14. dx on R
- 15. dx on (-1,∞)

Foundation Course - 8

4404-1-A

ANALYTICAL SKILLS Common Syllabus for all Second Year Degree W.e.f. 2015-16 (Revised in April, 2016) Semester – IV

UNIT – 1

Data Analysis:-The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT – 2

Sequence and Series: - Analogies of numbers and alphabets completion of blank spaces following the pattern in A: b::C: d relationship odd thing out; Missing number in a sequence or a series.

UNIT - 3

Arithmetic ability:-Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF).

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

UNIT - 4

Quantitative aptitude: - Averages, Ratio and proportion, Problems on ages, Time-distance – speed.

UNIT – 5

Business computations: - Percentages, Profit &loss, Partnership, simple compound interest.

Reference Books:

1. Quantitative Aptitude for Competitive Examination by Dr.R. S. Aggarwal, S.Chand publications.

2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.

3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers

4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.

5. Old question Paper of the exams conducted by (Wipro, TCS, Infosys, Etc) at their recruitment process, source-Internet.

Note: The teachers/students are expected to teach /learn the contents by not converting them to the problems of algebra at the maximum possible extent, but to use analytical thinking to solve the exercises related to those topics. This is the main aim of the course.

4404-1-A

D.R.W. Autonomous College: Gudur

Common paper for all Second Year Degree

Foundation Course Examinations

Fourth Semester

Foundation Course Paper 8: ANALYTICAL SKILLS

Time: 2 Hours

Max. Marks: 50

Write any 25 questions out of 50. All questions carry equal marks.

కోరిండి 50 ప్రేర్తనతుండి 25 పరశ్నలకుమాధానములు వరాయండిఅన్ సపరశ్నలకుమార్ కులు సమానము

<u>UNIT –I</u>

Direction (సూచనలు): Q. No: 1 to 5

Study the following table carefully to answer these questions. Percentage of mark obtained by six students in six different subjects.

కోరండుట్టికనజాగ్రతతు సించి దిగువ ఇవ్ పటిడిన ప్రశేనలకు మాధానములు ఇవ్ యండిలు

Subject Student	History (చరితేø (out of 50)	Geography (జియోగ్రాఫీ) (out of 50)	Maths (ก _็ เลือง) (out of 150)	Science (సైన్ని (out of 100)	English(ఇంగ్లీష) (out of 75)	Hindi (హిందీ) (out of 75)
Amit (అమిత్)	76	85	69	73	64	88
Bharat (భరత్)	84	80	85	78	73	92
Umesh (ఉమేష్)	82	67	92	87	69	76
Nikhil (సికిల్)	73	72	78	69	58	83
Pratiksha (ప్ రతీక్ర్ ష	68	79	64	91	66	65
Ritesh (రితిష్)	79	87	88	93	82	72

పిభిన్నసబ్జెక్టు ఆతోరుగురు పిద్యార్ థు ఆట్ చిన మార్ కులు కోరండుట్ టికలో ఇవ్ వబడినపి.

1. What is approximately the integral percentage of marks obtained by Umesh in all subject? ఉమేష్ అనే పిద్**యార్**థి**జుల**న్సి సబ్జెక్ట్ టులరోసమగ్**రహాట్**షిన మార్క్ కులు శాతం ఎంత ?

(a) 80% (b) 84 % (c) 86 % (d) 78%

2. What is the average percentage of marks obtained by all students in Hindi? (approximated to two places of decimal)

పొందీ సబ్జెక్టులలోఅండింద్యార్థుతుంచిన మార్కులు శాతం యొక్క సరాసర ఎంత ?

(a) 77.45 % (b) 79.33 % (c) 75.52 % (d) 73.52%

- 3. What is the average mark of all the students in mathematics? గణితంలో అందరు పిద్యార్థమాంధించిన సరాసరి మార్కులు ఎంత ?
 - (a) 128 (b) 112 (c) 119 (d) 138
- 4. What is the average mark obtained by all students in Geography? జియోగ్రాఫీలో అందరు పిదయార్థ మూర్రించిన సరాసరి మార్ కులు ఎంత ?
 - (a) 38.26 (b) 37.26 (c) 37.16 (d) 39.16

5. What are the total marks obtained by Pratiksha in all the subjects taken together?

అన్సి సబ్జెక్టుల్లోరతక్ష్మోతేతంనాధించిన మార్ కులు ఎంత ?

(a) 401.75 (b) 410.75 (c) 420.75 (d) 402.75

Direction (సూచనలు): Q. No: 6 to 10

Product of Fertilizers by a company (in 10000 tones) over the years

ఇచేషిన Bar- Graph ను పరిశీలించి కోరండిర్ఈనలకుమాధానం ఇవ్యండింపినీలో పిపిధ సంవత్సరాలలో ఎరుమల ఉత్పత్**టి**వేల టన్నులలో).

- 6. In how many of the given years was the production of fertilizers more than the average production of the given years? ఇచచిన సంవత్సరాలలో ఎరుమల సగటు ఉత్పత్తింటె ఎన్సి సంవత్సరంలో ఉత్పత్తిక్ కువగా ఉన్నది?
 - (a) 1 (b) 2 (c) 3 (d) 4
- 7. The average production of 1996 and 1997 was exactly equal to the average production of which of the following pairs of years? 1996, 1997 సంవత్సరాలలో సగటు ఉత్పత్తితోరండుంవత్సరాలజంటలోని దీసిలో సగటు ఉత్పత్ఊచేచితంగా సమానము? (a) 2000 and 2001(2000 మరయు 2001) (b) 1995 and 2001(1995 మరియు 2001) (c) 1998 and 2000 (1998 మరియు 2000) (d) 1995 and 1999 (1995 మరియు 1999)
- 8. What was the percentage decline in the production of fertilizers from 1997 to 1998? 1997 మరియు 1998 వరకు ఎరుమల ఉత్పతోతలోకోషిణుతతము? (a) 33 % (b) 30% (c) 25% (d) 21%
- 9. In which year was the percentage increase in production as compared to the previous year the maximum?

ముందు సంవత్సరంలో పోలిస్తేమి సంవత్సరంలో ఉత్పత్ తియేంపుదల శాతము గిరష్టటము

- (a) 2002 (b) 1999 (c) 1996 (d) 1997
- 10. What was the percentage increase in production of fertilizers in 2002 compared to that in 1995? 1995 తో వోలన్తే2002 సంవత్సరాలలో ఎరుమల ఉత్పత్**పి** శాతము మేరకు పొరిగింది? (a) 320% (b) 300% (c) 200% (d) 220%

<u>UNIT –II</u>

Complete the following series:

కోరండికేరేణులనుపురించండి
11	. 45, 54, 63, (a) 32	(b) 55	(c) 18	(d) 64
12	. 29 ,37, 43 , (a) 45	(b) 80	(c) 40	(d) 47
13.	MN: OP			
	(a) AD: PR	(b) CE: TQ	(c) QR: ST	(d) RS: TV
14.	B: 16:: D:			
	(a) 120	(b) 190	(c) 200	(d) 256
15.	20, 40, 60, 80,			
	(a) 90	(b) 85	(c) 100	(d) 110
16.	2B, 4C, 6E, 8H,			
	(a) 10L	(b) 9P	(c) 8F	(d) 13M
17.	D -4, F-6, H-8, J-10),		
	(a) Z-1	(b) N-10	(c) M- 16	(d) L- 12
18.	Find out the odd o	one		
	కోరందూటలోతప్ మప	దం కనుక్కోండి		
	(a) 19	(b) 17	(c) 13	(d) 12
19.	Girl : Beautiful :: E	Boy:?		
	బాలికా : అందమైన :	: బాలుడు : ?		
	(a) Smart	(b) handsome	e (c) heroic	(d) pretty

20. Find the odd word

కోరండూటిలోతప్ పుప ద	ం కనుక్కోండ										
(a) Orange	(b) Apple	(c) guava	(d) Grapes								
		<u>UNIT –III</u>									
21. The sum of the first 60 natural numbers is											
మొదటి 60 సహజస	ంఖ్ యటొత్ తం										
(a) 1830	(b) 1803	(c) 1083 (d	d) 1820								
22. If then find the va అయితే యొక్క సి	alue of రలువ ఎంత ?										
(a)	(b)	(c)	(d)								
23. Simplify 2– [3– {6 2– [3– {6– (5- }] ;	— (5- }] సూక్ష్ మౌరకరంచు	ము									
(a) 5	(b) 2	(c) 1	(d) 0								
24. Simplify 0.6 0.6 + 0.6	5 6										
0.60.6+0.6 6 సూక	కేష్ మొరకరంచుము										
(a) 0.02	(b) 0.46	(c) 0.004 (d) 0.03									
25. Which of the followi	ng fraction is the si	mallest?									
కోరందిభీన్నాలలో చిన్న	ාස් බස් ?										
(a)	(b)	(c)	(d)								
26. Which is the result = ? దీసి పిలువ ఎ	cof =?)o త ?										
(a) 1 27. Simplify of 0.176 , 0.176 సూక్ష్ మొర	(b) 2 కోరంచుము	(c)	(d)								
(a) 0.48	(b) 0.048	(c) 480	(d) 4800								
28. What is the HCF o 27, 18 మరియు 36	of 27, 18 and 36? 5 ల గిరష్ణుమానం	భాజకము ఎంత?									
(a) 7	(b) 11	(c) 9	(d) None of these (ఏదీకాదు)								
29. Determine the LCI	M of , and?										

, మరియు	ల క .సా .గు. ఎం	<u>ඡ</u> ?	
(a)	(b)	(c)	(d) None of these (ఏదీకాదు)
30. Find the HCF 36 مىكامى 8	F of 36 and 84 4 ల యొక్క గ .సా.	భా. ఎంత?	
(a) 4	(b) 6	(c) 12	(d) 18

<u>UNIT -IV</u>

31.	31. Average of 3, 7, 9 and 13								
	3, 7, 9 మరియు 13 ల యొక్క సరాసరి								
	(a) 7	(b) 8	(c) 2	(d) 4					
32.	The average of first	100 natural numb	ers is						
	మొదటి 100 సహజ	సంఖ్యతురాసరి	ఎంత?						
	(a) 52.5	(b) 50.5	(c) 51.5	(d) 5.1					
33.	The fourth proportion	onal to 4, 9, 12							
	4, 9, 12 ల చతుర్ఈ	సుహత సంఖ్యం	ාత?						
	(a) 27	(b) 30	(c) 20	(d) 15					
34.	Divide Rs. 672 in the	e ratio 5: 3 then th	e second part va	alue					
	రూ. 672 ను 5: 3 పిభజించిన రెండవ భాగం ఎంత?								
	(a) 251	(b) 250	(c) 248	(d) 252					
35.	If 12 : 15 :: x : 15 the	en x =?							
	12 : 15 :: x : 15 ම	ಯೆತೆn x =?							
	(a) 0.12	(b) 12	(c) 1.2	(d) 1.12					
36.	36. If then (x+5): (y+8) is equal to అయితే (x+5): (y+8)								
	(a) 3: 5	(b) 13:8	(c) 8:5	(d) 5:8					
37.	The sum of the ages	of father and his	son is 88 years. I	f the ratio between their ages is 7: 4.					
	Then find their ages	5							

తండిర్త కొడుకుల వయస్^{*}సు7: 4 పార వయస్^{*}సలమొత్తం88 అయితే పార వయస్^{*}సులుఎంత? (a) 56, 30 (b) 56, 28 (c) 56, 32 (d) 56, 26

38. Sachin is younger than Rahul by 4 years. If their ages are in the respective ratio of 7:9 how

Old is Sachin?

(a) 16 years (b) 18 years (c) 28 years (d) None of these సెటినే, రాహుల్ కంటే 4 సం లు టిన్న పారి వరుస వయసులు 7: 9 గా ఉంటే సెటినే వయనేసుఎంత? (b) 18 సంలు (c) 28 సంలు (d) ఏదీకాదు (a) 16 సంలు 39. How many minutes' does Aditya take to cover a distance of 400m. If he runs at a speed of 20 Km/hr? (a) 72 sec (b) 64 sec (c) 92sec (d) 70sec ఆదిత్య కి.మీ/గం వేగంతో 400 మీ. దూరం పోవడానికి ఎన్సిసిమేషాలు పడుతుంది? (a) 72 నోకానుకు (b) 64 నోకానుకు (c) 92 నోకానుకు (d) 70 నెకానుకు 40. A car moves at the speed of 80 km/hr. What is the speed of the car in meters per sound? (a) 8m/sec(b) 20 m/sec(c) 22 m/sec (d) None of these కారు వేగం 80 కి.మీ / గం అది ఎన్సి మీ/ నెకానుకు సంమానము (a) 8 మీ/ నెకానుకు (b) 20 మీ/ నెకానుకు (c) 22 మీ/ నెకానుకు (d) ఏదీకాదు <u>UNIT –V</u> 41. 45 % of 750 - 25% of 480 =? (b) 217.50 (c) 236.50 (a) 216 (d) 245 42. If 75% of a number is added to 75 then the result is the number itself. The number is ఒక సంఖ్యలో5% కు 75 కలిపితే పలితం ఆ సంఖ్యాయోమతుంది. అపుడు సంఖ్యంత? (a) 50 (b) 60 (c) 300 (d) 400 43. A shopkeeper expects a gain of 22 ½ % on his cost price. If in a week, his sale was of Rs.392, What was his profit? (a) Rs.18.20 (b) Rs.70 (c) Rs. 72 (d) Rs.88.25 దుకాణదారు పెట్టుభాడివై 2 1/2 % లాభం ఆశించి , పారంలో రూ. 392 లకు అమ్మకజిరిపాడు. అప్పుడు అతసి లాబం ఎంత ? (a) రూ.18.20 (b) రూ.70 (c) రూ. 72 (d) රා.88.25 44. Successive discount of 10%, 12 % and 15% amount to a single discount of (a) 32.68 % (b) 35.28% (c) 36.68 % (d) None of these 10%, 12 % మరియు 15% వరకు తగోగంపులుకోరిండినే తగోగింపుకాతానికి సమానము (d) ఏదీకాదు (a) 32.68 % (b) 35.28% (c) 36.68 %

45. A, B and C enter into partnership. A invests 3 times as much as B invests and B invests two Third of what C invests. At the end of the year, the profit earned is Rs. 6,600. What is the Share of B? (a) Rs.1,000 (b) Rs.1,200 (c) Rs.1,100 (d) Rs. 1,400 A,B,C లు భాగస్వామ్యంటేరారు. B మూలధనాసికి 3 రెట్లుA, C మూలధనంలో వంతు మూలదనంలో B పెట్**టుభాడపెట్**టగాసింవత్**సరం**చివర రూ. 6,600 లాభం వచేచింది. వాటా ఎంత ? (a) රා.1,000 (b) රා.1,200 (c) が.1,100 (d) රూ. 1,400 46. Find the simple interest on Rs. 68,000 at 16 % per annum for 9 months. (a) Rs.8,500 (b) Rs. 6,000 (c) Rs. 4,000 (d) Rs. 8,000 16 % p.a (సంవత్సరాసికి) S.I. తో రూ. 68,000 అసలు 9 నెలలో ఎంత వడేడొందుతుంది ? (d) రూ. 8,000 (a) රා.8,500 (b) రూ. 6,000 (c) రూ. 4,000 47. A person buys a toy for Rs.50 and sells for Rs.75 what will be his gain percent? ఒకడు టీమ్మనురూ. 50 కొస్తి, రూ. 75 అమ్మేతీతసి లాబ శాతమెంత? (a) 40 % (b) 30 % (c) 50 % (d) 60 % 48. Find the simple interest on Rs. 4,000 for 4 years 5 % per annum. (a) Rs.800 (b) Rs.500 (c) Rs.300 (d) Rs.1,000 5% p.a. S.I. తో రూ. 4.000 అసలు 4 సంవత్సరాలో ఎంత వడోడొందుతుంది? (a) రూ.800 (b) రూ.500 (c) **ひ**^{*}.300 (d) රා.1,000 49. Find compound interest on Rs.7,500 at 4 % per annum for 2 years compounded annually. (a) Rs.8,111 (b) Rs.8,110 (c) Rs.8,113 (d) Rs.8,112 ప్రతిసింవతేసరంవడేడుమ్మేళనంచేస్తేరూ7,500 పై 4 % p.a తో 2 సం లకు అయ్యాిక్రవడేడిత? (a) రూ.8,111 (b) రూ.8,110 (c) రూ.8,113 (d) රා.8,112 50. Find compound interest on Rs.20, 480 at 6 % per annum for 2 years 73 days is (d) Rs.3,636 (a) Rs.2,929 (b) Rs.3,000 (c) Rs.3,1313 రూ. 20,480 పై 2 సం 73రోజులలో 6 % p.a తో అయ్యాిక్రవడడి (a) රා.2,929 (b) රා.3,000 (c) రూ.3, 1313 (d) රා.3,636

D.R.W. Autonomous College: Gudur

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FIRST YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

I Semester, Generic Elective Paper

GE Paper-2: ECONOMETRIC STATISTICS

(With effect from 2017-2018)

UNIT-I

Introduction of statistics: Meaning and scope of statistics. Concepts of primary and secondary data methods of collection and editing of primary data designing a questionnaire and a schedule presentation of data.

UNIT-II

Diagrammatic representation: Bar diagrams and pie charts.

Graphical representation: Histogram, frequency curve, Ogives.

UNIT-III

Measures of central tendency: Mean, Median, Mode, Harmonic mean, Geometric mean- its merits and demerits

UNIT-IV

Measures of dispersions: Range, Quartile deviation and standard deviation, Mean deviation and its merits and demerits. Co-efficient of variance

UNIT-V

ECONOMETRICS: Meaning and features of Econometrics; Scope of Econometrics; Concepts of Two variable and Three variable Linear models and their inference; Specification of general linear model and assumptions; OLS Estimation and BLUE estimation .

<u>Reference Books:</u>

1. Fundamentals of mathematical statistics: S.C.Guptha and V.K. Kapoor

2. Descriptive Statistics and probability BA/BSc Iyear statistics - Telugu Academy

MODEL PAPER

2233

B.Sc. Mathematics (Hons.), I Year Degree Examinations

II Semester, Generic Elective Paper

GE Paper-2: ECONOMETRIC STATISTICS

(With effect from 2017-2018)

Time: 3 hours Max. Marks: 60

Answer any TEN questions, choosing at least TWO from each unit.

Each question carries SIX marks.

<u>UNIT-I</u>

- 1. Define Statistics, scope and limitations of Statistics?
- 2. Explain about tabulation of data?
- 3. How do you designing a questionnaire? What are the merits and demerits?
- 4. Explain about secondary data?

<u>UNIT-II</u>

5. Draw a histogram and frequency Curve?

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of	7	10	12	15	18	12	9	3
workers								

- 6. Explain about line diagrams?
- 7. Explain Ogive curve?
- 8. Write the limitations of bar diagram?

UNIT-III

- 9. What is measures of central tendency and write its characteristics?
- 10. Define Harmonic mean? Also write its merits and demerits?
- 11. Calculate Median to the following data:

C.I	10-20	20-30	30-40	40-50	50-60	60-70
Frequencies	10	3	23	20	12	11

12. Calculate mean to the following data:

C.I	10-15	15-20	20-25	25-30	30-35	35-40
Frequencies	3	9	13	22	12	11

UNIT-IV

- 13. Define Standard deviation. Also write its merits and demerits?
- 14. Calculate mean deviation about median to the following data:

C.I	20-30	30-40	40-50	50-60	60-70
Frequencies	5	12	21	8	2

15. Define Quartile deviation. What are the advantages and disadvantages?

16. (a) Define range. What are the merits and demerits?(b) Compute Standard deviation of the values 10, 6, 8, 12, 20, 14, 2.

<u>UNIT-V</u>

- 17. Explain two variable linear models.
- 18. Explain BULE.
- 19. Explain General linear model.
- 20. Define Econometrics. What are the features of Econometrics?

D.R.W. AUTONOMOUS COLLEGE: GUDUR 1110-B

I B.SC, MATHEMATICS, FIRST SEMESTER

PAPER I – Differential Equations

(With effect from 2017-2018)

UNIT – I:

Differential equations of first order and first degree: Linear Differential equations, Differential equations reduced to Linear form, Exact differential equations, Integrating factors, Change of Variables, Orthogonal trajectories.

UNIT-II:

Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x, Equation that do not contain x (or y); Equations of the first degree in x and y- Clairaut's equation.

UNIT-III:

Higher order linear differential equations - I: Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D)y = Q when Q is a function of x

is Expressed as partial fractions.

P.I of f(D)y = Q when Q = b

P.I of f(D)y = Q when Q is b or b

UNIT – IV:

Higher order Linear Differential Equations – II:

Solution of the non homogeneous linear differential equations with constant coefficients

P.I. of f(D)y = Q when Q = b

P.I. of f(D)y = Q when Q = V

P.I. of f(D)y = Q when Q = x V

P.I. of f(D)y = Q when Q =

UNIT – V:

Higher order Linear Differential Equations – III:

Method of variation of parameters, linear differential equations with non constant coefficients, the Cauchy - Euler equation

Prescribed Text books:

Scope as in V. Venkateswara Rao &others "A text book of B.Sc. Mathematics Vol I, First year first semester, S. Chand & Company, and New Delhi.

Reference Books:

- 1. Differential equations and their applications by Jafar Ashan ,Published by prentice –Hall of India Learning Pvt.Ltd New Delhi Second edition.
- 2. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- **3.** Ordinary and partial differential equations Raisinghania published by S.Chand & Company, New Delhi
- **4.** Differential equations with applications and programs S.Balachandra Rao & HR Anuradha universities press.

I and II SEMESTER

CBCS B.Sc.MATHEMATICS

w.e.f. 2017-18 (Revised in September 2017)

MODEL QUESTION PAPER

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 60

<u>PART-A</u> Answer any TWO out of FIVE questions.

2x5=10M

Each question carries 5 marks.

- 1. 2. 3. 4.
- 5.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

- 6.
- 7.
- 8.
- 9. 10.

11.

12.

13.

14.

15.

Instruction to Paper Setter:

Two questions must be given from each unit in Part-B

MODEL PAPER

1110-B

B.Sc. I Year Degree Examinations – 2017

I Semester – Branch: Mathematics

PAPER – I: DIFFERENTIAL EQUATIONS

Time: 3 Hours

Max.Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x5=10M

Each question carries 5 marks.

1. Solve: x dy-y dx=x.

సాధించండి: x dy- y dx=x

2. Solve: y+ px =.

సాధించండి: y+ px =

3. Solve: (+1) y= 0.

సాధించండి: (+1) y= 0

4. Solve: (D²+1) $y = \frac{secx}{2}$.

సాధించండి: (D²+1) y= ^{secx}

5. Solve: $(D^2 - 2D)y = e^x sinx$ by the method of variation of parameter.

పరామేతుల మార్1పుపద్ధతినుపయోగంషి $(D^2 - 2D)y = e^x sinx$ ను సాధించండి.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

UNIT-I

6. Solve: $x^2y dx - (x^3+y^3) dy = 0$.

సాధించండి:
$$x^2y dx - (x^3+y^3) dy = 0$$

7. Show that the family of Confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$ is self orthogonal, where is parameter.

పరామేతిగా ఉన్న, ఏకనాభియ శాంకపాల కుటుంబము $\frac{x^2}{a^2+\lambda}+\frac{y^2}{b^2+\lambda}=1$ న్వలంబకోణియ

వక్రాతుటుంబమని చూపండి.

<u>UNIT-II</u>

8. Solve: $y^2 \log y = xpy + p^2$

సాధించండి: $y^2 \log y = xpy + p^2$

9. Solve: $p^2+2pycotx=y^2$, where p=dx.

సాధించండి: p²+2pycotx=y², ఇక్కడ p = $\frac{dy}{dx}$.

UNIT-III

- 10. Solve: (D²+4) y= e^{x} +sin2x+cos3x. సాధించండి: (D²+4) y= e^{x} +sin2x+cos3x.
- 11. Solve: $(D^2 4D + 3) y = \frac{\sin 3x \cos 2x}{2}$.

సాధించండి: (D^2 - 4D +3) y = $\frac{\sin 3x \cos 2x}{2}$

UNIT-IV

12. Solve:

సాధించండి:

13. Solve: (
$$^{D^2} - 4D + 4$$
) y = x^3 .
నాధించండి: ($^{D^2} - 4D + 4$) y = x^3

UNIT-V

- 14. Solve: $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$ సాధించండి: $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$
- 15. Solve: () y=tan ax, by the method of variation parameter.
 పరామేతుల మార్¹పుపద్ధతనుపయోగంచి() y=tan ax ను సాధించండి.

D.R.W. (Autonomous) College: Gudur

I B.SC, MATHEMATICS, SECOND SEMESTER 2210-A

PAPER II - Solid Geometry

(With effect from 2017-2018)

UNIT-I: The plane: Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT-II: The Lines: Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines.

UNIT-III: Sphere -I: Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle 0`

UNIT -IV: Sphere -II: Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal,Radical plane. Coaxical system of spheres, Limiting points.

UNIT-V: Cone& Cylinder: Definitions of a cone, vertex, Quadric cones with vertex at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone.

Definitions, Elliptic cylinder, Hyperbolic, Parabolic, cylinder with base guiding curve, Equation of a cylinder, the right circular cylinder, Enveloping cylinder.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, S.Chand & Company, and New Delhi.

Reference Books:

- 1. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 2. V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year second semester, S.Chand & Company, New Delhi.

3. P.K Jain and Khallel Ahmed, "A text book of Analytical Geometry of Three Dimentions" Wiley Eastern Ltd., 1999.

MODEL PAPER 2210-A

B.Sc., I Year Degree Examinations - 2018

II Semester, DSE: Mathematics

PAPER – II - SOLID GEOMETRY

(With effect from 2017-2018)

Time: 3 hours

Max. Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x 5 =10M

Each question carries 5 marks.

1. Find the equation of plane through (4, 4, 0) and perpendicular to the planes x+2y+2z= 5 and 3x+3y+2z-8= 0.

(4, 4, 0) బిందుమ గుండా పోతూ , x+2y+2z= 5 మరియు 3x+3y+2z-8= 0 తలాసికి లంబంగా ఉన్నతలాసికి

సమీకరణం కనుక్కోండి.

- 2. Find the image of the point (2, -1, 3) in the plane 3x-2y+z=9. 3x-2y+z=9 అను తలంలో (2, -1, 3) **ఓందుమ యోక్ ప్**రతిటింబమునుకనుకేకోండి.
- Find the centre and radius of the sphere x²+y²+z²-6x+2y-4z+14=0.
 x²+y²+z²-6x+2y-4z+14=0. గోళాలకు కేంద్ మరియు వ్యాసార్**షానుకోకండి.**
- 4. Find the enveloping cone of the sphere x²+y²+z²+2x-2y-2=0with its vertex at (1, 1, 1).
 *ర్షము(1,1,1) గా ఉండి x²+y²+z²+2x-2y-2=0 అన గోళమునకు స్పర్శశంఖమ యొక్క సమీకరణం

కనుకేకోండి .

5. Find the equation to the right circular cylinder whose axis is x= 2y= -z and having the radius 4. x= 2y= -z అక్షంగాను4 వ్**యా**నార్**థముమేడుపర్**తుణ్**తూపకుచుకరణం కనుక్**రిండి .

PART-B 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

6. Determine the planes through the intersection of the planes 2x+3y-z+4=0, x+y+z-1=0 and which

are parallel to the co-ordinate axes.

2x+3y-z+4=0, x+y+z-1=0 అన తలాల చదన రక గుండా పోతూ సిరూపకాకలను సమాంతరంగా ఉండి

తలాలను **కనుకోకోండి**.

7. A variable plane at a constant distance p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of the tetrahedron OABC is $x^{-2}+y^{-2}+z^2=16p^{-2}$.

ఒక చరతలము మూలబిందుమ నుండి ఎల్లప్ ముథుదూరంలో ఉండి సిరుపకాకలను A,B,C. ల

వద్**డుండించుచున్నది.** OABC చతు కేంద్**రా**బాసముయోక్ కి బిందుపదము x⁻²+y⁻²+z²=16p⁻².

అసి చూపండి.

<u>UNIT-II</u>

8. Prove that the lines and x+2y+3z-8=0=2x+3y+4z-11 are intersecting and find the point of their intersection. Find also the equation to the plane containing them.

మరియు x+2y+3z-8=0=2x+3y+4z-11 అను రే**ఖలు ఖండించుకుంటయాసి రుజుమచేయండి మరియు**

ఖండన బిందుమను కనుక్కోండి. ఇంకా ఆ రేఖలనుకలిగిన ఉన్నతలాసి కనుక్కోండి.

9. Find the S.D between the lines find also the equation and the points in which the S.D meets the given lines.

అను రేఖల మధ్యుల్పతమదూరాన్ ని కనుకోకోండి. ఇంకా అల్పతమరేఖ సమీకరణములు మరియు ఈ

రేఖ ఇచేచిన రేఖను ఖండించు బిందుమలను కనుక్కోండి.

<u>UNIT-III</u>

10. Find the equation of the sphere through the points (1, 0, 0), (0, 1, 0), (0, 0, 1) and having the least radius.

(1, 0, 0), (0, 1, 0), (0, 0, 1) **ఓందుమల గుండా పోతూ కసెష్**టుయానార్ఱుిి న గోళము సమీకరణాన్సి

కనుకేకోండి .

11. Find the equation of the sphere if the circle is $x^2+y^2+z^2=9$, x-2y+2z-5=0 is great circle and also find its centre and radius.

 $x^{2}+y^{2}+z^{2}=9$, x-2y+2z-5=0 అనే వృతం గురువృతంగా గల గోళము సమీకరణము కనుకోకోండి.

ఇoకా దాసి కేంద్రంవ్యాసార్ధకుతుక్కోండి.

UNIT-IV

12. Show that the plane 2x-2y+z=12=0 touches the sphere x²+y²+z²-2x-4y+2z-3=0 and find the point of contact.

x²+y²+z²-2x-4y+2z-3=0 అనే గోళాన్సి2x-2y+z=12=0 తలము స్పృశిస్తుంజిని చూపి మరియు దాసి స్పర్

బిందుమ కనుక్కోండి.

13. Find the limiting points of the coaxial system defined by the spheres x²+y²+z²+4x+2y+2z+6=0 and x²+y²+z²+2x-4y-2z+6=0. x²+y²+z²+4x+2y+2z+6=0 **మరియు** x²+y²+z²+2x-4y-2z+6=0 సమీకరణాలు సూచించే గోళాలతో సిర్**ది**చ్ఛటమయ్యే

సహతల గోళ సరణి అవధి బిందుమలు కనుక్కోండి.

<u>UNIT-V</u>

- 14. Find the vertex of the cone 7x²+2y²+2z²-10zx+10xy+26x-2y+2z-17=0. 7x²+2y²+2z²-10zx+10xy+26x-2y+2z-17=0 అను **శంఖమనకు శిర్**థ కనుకోకోండి.
- 15. Find the equation of the enveloping cylinder of the sphere x²+y²+z²-2x+4y-1=0 having its generators parallel to the line x=y=z. జనకరేఖలు x=y=z అను రేఖకు సమాంతరంగా ఉంటు x²+y²+z²-2x+4y-1=0 అను గోళమునకు

స్పర్ శిందుమ కనుక్ కోండి .

D.R.W. AUTONOMOUS COLLEGE: GUDUR 3310-A

II B.Sc, MATHEMATICS, THIRD SEMESTER

PAPER III: REAL ANALYSIS

(With effect from 2018-2019)

UNIT - I: **REAL NUMBERS**: The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Definition of Sequences, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence, properly divergent sequences, Definition of Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano- Weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II: INFINITIE SERIES:

Series: Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

- 1. P-test
- 2. Cauchy's nth root test or Root Test.
- 3. D'- Alembert's Test or Ratio Test.
- 4. Alternating Series Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III: CONTINUITY:

Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion. *Continuous functions:* Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV: DIFFERENTIATION AND MEAN VALUE THEORMS:

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT - V: RIEMANN INTEGRATION:

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First Mean value Theorem.

Prescribed Textbook:N.Krishna Murthy &Others''A text book of B.Sc.MathematicsVol -II,(old book) S.Chand & Company, New Delhi''.

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi

publications.

I, II, III and IV SEMESTER

CBCS B.Sc. MATHEMATICS

MODEL QUESTION PAPER PATTERN

(With effect from 2018-2019)

Time: 3 Hours

Max.Marks: 60

<u>PART-A</u> Answer any TWO out of FIVE questions.

2x5=10M

Each question carries 5 marks.

- 1. 2. 3. 4.
- 5.

<u>PART – B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

- 9.
- 10.
- 11.
- 12.

13. 14.

14. 15.

15. 16.

17.

18.

Instruction to Paper Setter:

One question must be given from each unit in Part-A Two questions must be given from each unit in Part-B

MODEL PAPER

SECOND YEAR B.Sc. DEGREE EXAMINATIONS-2018

Branch: Mathematics, Semester-III

PAPER III – REAL ANALYSIS

(With effect from 2018-2019)

Time: 3 Hours

Max Marks: 60

PART-A

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

- Every bounded sequence has at least one limit point.
 ప్రతురబద్య సుక్రమానికి సీసం ఒక అవధి బిందుమ ఉంటుంది.
- 2. Prove that is not convergent. అభిసరించదు అసి రుజుమచేయండి.
- 3. Prove that f(x) = and f (o) is continuity at x = 0.
 f(x)= అయితే మరియు x = 0 పద్ద (o) ప్రమేయ అపిఫిన్నం అసి చూపండి.
- 4. Discuss the derivability f(x) = -1 if x f(x) = 1 x if x < 1. f(x) = -1 **ಅಯೆ**න් x , f(x) = 1 - x **ಅಯೆ**න් x < 1 **ಅಯೆ**ನವಿ್ಮುದು f ವಿರಮೆಯಂ ಯಿಕ್ಕೆಕ

అవకలసీయతను చరేచించండి

5. Show that. అసి చూపండి.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT –I</u>

6. (a) {} is bounded increasing sequence ⇔ lim=sup {/n 2№}

{} అనుక్రమథురిబద్దఆరోహణం ⇔ lim= క.ఎ.హ {/n 🕅 🕅}

(b) {} is bounded decreasing sequence \Leftrightarrow lim=inf {/n $\square M$ }.

{} అనుక్రమతరిబద్దఅవరోహణం ⇔ lim= గ.ది.హ {/n బి౪ి.

State and Prove Bolzano Weierstrass theorem for sequence.
 బీల్జానోపియస్ట్రామ్దేదాతం ను సిర్వపిచి సిరూపిoచండి.

<u>UNIT –II</u>

- State and Prove P-test.
 P- శ్రేజురీకేషినసిర్వపించిందినిరూపించండి.
- State and prove D'Alembert's ratio test.
 డి ఆలంబర్ట్ మేరీక్షను సిర్వపించిని రూపించండి.

<u>UNIT –III</u>

- 10. Discuss the continuity of f(x) = if x f(0) = 0 at the origin. f(x) = అయితే x f(0) = 0 వద్**డుపిఫిన్**నం ను చర్**చించండి.**
- 11. If a function f is continuous on [a, b], then it is uniformly continuous on [a, b]. [a, b] మీద f ప్రమేయఱపిఫిన్నం అయితే అప్పుడుఅది [a, b] ఏకరూప అపిఫిన్నం.

UNIT -IV

- State and prove Rolle's Theorem.
 రోలే సిద్దాంతమ సిర్వపించిసిరూపించండి.
- 13. Using Lagrange's theorem, Show that $x > \log (1+x) >$. లెగ్రాంజీసిద్*దాంతమ* ఉపయోగంచి $x > \log (1+x) >$ అసి చూపండి.

<u>UNIT V</u>

 14. Define Oscillatory sum and find W (P, f) if f(x) = x³ on [0, 1] and P = {0, 1/4, 2/4, 3/4}.

```
f(x) = x^3 ప్రమేయం[0,1] వద్a = \{0, 1/4, 2/4, 3/4\} అయితే W(P, f) పిలువను కనుకోకోండి.
```

15. State and prove Darboux's theorem. డార్బూసిద్ధాంతాన్**షెర్**వచించిసిరూపించండి.

D.R.W. Autonomous College: Gudur

4410-A

II B.Sc. Mathematics, FOURTH SEMESTER

PAPER IV: ABSTRACT ALGEBRA

(With effect from 2016-2017)

UNIT-I: Number Theory

Elements of Number Theory - prime and composite numbers- Definition of Euclid's division Algorithm & Divisibility - Fundamental Theorem on arithmetic - Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation- Congruence, linear Congruence problems -Euler's function definition - Theorem of Fermat's and Wilson .

UNIT – II: Groups and Subgroups

Groups: Binary operation-Algebraic structure- Semi group –Definition of Monoid - Group definition and Elementary properties- Order of a Group - Composition Tables with examples.

Subgroups: Complex definition – multiplication of two complexes inverse of a complex-Definition of subgroup-examples-criterion for a complex to be a sub groups-Criterion for the product of two subgroups to be a subgroup-union and intersection of subgroups.

UNIT-III: Cosets and Lagrange's theorem& Normal subgroups

Cosets and Lagrange's theorem: Cosets definition – properties of cosets- Index of subgroups of a finite groups-Lagrange's theorem.

Normal Sub groups: Definition of Normal sub group- Simple groups- Quotient groups (or) Factor groups.

UNIT-IV : Homomorphism -Definitions of Homomorphism - Isomorphism and Automorphism - Properties of Homomorphism- Fundamental theorem on Homomorphism of groups - Definition of Inner and outer Automorphisms of a group, Kernel of a homomorphism .

UNIT-V Permutation Groups& Cyclic Groups

Permutation Groups: Definitions of Permutation- Orbits and cycles of permutation, Disjoint Cycles, Even and Odd permutation problems, Inverse permutation, Cayley's theorem.

Cyclic Groups: Definition of cyclic group - Classification of cyclic groups - Order of the cyclic group problems - Find the number of generators problems.

Prescribed Textbook: N.Krishna Murthy & others "A text book of Mathematics for B.Sc Volume-II, S.Chand & Company, New Delhi.

Reference books: Dr.A.Anjaneyulu "A text book of B.Sc. Mathematics Volume–II", Deepthi publications.

MODEL PAPER 4410-A

B.Sc., II Year Degree Examinations

IV Semester, DSE: Mathematics

Paper IV - ABSTRACT ALGEBRA

(With effect from 2017-2018)

Time: 3 hours

Max. Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2x 5=10M Each question carries 5 marks.

- If p is a prime and a, b then p|ab => p|a or p|b
 P ప్oధానుంఖ్యమిరియు a, b అయితే p|ab => p|a లేక p|b అసి చూపండి.
- 2. Let G be a group. If a, bG=> (a=. G ఒక సమూహము అనుకోండి , a, bG=> (a=.
- 3. If G is a group and H is a sub group of index 2 in G then H is a normal subgroup of G G ఒక సమూహము G లో H ఉప సమూహము. H యొక్కసూటిక 2 అయితే G లో H అటలంబ ఉప

సమూహము.

- Every homomorphic image of an abelian group is abelian.
 ఒక పిసిమయ సమూహము యొక్క ప్**ర**తీసమరూపతురతింటముఒక పిసిమయ సమూహము అమతుంది.
- If f = (2 5 4) (1 4 3) (2 1) find the disjoint cycles and find inverse of its cycle.
 f = (2 5 4) (1 4 3) (2 1) అనే లాబ్దనిపియుక్తచక్రాల**మ**రియు పిలేమచక్రాలను కనుకోకండి.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT –I</u>

- 6. State & Prove the Fundamental theorem of Arithmetic. ప్రాధమతుంకగణత సిద్దాంతంనపిర్ విచించి సిరూపించండి
- 7. State & Prove the Wilson's theorem

<u>UNIT –II</u>

8. Show that the set of all rational numbers form a group under the composition circle defined by , for a, b + ధనఅకరణీయ సంఖ్యమితి పై 'o' పరికోరయా,b+కు గా సిర్వచించపబడిన(+ , o) ఒక సమూహము అసి

చూపండి.

9. If and are two subgroups of G then is also a sub group of G ఒక సమూహము G లో లు ఉప సమూహములు అయితే కూడా G లేఉప సమూహము అవుతుంది.

<u>UNIT – III</u>

10. State and Prove the Lagrange's theorem.

సిద్**దాంతంనుసిర్**వచించి సిరూపించండి.

11. A sub group H of G is normal sub group of G iff each left coset of H in G is a right coset of H in G G లో H అభిలంబ ఉప సమూహము కావడానికి అవశ్**యాక**ర్**యాప్**తువుము G లో H యొక్**క** ప్**ర**త్

ఎడమ సహసమితి ఒక కుడి సహసమితి.

$\underline{UNIT - IV}$

- State & Prove the Fundamental theorem on Homomorphism.
 సమూహాలయోక్ సమరూపత మూల సిద్దదాంతంనుసిర్ వచించి సిరూపించండి.
- 13. If f is a homomorphism of a group G into a group G then the kernel of f is a normal sub group of G.

సమూహము G నుండి సమూహము G'కు f ఒక సమరూపత అయితే కెర్ f అనేది Gలో అభిలంబఉప

సమూహము అమతుంది.

<u>UNIT – V</u>

- State and Prove Cayley's theorem.
 కెయిలీ సిద్దాంతంనుసర్వపించి సిరూపించండి.
- Every sub group of a cyclic group is a cyclic.
 చకోరయుమూహము యొక్ పరిఊప సమూహము చకోరయము

లెగ్రంజేస్

D.R.W. AUTONOMOUS COLLEGE: GUDUR 55101

B.Sc. THIRD YEAR MATHEMATICS SYLLABUS Branch: Mathematics, Semester-V

PAPER- V: RING THEORY & MATRICES

(With effect from 2017-2018)

UNIT – I: Rings-I : Definition of Ring and basic properties, Boolean Rings, Zero Divisors of Ring - Cancellation laws in a Rings - Integral Domain Division Ring – Fields Examples.

UNIT-II: Rings-II: Characteristic of Ring, Characteristic of an Integral Domain – Characteristic of Field Characteristic of Boolean Ring. Sub Ring Definition – Sub ring test – Union and Intersection of sub rings – Ideal Right and left Ideals – Union and Intersection of Ideals -- Excluding Principal, prime and maximal Ideals.

UNIT –III: Rings-III: Definition of Homomorphism – Homomorphism Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

UNIT – IV: Matrix-I: Rank of a Matrix – Elementary operations – Normal form of a matrix Echelon from of a Matrix - Solutions of Linear Equations System of homogenous Linear equations – System of non Homogenous Linear Equations method of consistency.

UNIT – V : Matrix-II : Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

Prescribed Text books:

A text Book of B.Sc.Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

Reference Books:

- 1. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.
- 2. Matrices by Shanti Narayana, published by S.Chand Publications.
- 3. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.

MODEL PAPER

III B.Sc DEGREE EXAMINATIONS - 2017

BRANCH: MATHEMATICS- V SEMESTER

PAPER-V: RING THEORY AND MATRICES

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 70

Part-A

Answer any FIVE out of EIGHT questions.

5x4=20M

Each question carries 4 marks.

- Define a ring, integral domain and field సిర్ పెటించండి: వలయం పూర్ ణాం కురదేశయిరయు క్ షేత్ రము
- A field has no zero divisors కోషేత్రవయి శూన్యాజకాలు లేమ
- If R is a non zero ring so that a²=a, . Prove that the characteristic of a ring is two R ఒక శూన్యేత**ప**లయం అయి a²=a, అయితే R యొక్క లాక్షోణకం 2 అసి సిరూపించండి.
- The characteristic of an integral domain is either prime or zero పూర్ణాంఖ్రదేశయొక్ లాక్షణికఅభాజ్యంఖ్యాసి లేక సున్నకాసి అవుతుంది.
- 5. The homomorphic image of a ring is ring ఒక వలయం యొక్క సమరూపత ప్**రతి**ఓింబయరల వలయమే అమతుంది.
- 6. If f is a homomorphism of a ring R in to the ring R¹ then f is an in to Isomorphism iff kerf={0}
 - f: $R \rightarrow R^1$ వలయ సమరూపత అయితే అనేవేకసమరూపత కావడానికి Ker f = {o}

అవడం, ఆవశ్యకముమిరయు పర్యాప్తమూ

7. Solve the following system of linear equations by using Cramer's rule $x_1+2x_2+3x_3=2$, $x_1+x_3=3$, $x_1+x_2-x_3=1$

దిగువ సమీకరణాలను క్రామథుద్దదతిశుపయోగంచి నాధించండి

x₁+2x₂+3x₃=2, x₁+x₃=3, x₁+x₂-x₃=1

55101

8. If A= express $A^{6}-4A^{5}+8A^{4}-12A^{3}+14A^{2}$ as a linear polynomial of A.

 $A = అ control A^{6} - 4A^{5} + 8A^{4} - 12A^{3} + 14A^{2}$ ను A లో బుుజుబహుపదిగా రాయండి.

<u>Part -B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

9. If R is a Boolean ring then (i) a+ a = o a R

(ii) a+ b=o => a=b and

(iii) R is commutative under multiplication

R బూలియన్ వలయం అయితే (i) ప్**ర**ితీ కు a+ a = o

- (ii) **వ్**రతు, b R లకు a+ b=o => a=b మరియు
 - (iii) గుణకార పరికోరయదృష్ట్ యోపిసిమయం లేదా ప్రతిటూలీయన్ వలయము .

పిసిమయం.

10. Every finite integral domain is a field

ప్రతిపిరమత పూర్ డాంఖ్ రదేశ్ శ్రేతే అనుతుంది.

UNIT-II

11. Let S be a non empty subset of a ring R. Then S is a sub ring of R iff a-b S and ab S, a, b S

ఒక వలయం R లో S ఒక శూన్rయేతఉపసమేతి.R . లో S ఒక ఉపవలయం కావడానికి ఆవశ్rయక

పర్**యాప్**తసియమ(ల్లుa-b S మరియు (ii) abSbS

12. An ideal in Z is a maximal ideal iff it is generated by a prime integer పూర్ణాంకులయం Z లోసి ఒక ఐడియల్ అధికతమం కావడాసికి ఆవశేయుతర్యాప్తసియమం

ఐడియల్ ఒక అభాజ్యంఖ్యజీనితం కావడం.

UNIT-III

- 13. State and prove Fundamental theorem of homomorphism సమరూపత మూలసిద్దదాంతమునుమ్రవచించినరూపించండి
- 14. Every quotient ring of a ring is a homomorphism image of the ring . ఒక వలయం యొక్క ఏ వ్యుత్పనేశులయం అయిన దత్తవలయాసికుమరూపత

ప్రతిటింబం

UNIT-IV

15. Show that the equation x+y+z-3=0, 3x-5y+2z-8=0, 5x-3y+4z-14=0 are consistent and solve them.

దిగువ సమీకరణాలకు నాధన కలదు(పొంతన సియమం పాటించును) అసి చూపండి, మరియు

సాదించండి.

16. Compute the inverse of A= పిలేమ మాతారకనుకనుగొనండి

<u>UNIT-V</u>

- 17. Find the characteristic roots and vectors of the matrix మాతోరకయొక్ లాక్షణకమూలాలు, లాక్షణకుదిశలు కనుగోనండి.
- 18. Find the inverse of the matrix by using cayley Hamilton theorem. ఈ మాతోరకకు లీ-హామేల్టన్మోద్దాంతమునుపరిశీలించండి తద్వారాకనుగోనండి.

D.R.W. AUTONOMOUS COLLEGE: GUDUR 55102

B.Sc. THIRD YEAR MATHEMATICS SYLLABUS Branch: Mathematics, Semester-V

PAPER-VI: LINEAR ALGEBRA

(With effect from 2017-2018)

UNIT-I

Vector Spaces: Definitions of Vector space, vector subspaces, Algebra of subspaces, Linear combinations of vectors, Linear span, Linear sum of two subspaces, Linear independence and dependence of vectors.

UNIT-II

Linear Transformation-I: Vector space homomorphism, Linear Transformation, Range and Null space of a linear Transformation, problems

UNIT-III

Linear Transformation-II: Definitions of Vector space Isomorphism, Fundamental theorem of homomorphism, Singular and non-singular transformations, Inverse function, Uniqueness of inverse

UNIT-IV

Inner product spaces: Definition of Inner product spaces, Norm of Length of a vector, Cauchy-Schwartz's inequality, Triangle inequality, Parallelogram law, Normed vector space and distance, solved problems.

UNIT-V

Orthogonalilty: Orthogonal and orthonormal vectors, Geometrical Interpretation, orthogonal and orthonormal sets of inner products space, Gram- Schmidt Orthogonalisation process, Working method for finding, Orthogonal Basis.

Prescribed Text books:

N.Krishna Murthy & others "A text book of B.Sc mathematics Vol III.chand & company, New Delhi.

Reference books:

G.Shankar Rao a text book of mathematics for B.Sc Vol III. Himalaya Publishing House.

MODEL PAPER

55102

III B.Sc DEGREE EXAMINATIONS - 2017

BRANCH: MATHEMATICS- V SEMESTER

PAPER-VI: LINEAR ALGEBRA

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 70

Part-A

Answer any FIVE out of EIGHT questions. 5x4=20M

Each question carries 4 marks.

The set W of ordered triads (x, y, 0) where x, y EF is a subspace of V₃ (F).
 అనేసి x, y E F నకు (x, y, 0)అను క్**ర**చ**టోరకములులయితే** V₃ (F) నకు ఒక ఉహంతరాళం అసి

చూపండి.

- Express the vector (1,-2, 5) as a linear combination of the vectors. e1 =(1,1,1), e2 = (1,2,3), e3= (2,-1,1).
 అను సదిశను సదిశల ఋజుసంయోగంగా రాయండి.
- 3. The mapping T: V₃(R) V₁(R) is defined by T (a, b, c) = $a^2 + b^2 + c^2$ then T is a Linear

Transformation.

T: V₃(R) V₁(R) **ప్**రమేయం (a, b, c) =గా సిర్వపిస్తేఋజుపరివర్తనఅవుతుందా?

4. Let T: R³ R² and H: R²R³ is defined by T(x, y, z) = (x-3y-2z, y-4z) and H(x, y) = (2x, 4x-y, 2x+ 3y) compute HT and TH. Is product Commutative. T: R³ మారియు H: R²అనేపి రెండు ఋజుపరివర్**తనాలు**

T(x, y, z) = (x-3y-2z, y-4z), H(x, y) = (2x, 4x-y, 2x+ 3y) గా సిర్వచిసోజీ⊺ మరియు TH లను

రాబట్**టం**డిబ్**ద** పిసిమయమా?

- 5. If the linear operator T is defined by T(x, y, z) = (x+y+z, y+z, z) then find T⁻¹.
 T: పరివర్తనం(x, y, z) = (x+y+z, y+z, z) పరికోరయనపిర్వచినతే¹ను కనుకోకోండి.
- 6. Let T: U→V be a non singular linear transformation then prove that (=T. T: U→V **నాదారణ ఋజుపరివర్**తనఅయితే (=T అసి చూపండి.
- 7. If are two vectors in an inner product space V(F) then prove that $\| \alpha + \beta \| \| \alpha \| + \| \beta \|$.

V(F) అంతరలబ్దాంతరళంలే⁄/ అయితే || α + β || || α || + || β || అసి చూపండి.

8. Find a unit vector orthogonal to (4, 2, 3) in R³(R). R³(R) **అంతరాళంలో (**4, 2, 3) సదిశకు లంబంగా మండే యూసిట్ సదిశ ను కనుక్**కోండి.**

Part -B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

- 9. If W₁ and W₂ are two subspaces of vector space V(F) then L (W₁W₂) = W₁ + W₂. V (F) నకు W₁, W₂ ఉహంతరళాలు అయితే L (W₁W₂) = W₁ + W₂
- 10. S.T the system of vectors are L.I or L.D{(1,2,-1,1),(0,1,-1,2),(2,1,0,3),(1,1,0,0)} . {(1,2,-1,1),(0,1,-1,2),(2,1,0,3),(1,1,0,0)} అను సదిశా సమేతీ ఋజు న్హాతంత్ర్**యమే**క

ఋజుపరాదీనమో కనుక్కోండి.

<u>UNIT-II</u>

11. Let T: $V_3(R)V_3(R)$ be defined by T (a, b, c)=(3a, a-b,2a+b+c). Prove that $(T^2-I)(T-3I) = 0$.

T: V₃(R)V₃(R) **ప్రమేయరె** (a, b, c)=(3a, a-b,2a+b+c) **అసి సిర్**వచిన్**తే**

(T²-I)(T-3I) = 0 **అసి చూపండి.**

12. Prove that Kernel is a subspace of vector space V (F). V(F) సదిశాంతరాళాసికి శూన్యాంతరాళఉపాంతరాళం అమతుంది అసి చూపండి.

<u>UNIT-III</u>

- 13. State and prove Fundamental theorem of Homomorphism. సమరూప పరివర్త యొక్క పరాధామికుద్**దాంతంను రవటించిన రూపించండి.**
- 14. If T is linear operator on a vector space V (F) such that $T^2-T+I=0$ then show that T is invertible.

 $T^2-T+I=0$ అగునట్లు (F) పై T ఋజుపరికొరయాలయితే T పిలేమం అసి చూపండి.

<u>UNIT-IV</u>

15. If u,v are two vectors in complex inner product space then prove that $4 < \mathbf{u}, \mathbf{v} > = || \mathbf{u} + \mathbf{v} ||^2 - ||\mathbf{u} - \mathbf{v}||^2 + \mathbf{i} ||\mathbf{u} + \mathbf{i}\mathbf{v}||^2 - \mathbf{i} ||\mathbf{u} - \mathbf{i}\mathbf{v}||^2$

సంకీర్ణుంతర లబ్దాంతాళంలో u,v లు రెండు సదిశలు అయితే పరమణ అంతర లబ్దందృష్ట్యా

 $4 < \mathbf{u}, \mathbf{v} > = || \mathbf{u} + \mathbf{v} ||^2 - || \mathbf{u} - \mathbf{v} ||^2 + i || \mathbf{u} + i \mathbf{v} ||^2 - i$ అని చూపండి.

16. State and prove Cauchy's Schwarz's inequality. "కోషి కేహర్టోమ్ానతలు" సిర్వచించిసిరూపించండి.

<u>UNIT-V</u>

- 17. Define distance of α , β and if are two Orthogonal vectors in an inner product space V (F) and $||\alpha|| = ||\beta|| = 1$. Then prove that $||\alpha-\beta|| = d < \alpha, \beta > =$.
 - V(F) అంతరాళంలో α, β లు రెండు లంబ సడిశలైతే $\|\alpha\|=\|\beta\|=1$ అయితే $\|\alpha-\beta\|=d<\alpha,$

β>=.

18. If { (2,1,3) , (1,2,3), (1,1,1) } is a basis of R³ Construct an Orthonormal basis. R³ అంతర లబ్**దాంతరాళాసెక్ట** (2,1,3) , (1,2,3), (1,1,1) } ఒక ఆధారం అయితే ఒక

లంభాభిలంభ ఆధారం సిర్మించండి

D.R.W. (Autonomous) College: Gudur III B.SC, MATHEMATICS, SIXTH SEMESTER 610EL01 Elective Paper VII: VECTOR CALCULUS

(With effect from 2017-2018)

UNIT - I: Vector Differentiation – I: Vector Function of Scalar Variable continuity of a vector function partial differentiation scalar point Function vector point faction – Gradient of a scalar point Function – Unit normal – Directional Derivative at a Point – Angle between two surfaces.

UNIT – II: Vector Differentiation – II: Vector differential Operator – Scalar Differential Operator – Divergence of a vector – Solenoidal vector – Laplacian operator – curl of a vector – Irrotational Vector – Vector identities.

UNIT – III: Vector Integration – I : Definition – Integration of a vector – simple problems – smooth curve – Line integral – Tangential Integral – circulation Problems on line Integral. Surface Integral.

UNIT – IV: Vector Integration - II: Volume Integrals – Gauss Divergence Theorem statement and proof – Applications of Gauss Divergence theorem.

UNIT – V: Vector Integration - III: Green's Theorem in a plane Statement and proof – Application of Green's Theorem. Statement and Proof of Stoke Theorem – Application of stoke Theorem.

Prescribed Text books:

A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

Reference Books:
- 1. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Vector Calculus by R. Gupta, Published by Laxmi Publications.

MODEL PAPER 610EL01 B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018 VI Semester, DSE: Mathematics

Elective Paper –VII: Vector Calculus

(With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

5x 4=20M

<u>PART-A</u> Answer any FIVE out of EIGHT Questions. Each question carries 4 marks.

1. If $A = (A \times B)^1$ at t = 1.

A = అయితే t =1 నకు (AxB)¹

- 2. Find the directional derivative of the function in the direction of the vector+2j+2k at the point (1, 2, 0).
 +2j+2k దిశలో (1, 2, 0) టిందుమ వద్దయొక్ ద్రిశిక వ్యుత్పన్నం
- 3. Prove that grad(.a) = a

grad(.a) = a అసి చూపండి.

- 4. If f=(x+3)i+(y-2z)j+(x+pz)k is a solenoidal find p. f=(x+3)i+(y-2z)j+(x+pz)k solenoidal అయితే p ∂ ංత .
- 5. If A= and B=. Find . A= మిరియు B= ను రాబట్టండ
- 6. If F = y i + z j + x k find the circulation of F round the curve C, where C is the circle . F = y i + z j + x k මතා C పక්රකානු F యోకీక రేఖా సమాకలసి రాబట్టండి
- 7. Show that N ds = (a+b+c), where S is the surface of the sphere.

అను గోళ తలం S పై . N ds = (a+b+c) అని చూపండి.

8. If F= yi +(x-2xz)j -xy k evaluate x F).N ds where S is the surface of the sphere xy తలపై భాగములోని అర్ధగోళము S F= yi +(x-2xz)j -xy k అయినపోషుడు x F).N ds రాబట్టండ

<u>PART-B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit.Each Question carries 10 marks5x10=50M

<u>UNIT – I</u>

9. If r=xi+yj+zk and x=2sin3t,y=2cos3t,z=8t then prove that ||=10 and ||=18. r=xi+yj+zk ක්රීරාභ x=2sin3t,y=2cos3t,z=8t ||=10, ||=18 මර් යාස්කර්දී.

10. If ; prove that

[grad a, grad b, grad c]=0.

[grad a, grad b ,grad c]=0.అని రుజుమచేయండి

<u>UNIT – II</u>

- 11. If is a constant Vector, prove that curl = + (a.) నోథీదుదిశ అయితే = + (a.) అని చూపండి
- 12. grad (A.B) = (B.A + (A.B + B x curl A + A x curl B.

grad(A.B) = (B.A + (A.B + B x curl A + A x curl B అసి చూపండి.

<u>UNIT – III</u>

13. If F=4xzi -j+yzk, evaluate where S is the surface of the cube bounded by x=0,x=a, y=0,y=a, z=0,z=a.

F=4xzi -j+ yzk అయి x=0, x=a, y=0, y=a, z=0, z=a గణించండి

14. Evaluate. dr where $F=x^2y^2i+yj$ and the curve C isy²=4x in the xy plane from (0,0)to(4,4)

 $F=x^2y^2i+yj xy$ లో (0,0) నుండి(4,4)వరకు $y^2=4x$ అనువక్రము పై. dr గణించండి.

$\underline{UNIT - IV}$

15.State and prove Gauss divergence theorem.

గాస్ అపసరణ సిద్**దాంతమువ్**రవ**చించినరూపించండి**.

16. Verify Gauss's divergence theorem to Evaluate

Over the surface of a cube bounded by the

Co-ordinate planes x=y=z=a

x=y=z=a తలాలచే పరివృతమై ఘనతలముపై పిలువను గాస్ అపసరణ సిద్**దాంతము**తో

సరిచూడండి.

<u>UNIT –V</u>

17. State and prove stokes theorem.

స్ట్ రో కి సిరిదాంతమును ప్రవిషించిన రూపించండి

18. Verify Greens theorem in the plane for, where c is the region bounded by and y =

, y = , నకు గోరన్ సిద్**దాంతమునుపరచూడం**డి.

D.R.W. (Autonomous) College: Gudur

III B.SC, MATHEMATICS, SIXTH SEMESTER 610CLA1

Cluster Elective –VIII: LAPLACE TRANSFORMS (With effect from 2017-2018)

60 Hrs

UNIT-I:

Laplace Transform I: Definition of - Integral Transform – Laplace Transform Linearity, Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A. Linear property, First Shifting Theorem.

UNIT-II:

Laplace Transform II: Second Shifting Theorem, Change of Scale Property, Laplace Transform of the derivative of f(t), Initial Value theorem and Final Value theorem.

UNIT-III:

Laplace Transform III: Laplace Transform of Integrals – Multiplication by t, Multiplication by t^n – Division by t. Laplace transform of Bessel Function Only.

UNIT-IV:

Inverse Laplace Transform I: Definition of Inverse Laplace Transform. Linearity, Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions, Examples.

UNIT-V : Inverse Laplace Transform II : Inverse Laplace transforms of Derivatives–Inverse Laplace Transforms of Integrals – Multiplication by Powers of "P'– Division by powers of "P'– Convolution Definition – Convolution Theorem – proof and Applications – Heaviside's Expansion theorem and its Applications.

Prescribed Text Books:

"Laplace and Fourier Transforms" by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.

Reference Books:

- 1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
- 2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi
- 3. Integral Transforms by M.D. Raising hania, H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.
 - MODEL PAPER 610CLA1 B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018 VI Semester, DSE: Mathematics

Cluster Elective –VIII: LAPLACE TRANSFORMS (With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions.

5x 4=20M

Each question carries 4 marks.

- 1. State and prove Second shifting theorem
- 2. F(t) =find the L{F(t)}.

- 3. State and prove laplace transform of integral
- 4. S.T sint dt =
- 5. Find L and also find dt.
- 6. Find
- 7. Prove that dx =
- 8. Apply the convolution theorem to show that du = (t sint).

5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

<u>UNIT – I</u>

PART-B

- 9. Find L{ Sinh at cos at} and L{Sinh at sin at}.
- 10. (a) Find L{ by using first shifting theorem.(b) Find L{ cos 3t } by using change of scale property.

UNIT – II

- 11. (a) State and prove division by 't'
 - (b) Find L.
- 12. Find $L{J_0(t)}$ and also find $L{t J_0(at)}$

UNIT-III

- 13. Find the Laplace Transform of (i) and (ii)
- 14. Find $L{J_0(t)}$ and also Find $L{t J_0(at)}$.

UNIT-IV

15. (a) Find by using inverse Laplace transform of derivative.(b) Find is by using inverse Laplace transform of division

By p

16. State and prove Second shifting theorem of inverse Laplace transform.

$\underline{UNIT} - \underline{V}$

- 17. Find by using Heavi sides expansion formula.
- 18. State and prove convolution theorem.

D.R.W. (Autonomous) College: Gudur

III B.SC, MATHEMATICS, SIXTH SEMESTER 610CLA2

Cluster Elective- IX: INTEGRAL TRANSFORMS

(With effect from 2017-2018)

60 Hrs

UNIT-I

Application of Laplace Transform to solutions of Differential Equations: Solutions of ordinary Differential Equations. Solutions of Differential Equations with constants co-efficient Solutions of Differential Equations with Variable co-efficient

UNIT-II

Application of Laplace Transform: Solutions of partial Differential Equations.

UNIT-III

Application of Laplace Transforms to Integral Equations: Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integral Differential Equations. Application of L.T. to Integral Equations.

UNIT-IV

Fourier Transforms-I: Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT-V

Fourier Transform-II: Convolution Definition – Convolution Theorem for Fourier transform – parseval's Indentify – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Prescribed Text Books:

Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.

Reference Books:

- 1. Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
- 2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi.
- 3. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut. .

MODEL PAPER

610CLA2

B.Sc (M.S.Cs, M.P.E&M.P.C), III Year Degree Examinations - 2018 VI Semester, DSE: Mathematics

Cluster Elective- IX: INTEGRAL TRANSFORMS (With effect from 2017-2018)

Time: 3 hours

Max. Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. Each question carries 4 marks

5x 4=20M

- 1. Using Laplace Transforms, find solution of $y''+25y = 10 \cos 5t$, where y(0) = 2, y'(0) = 0.
- 2. Apply Laplace Transforms to solve $+y = 6 \cos 2t$ given that y = 3, =1 when t=0.
- 3. Show that $\phi(x) = is a solution of integral equation = 1$.
- 4. Using Laplace Transforms, find solution of y''(t)+y(t) = t given that y'(0) = 1, $y(\pi) = 0$.
- 5. If f(s) is the Fourier transform of F(x), then is the Fourier transform of F(ax)
- 6. Find the Fourier transform of f(x) =
- 7. Prove that the finite Fourier sine transform of the function f(x) = 2x, 0 < x < 4 is
- 8. Find the finite cosine transform of f(x) if (i) f(x) = -x + (ii) f(x) = sin(nx)

PART-B

5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

<u>UNIT – I</u>

9. Using laplace's transform solve ther equation +t - y = 0 if y(0) = 0, =1, if t=0. 10. Solve $(D+2)^2 y = 4e^{-2t}$ with y(0) = -1, y'(0)=4.

<u>UNIT-II</u>

- 11. Find the bounded solution of = 2 + y if $(y,0) = 6e^{-3x}$
- 12. Solve = 3, y(= $0,y(x,0) = 30\cos 5x$ (x=0=0

UNIT-III

- 13. Solve the integral equation F(t) = 1 + and verify your solution.
- 14. Convert the integral equation $F(t) = t^2-3t+4-3 (t-u)^2 du$ into differential equation and associated conditions.

UNIT-IV

- 15. Find the Fourier transform of f(x) =
- 16. Find the sine transform of

UNIT-V

- 17. Find the finite cosine transform of $(1-)^2$
- 18. State and prove Parsevel's theorem

D.R.W. Autonomous College: Gudur

1131

FIRST YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-I, Core Paper-I: CALCULUS

(With effect from 2017-2018)

Unit-I: Introduction

Hyperbolic functions, Higher order derivatives, Calculation of the nth

Derivative, same standard results, Determination of nth derivative of rational

Functions, The nth derivatives of the products of the powers of sines and cosines, Leibnitz's Theorem, The nth derivative of the product of two functions.

Unit- II: Vector Differentiation I

Definition- Vector function of scalar Variable-Continuity of a Vector function, Limit of a vector function, Derivative of Constant vector- Theorems

Scalar point function- Vector point function- Directional Derivative at a point- Gradient of a scalar point function- Unit normal-Angle between two surfaces.

Unit- III: Vector Differentiation II

Vector differential Operator – Scalar differential Operator – Divergence of a Vector – Solenoidal Vector – Laplacian Operator – Curl of a Vector – Irrotational Vector – Vector Identities – theorems.

Unit- IV: Vector Integration I

Definition- Integration of a vector- Simple problem- smooth curve- Line Integral-Tangential Integral- circulation Problems on line Integral- Surface Integral- Volume Integral.

Unit- V: Vector Integration II

Gauss Divergence Theorem Statement and Proof – Application of Gauss Divergence theorem-Green's Theorem in a plane Statement and Proof – Application of Green's Theorem. Statement and proof of Stoke Theorem – Application of stoke Theorem.

Prescribed Text books:

- Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol III, Old book, S.Chand & Company, and New Delhi
- 2. "Differential Calculus" by Santhi Narayana& Miteal, S.Chand Publications

Reference Books:

- 1. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Vector Calculus by R. Gupta, Published by Laxmi Publications.
- 3. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications.
- 4 Dr.A.Anjaneyulu, "A text book of B.Sc Mathematics", Deepthi Publications.

MODEL PAPER

1131

B.Sc. Mathematics (Hons.)., I Year Degree Examinations

I Semester, DSE: Mathematics

Core Paper I: <u>Calculus</u>

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 60

PART-A

Answer any TWO out of FIVE Questions.2x 5=10MEach question carries 5 marks.

1. If r = xi + yj + zk and x = 2sin3t, y = 2cos3t, z = 8t then prove that || = 10 and || = 18.

2. If $Y = (A \operatorname{Cosx} + B \operatorname{Sinx})$. Prove that +2 + 2y = 0.

3. Find the directional derivative of the function in the direction of the vector +2j+2k at the point (1, 2, 0).

4. Find **div f** and **curl f** where).

5. Find dr where F = xyi+yzj+zxk and the curve C is $r = ti+t^2j+t^3k$, t varying from -1

<u>PART-B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

5x10=50M

<u>UNIT-I</u>

6. State and Prove Leibnitz's theorem

7. If $Y = Cos (m Sin^{-1}x)$. Show that (1-x²) Y_{n+2} -(2n+1) xY_{n+1} +(m²-n²) Y_n =0 and hence find $Y_n(0)$

UNIT-II

8. If r=2t i + j +/3 k. Prove that $||/||\mathbf{x}|^2 = ||\mathbf{x}||/||^3$ at t=1.

9. If $r=a \cot I + a \sin j + at \tan k$ find and.

<u>UNIT-III</u>

10. Evaluate where $F=Zi+Xj-3Y^2Z$ k and S is the surface $x^2+y^2=16$ include in the first octant between Z=0 and Z=5.

11. If $F = (2x^2-3z)i-2xyj-4xk$ evaluate (a) .Fdv and (b) X Fdv where V is the closed region bounded by x=0, y=0, z=0.

UNIT-IV

- 12. By transforming into triple integral, evaluate
- ³ dy dz + x^2y dz dx + x^2z dx dy) where S is the closed surface consisting of the

Cylinder $x^2+y^2=a^2$ and the circular discs z=0 and z=b.

13. State and prove Gauss Divergence Theorem.

UNIT-V

- 14. State and prove Green's Theorem.
- 15. State and prove Stroke's Theorem.

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D.R.W. Autonomous College: Gudur 1132 FIRST YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-I, Core Paper-II: ALGEBRA

(With effect from 2017-2018)

Unit-I: Integers

Sets – Some basic properties of integers – Mathematical Induction – Divisibility of integers – Representation of Positive Integers - Prime numbers and Euclid's division Algorithm -Fundamental Theorem on arithmetic.

Unit-II: Number Theory

Method of finding G.C.D and L.C.M of two numbers by using the Canonical representation-Congruence, linear Congruence problems -Euler's function definition - Theorem of Fermat's and Wilson.

Unit- III: Matrix Algebra-I

Introduction-- Types of Matrix-- Operations -- Cofactor matrix -- Transpose of a matrix --

Ad joint matrix -- The Inverse of a Matrix-- Rank of a Matrix – Elementary operations, Normal form of a matrix, Echelon from of a Matrix

Unit-IV: Matrix Algebra-II

Characteristic Roots -- Characteristic Values and Characteristic Vectors of square Matrix –Cayley-Hamilton Theorem.

Unit-V: System of Linear Equations:

Direct Methods- Matrix Inversion Method -- Gaussian Elimination Method -- Method of Factorization.

Prescribed Text books:

- 1. "Introduction to Discrete Mathematics" by Dr.M.K.Sen& Dr.B.Chakraboety, Books and Allied (P) Ltd.
- 2. **"A Competitive Approach to Linear Algebra"** by **Dr.Sudhir Kumar Pundir**, Pundir Published by Pragathi Prakashan.
- 3. **"A text Book of B.Sc., Mathematics"** by **B.V.S.S.Sarma and other** Published by S. Chand & Company Pvt. Ltd., New Delhi.

<u>Reference Books</u>:

- 1. Dr.A.Anjaneyulu, "A text book of B.Sc Mathematics", Deepthi Publications.
- 2. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
- 3. Matrices by Shanti Narayana, published by S.Chand Publications.

MODEL PAPER

1132

B.Sc. Mathematics (Hons.)., I Year Degree Examinations

I Semester, DSE: Mathematics

Core Paper II: <u>Algebra</u>

(With effect from 2017-2018)

Time: 3 hrs

Max.Marks: 60

PART-A

Answer any TWO out of FIVE Questions.2x5=10MEach question carries 5 marks.

- Use mathematical induction to show that 1+2+3+......+n = , for all non-negative integer n.
- 2. Find L.C.M & G.C.D of 5040 by using canonical form.
- 3. Given that A = . Verify that $-4A + 5 \square \blacksquare 0$.
- 4. If A= express $A^{6}-4A^{5}+8A^{4}-12A^{3}+14A^{2}$ as a linear polynomial of A.
- 5. Show that the equation x+y+z-3=0, 3x-5y+2z-8=0, 5x-3y+4z-14=0 are consistent and

solve them.

PART-B

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

- 6. Let A, B, C be any three sets. Then prove that $A \cap (BUC) = (A \cap B)U(A \cap C)$.
- 7. Convert these integers from hexadecimal to binary notation:
 - (i) $(2FB5)_{16}$ (ii) $(3DE9)_{16}$

<u>UNIT-II</u>

- 8. State &Prove the Fundamental theorem of Arithmetic.
- 9. State &Prove the Wilson's theorem.

<u>UNIT-III</u>

- 10. Find the rank of the matrix
- 11. Find the inverse of the matrix

UNIT-IV

			$A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$
12. Find the cha	irac	terist	ic roots and vectors to the matrix $\begin{bmatrix} 0 & 0 & 2 \end{bmatrix}$.
[2	1	2	
$A = \int 5$	3	3	
13. If [-1	0	-2_	verify cayley – Hamilton theorem. Hence find A^{-1} .
			<u>UNIT-V</u>

- 14. Solve the following system by the method of Factorization: 2x-3y+10z=3; x+4y+2z=20; 5x+2y+z=-12.
- 15. Solve the following system: 8x+y+z=8; 2x+4y+z=4; x+3y+5z=5.

D.R.W. Autonomous College: Gudur

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FIRST YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-II, Core Paper- III: <u>REAL ANALYSIS</u>

(With effect from 2017-2018)

UNIT –I

Real Numbers: The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Definition of Sequences, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence, properly divergent sequences, Definition of Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II: Infinite Series: Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms. P-test, Cauchy's nth root test or Root Test, 'D-Alembert's'' Test or Ratio Test, Alternating Series – Leibnitz Test. Absolute convergence and conditional convergence, semi convergence. UNIT – III

Continuity- Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion.

Continuous functions: Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV: Differentiation and Mean Value Theorems: The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value

Theorem

UNIT – V: Riemann integration: Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First Mean value Theorem

Prescribed Textbook:

N.Krishna Murthy &Others "A text book of B.Sc.MathematicsVol–II",(old book) S.Chand & Company, New Delhi".

Reference books: Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi

publications

MODEL PAPER

B.Sc. Mathematics (Hons.)., I Year Degree Examinations

II Semester, DSE: Mathematics

Core Paper III: Real Analysis

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

2x5=10M

2231

PART-A

Answer any TWO out of FIVE Questions

Each question carries 5 marks

- 1. Every bounded sequence has at least one limit point.
- 2. Using Cauchy's principle proves that is divergent.
- 3. Prove that f(x) = and f(o) is continuity at x = 0.
- 4. Discuss the derivability f(x) = -1 if x f(x) = 1 x if x < 1.
- 5. Prove that where K.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT –I</u>

- 6. (a) {} is bounded increasing sequence $\Leftrightarrow \lim \sup \{/n \mathbb{N}\}$
 - (b) {} is bounded decreasing sequence \Rightarrow lim=inf {/n \mathbb{N} }.
- 7. State and Prove Bolzano Weierstrass theorem for sequence. UNIT –II
- 8. State and Prove P-test.
- 9. State and prove D'Alembert's ratio test.

<u>UNIT –III</u>

- 10. Discuss the continuity of f(x) = -if x f(0) = 0 at the origin.
- 11. If a function f is continuous on [a, b], then it is uniformly continuous on [a, b].

<u>UNIT –IV</u>

- 12. State and prove Rolle's Theorem.
- 13. Using Lagrange's theorem, Show that $x > \log (1+x) >$.

<u>UNIT V</u>

- 14. Define Oscillatory sum and find W(P, f) if $f(x) = x^3$ on [0, 1] and P = {0, 1/4, 2/4, 3/4}.
- 15. State and prove Darboux's theorem.

D.R.W. Autonomous College: Gudur 2232 FIRST YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS Semester-II, Core Paper- IV: <u>DIFFERENTIAL EQUATIONS</u>

UNIT –I: Differential equations of first order and first degree: Linear Differential equations, Differential equations reduced to linear form, exact differential equations, Integrating factors, orthogonal trajectories.

UNIT –II: Differential equations of the first order but not of the first degree: Equations solvable for p; Equations solvable for y; Equations solvable for x, Equation that do not contain x (or y); Equations of the first degree in x and y- Clairaut's equation.

UNIT –III: Higher order linear differential equations – I: Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0 General solution of f(D)y = Q when Q is a function of x is Expressed as partial fractions. P.I of f(D)y = Q when Q = b P.I of f(D)y = Q when Q is b or b

UNIT –IV: Higher order Linear Differential Equations – II: Solution of the non homogeneous linear differential equations with constant co-efficient.

P.I. of f(D)y = Q when Q = bP.I. of f(D)y = Q when Q = VP.I. of f(D)y = Q when Q = xVP.I. of f(D)y = Q when Q =

UNIT –V: Higher order Linear Differential Equations – III: Method of variation of parameters, linear differential equations with non constant coefficients, the Cauchy - Euler equation.

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, and New Delhi.

Reference Books:

- 1. Differential equations and their applications by Jafar Ashan , Published by prentice –Hall of India Learning Pvt.Ltd New Delhi Second edition.
- 2. Ordinary and partial differential equations Raisinghania published by S.Chand & Company, New Delhi
- 3. Differential equations with applications and programs S.Balachandra Rao & HR Anuradha universities press.

Practical: As for theory

MODEL PAPER

B.Sc. Mathematics (Honos.)., I Year Degree Examinations

II Semester, DSE: Mathematics

Core Paper IV: DIFFERENTIAL EQUATIONS

(With effect from 2017-2018)

Time: 3 Hours

Max. Marks: 60

2232

PART-A

Answer any TWO out of FIVE Questions.

2x5=10M

Each question carries 5 marks.

13. Solve: x dy- y dx= x. 14. Solve: y+ px =. 15. Solve: (+1) y= 0. 16. Solve: $(D^2+1) y=\frac{secx}{2D}$. 17. Solve: $(D^2 - 2D)y = e^x sinx$ by the method of variation of parameter.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

UNIT-I

- 18. Solve: $x^2y dx (x^3+y^3) dy = 0$.
- 19. Show that the family of Confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$ is self orthogonal, where λ is parameter.

UNIT-II

- 20. Solve: $y^2 \log = xpy + p^2$
- 21. Solve: $p^2+2pycotx=y^2$, where $p=\frac{dy}{dx}$

<u>UNIT-III</u>

- 22. Solve: (D²+4) $y = e^{x} + \sin 2x + \cos 3x$.
- 23. Solve: $(\mathbf{D}^2 4D + 3) y = \frac{\sin 3x \cos 2x}{2}$

UNIT-IV

- 24. Solve:
- 13. Solve: $(D^2 4D + 4) y = x^3$.

UNIT-V

- 14. Solve: $x^2 \frac{d^2 y}{dx^2 + 3x} \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$
- 15. Solve: () y=tan ax, by the method of variation parameter

D.R.W. Autonomous College: Gudur 3331

SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-III, Core Paper-V: <u>THEORY OF REAL FUNCTIONS</u>

UNIT - I: Limits and Continuity

Introduction, Algebraic operations on functions, Bounded and Unbounded functions, Limit of a function, Algebra of limits, One side limits- right- hand and left-hand limits, Limits at infinity and infinite limits, Cauchy's criterion for finite limits, Continuous functions, and their problems, Algebra of continuous functions, Criteria for Continuity theorem (or) Sequence Criterion theorem, Discontinuity and their problems

Derivative of a function, a necessary condition for the existence of a finite derivative, algebra of derivatives, problems on differentiable and continuity, Darboux's theorem.

UNIT - II: Mean value theorems

Rolle's theorem and applications of Rolle's theorem, Lagrange's mean value theorem and applications of Lagrange's, increasing and decreasing functions, monotone functions, Cauchy's mean value theorem, and applications of Cauchy's mean value theorem, Taylor's theorem, Maclaurin's theorem.

Prescribed Textbook: N.Krishna Murthy& Other "A text book of B.Sc.Mathematics Vol II,(old book)" S.Chand & Company, New Delhi".

UNIT - III: Functions of several variables-I

Explicit and Implicit Functions, Continuity, Partial Derivatives, Differentiability.

UNIT - IV: Functions of several variables-II

Partial Derivates of Higher order, Differentials of Higher order, Functions of functions, Change of variables, Taylor's Theorem.

UNIT - V: Maxima and Minima (only one variable)

Introduction, A necessary condition for the existence of extreme values, sufficient criteria for the existence of extreme values, Applications to problem

<u>Prescribed Book</u>: Scope and standard as in sections 1 to 10 of chapter 15 of "Mathematical Analysis" second edition by S.C. Malik, Savita Arora new age international (P) limited.

<u>Reference books:</u> 1. Dr.A.Anjaneyulu A "text book of B.Sc Mathematics Volume-II, Deepthi publications.

2. Elements of Real analysis as per UGC syllabus revised edition Shanti Narayana and Dr.M.D.Raisinghania S.Chand publications.

MODEL PAPER 3331

B.Sc. Mathematics (Hons.), II Year Degree Examinations

III Semester, DSE: Mathematics

Core Paper V: Theory of Real Functions

(With effect from 2018-2019)

Time: 3 hours

Max. Marks: 60

PART-A

Answer any TWO out of FIVE Questions. 2 x 5=10M

Each question carries 5 marks.

- 1. Examine the following function for continuity and derivability at = 0, 1.
- 2. Verify Rolle's theorem for in [2,4]
- 3. If , Show that does not exist.
- 4. (x,y) = (0,0) = 0 then show that at the origin
- 5. Find the maximum value of the function,.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks

<u>UNIT –I</u>

- 6. State and prove Darboux's theorem
- 7. Draw the graph of the function in the interval [0,3] and discuss the continuity and differentiability at the function of the interval.

<u>UNIT –II</u>

- 8. State and Prove Lagrange's theorem.
- 9. State and Prove Maclaurin's theorem.

<u>UNIT –III</u>

- 10. is continuous and derivable at the origin.
- 11. Show that the limit exist at the origin but the repeated limits do not exist for

<u>UNIT –IV</u>

- 12. State and prove Young's theorem
- 13. Expand in the powers of using Taylor's expansion, .

<u>UNIT –V</u>

- 14. Find the points of Maxima and Minima of , <.
- 15. If the sum of the lengths of hypotenuse and another side of a right angled triangle be given, show that the area of the triangle is maximum when the angle between the hypotenuse and the given side is .

$5 \times 10 = 50 M$

D.R.W. Autonomous College: Gudur

SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-III, Core Paper-V: GROUP THEORY-I

(With effect from 2018-2019)

UNIT – I: Groups

Binary operation- Algebraic structure- Semi group- Definition of Monoid- Group definition and Elementary properties- Order of a Group - Composition Tables with examples.

UNIT – II: Subgroups

Complex definition – multiplication of two complexes inverse of a complex-Definition of subgroup-examples- criterion for a complex to be a sub groups-Criterion for the product of two subgroups to be a subgroup-union and intersection of subgroups.

UNIT-III: Cosets and Lagrange's theorem& Normal subgroups

Cosets and Lagranges theorem: Cosets definition – properties of cosets- Index of subgroups of a finite groups- Lagrange's theorem.

Normal Sub groups: Definition of Normal sub group - Simple groups- Quotient groups (or) Factor groups.

UNIT-IV:Homomorphism

Definitions of Homomorphism - Isomorphism and Automorphism - Properties of Homomorphism- Fundamental theorem on Homomorphism of groups - Definition of Inner and outer Automorphisms of a group, Kernel of a homomorphism.

UNIT-V:Permutation Groups& Cyclic Groups

Permutation Groups: Definitions of Permutation - Orbits and cycles of permutation- Disjoint Cycles- Even and Odd permutation problems- Inverse permutation- Cayley's theorem.

Cyclic Groups: Definition of cyclic group - Classification of cyclic groups - Order of the cyclic group problems- Find the number of generators problems.

Prescribed Textbook: N.Krishna Murthy & others "A text book of Mathematics for B.Sc.Volume II", S.Chand & Company, New Delhi.

<u>Reference book:</u> 1. Dr.A.Anjaneyulu, "A text book of B.Sc Mathematics Volume-II, Deepthi publications. 2. 'Basic Abstract Algebra' by P.B. Bhattacharya and others, Second edition, Cambridge University press.

MODEL PAPER

B.Sc. Mathematics (Hons.), II Year Degree Examinations

III Semester, DSE: Mathematics

Core Paper VI: GROUP THEORY-I

(With effect from 2018-2019)

Time: 3 hours

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Max. Marks: 60

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PART-A

Answer any TWO out of FIVE Questions. 2x5=10M Each question carries 5 marks.

- 1. Let G be a group, $G \Rightarrow (a = .)$
- 2. If *a*, *b* are any two elements of a group (*G*, *o*) and *H* any sub group of *G* then

$Ha = Hb \iff a$ and = b

- 3. If G is a group and H is a sub group of index 2 in G then H is a normal subgroup of G.
- 4. If H and K are two sub groups of a group G then HK is a sub group of G iff HK = KH.
- 5. If f = (2 5 4) (1 4 3) (2 1) find the disjoint cycles and find inverse of its cycle.

PART-B

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT –I</u>

- 6. Show that the set of all rational numbers form a group under the composition circle defined by , *for* +
- 7. (i) In a group *G* for every *G*, $a^2=e$. Prove that *G* is an abelian group.

(ii) Show that in a group G for G, $(ab)^2 = a^2b^2$ G is abelian.

<u>UNIT –II</u>

- 8. If and are two subgroups of *G* then is also a sub group of G
- 9. *H* is a non-empty complex of a group *G*. The necessary and sufficient conditions for *H* to be a subgroup of *G* is H => a H, where b^{-1} is the inverse of *b* in *G*.

<u>UNIT – III</u>

- 10. A sub group H of G is normal sub group of G iff each left coset of H in G is a right coset of H in G.
- **11.** State & Prove the Lagrange's theorem.

$\underline{UNIT-IV}$

- 12. State &Prove the Fundamental theorem on Homomorphism.
- 13. If f is a homomorphism of a group G into a group G then the kernel of f is a normal sub group of G.

$\underline{UNIT - V}$

- 14. State and Prove Cayley's theorem.
- **15.** Every sub group of a cyclic group is a cyclic.

D.R.W. Autonomous College: Gudur

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SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-III, Paper-VII: PDE and Systems of ODE

UNIT-I:

Origin of Partial Differential Equations

Definition, order and degree of partial differential equation - Linear and Non linear partial differential equation - Classification of first order partial differential equations - Origin of partial differential equation - Derivation of PDE by elimination of arbitrary constants and by elimination of arbitrary function - Cauchy's problem for first order equations.

UNIT-II:

Partial differential equations reducible to equations with constant coefficients

Method of reducible Euler-Cauchy type equation to linear partial differential equation with constant Coefficients - Solving Euler- Cauchy type equations - Solutions under given geometrical conditions.

UNIT-III:

Partial differential equations reduction to canonical form

Classification of partial differential equation of second order - Cauchy's problems of second

order PDE – Laplace transformation – Reduction to canonical (normal) form: Hyperbolic,

Parabolic and Elliptic equation to its canonical form.

UNIT-IV:

Cauchy initial value problem for first order PDE

The Cauchy problem (initial value problem) – Cauchy initial value problem for semi-linear partial

Differential equations - Quasi-linear partial differential equations - The existence and uniqueness

Theorem for the solution of Cauchy problem for quasi-linear partial differential equations.

UNIT-V:

Heat, Wave and Laplace equation, Method of separation of variables.

Derivation of one-dimensional wave equation and Derivation of one dimensional Heat equation,

Laplace's equation, Laplace's equation in plane polar coordinates, cylindrical coordinates, spherical Coordinates. Definition of Boundary value problem, Method of separation of variables or product method.

Prescribed text book: "Advanced differential equations" by Dr.M.D.Raisingahania, S.Chand

Reference books: Ordinary and partial differential equations" by Dr.M.D.Raisingahania, S.Chand, 19th edition

MODEL PAPER

B.Sc. Mathematics (Hons.), II Year Degree Examinations - 2018

III Semester, DSE: Mathematics

Core Paper VII: PDE and Systems of ODE

(With effect from 2018-2019)

Time: 3 hours

Max. Marks: 60

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<u>PART-A</u>

Answer any TWO out of FIVE Questions. 2x 5=10M Each question carries 5 marks.

- 1. Find the differential equation of all spheres of radius λ , having center in the xy-plane.
- 2. Solve: $x^2 ((-y () + x () = 0)$
- 3. Classify $U_{xx} + U_{yy} = U_{zz}$
- Find the integral surface of the equation x () + y () =0 which passing through the condition u(1,y) =y.
- 5. Solve the Boundary value problem = 4() if $u(0,y) = 8 e^{-3y} + 4 e^{-5y}$.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT –I</u>

6. (a) Find a P.D.E by eliminating a, b, c from ++=1.

(b) Find a P.D.E by eliminating the arbitrary function \emptyset from $\emptyset(x^2+y^2+z^2, z^2-2xy) = 0$.

7. (a) If z = f(x + ay) + O(x - ay), prove that $= a^2$ (

(b) Eliminate the arbitrary functions and hence obtain the P.D.E. is $z = xy + f(x^2 + y^2)$.

<u>UNIT –II</u>

- 8. Solve: $x^2 (-y^{2})$
- 9. Solve: $x^2 r y^2 t + P x + q y =$.

<u>UNIT –III</u>

- 10. Reduce the equation to canonical form and hence solve it.
- 11. Find the canonical form of the equation $= x^2($

<u>UNIT –IV</u>

- 12. Find the integral surface of the equation $y () + x () = x^2+y^2$ which passing through the curve x = 1-t, y=1+t, $z = 1+t^2$.
- 13. Solve the initial value problem for the quasi-linear P.D. E containing the initial data curve C , = s/2 for 0 < S < 1.

<u>UNIT –V</u>

- 14. Derive the One dimensional wave equation.
- 15. Derive the Laplace's equation in plane polar coordinates.

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SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-IV, Paper-VIII: NUMERICAL METHODS

UNIT-I

Errors in Numerical Computations: Numbers and their Accuracy, Errors and their computation, Absolute relative and percentage errors, General Error formula.

Transcendental and Polynomial Equation: The Bisection method, The Method of False Position, Newton- Rapshon method, Generalized Newton's method, Iterative method.

UNIT – II

Solution of Linear algebraic equations: Solution of linear systems, Gaussian Elimination and Gauss Jordan methods, Gauss Jacobi's method& Gauss- Seidel method.

UNIT – III

Interpolation with Equal and Unequal Intervals: Forward Differences, Backward Differences, Newton's divided Differences formula, Lagrange's interpolation formula and their problems.

Central Difference Interpolation Formulae: Gauss's Interpolation formulae (Forward formula& backward formulae), Stirling's central difference formulae, Bessel's formulae and their problems.

UNIT-IV

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd rule, Simpsons 3/8th rule, Boole's Rule, Weddle'srule.

UNIT-V

Ordinary Differential Equations: Euler's method, Runge-Kutta methods of orders two and four.

<u>Prescribed text book:</u> Numerical Analysis for B.A/B.Sc.,(Third year) by Dr.M.V.S.S.N.Prasad, S.Chand Publications.

Reference books:

1. Introductory Methods of Numerical Analysis by S.S.Sastry, prentice Hall India (3rd Edition)

2. Dr. Anjaneyulu, M.Sc., Ph.D., Deepti publications, Kothapet, Tenali, First edition

3. Calculus of Finite Difference and Numerical Analysis by P.P.Gupta &G.S.Malik, Krishna Prakashan Media (P) Ltd.Meerut.

MODEL PAPER 4431

B.Sc. Mathematics (Hons.), II Year Degree Examinations

IV Semester, DSE: Mathematics

Core Paper-VIII: NUMERICAL METHODS

(With effect from 2018-2019)

Time: 3 hours

Max. Marks: 60

<u>PART-A</u>

2x5=10M

Answer any TWO out of FIVE Questions.

Each question carries 5 marks.

- 1. Find the percentage error if 625.483 is approximated to three significant figures.
- 2. Explain the Gauss siedel method.
- 3. Explain the Lagrange's interpolation formula.
- 4. Find the third divided differences with arguments 2,4,9,10 where f(x) = -2x
- 5. Evaluate Simpson's $3/8^{th}$ rule, with h = 0.25.

PART-B

5x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT – I</u>

- 6. If R = and errors in x,y,z be 0.001,show that the maximum relative error in x = y = z = 1 is 0.009
- 7. Find a real root of the equation using Bisection method.

<u>UNIT – II</u>

- 8. Using Gauss elimination method to solve the system:
- 9. Using Gauss Seidel method to solve the system:

<u>UNIT – III</u>

10. Using Newton's divided difference formula find the values of f(2),f(8)

X	4	5	7	10	11	13
f(x)	48	400	294	900	1210	2028

11. Find y (25), given that using Gauss forward difference formula.

<u>UNIT – IV</u>

- 12. Compute = for p = 0 by Simpson's $3/8^{th}$ rule with h = 0.25
- 13. Evaluate the integral using Weddle's rule.

$\underline{\text{UNIT}} - \mathbf{V}$

- 14. Using modified Euler method find y(0.2) and y(0.4) given = y + y(0) = 0
- 15. Using Runge kutta method of second order ,compute y(2.5) from = , y(2) =2 taking h = 0.25.

D.R.W. Autonomous College: Gudur 4432

SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-IV, Paper-IX: Riemann Integration and Series of Functions

Unit –I: Riemann Integration

Introduction, Partitions and Riemann sums, some properties of Riemann sums, Upper and lower Riemann integrals. Riemann integral, Necessary and sufficient condition for integrability, Fundamental theorem of integral calculus, First mean value theorem, second mean value theorem(or) generalized first mean value theorem, Definition of Riemann stieltjes integrals.

UNIT-II: Uniform convergence of Sequence and Series of functions

Introduction, Cauchy's general principle of uniform convergence, a test for uniform convergence of sequence of functions, infinite series of functions, test for uniform convergence of series, Cauchy's general principle of uniform convergence for series, weier strass M-test for uniform convergence, Weierstrass approximation theorem.

UNIT-III: Improper Integrals – I : Convergence of improper integrals of first kind, convergent at, the integrand being positive, comparison of two integrals (Comparison test) useful comparison integrals, Cauchy test for convergence, Absolute and conditionally convergence of improper integrals of first kind.

UNIT-IV:Improper Integrals – II

Proper and improper integrals, convergence of improper integrals of second kind, Test for convergent at 'a'. positive integrand ,the necessary and sufficient condition for the convergence of the improper integral, comparison of two integrals, useful comparisons integrals, two useful tests, Absolute and conditionally convergence of improper integrals of second kind.

UNIT-V: Power series

Introduction, Power series, radius of convergence and integral of Convergence, Formula for

Determining the radius of convergence and their solved Problems, Abel's theorem, first form of

Abel's theorem, second form of Abel's theorem, An application of Abel's theorem,

some theorems on power series.

Prescribed Book: Scope and standard Chapter 13, chapter 15, chapter 16& chapter 17 of Elements of Real analysis as per UGC syllabus revised edition Shanti Narayana and Dr.M.D.Raisinghania, S.Chand publications.

Reference books: "Differential Equations with Applications and Historical notes" by George F.Simmons, (1992) Tata Mc Graw Hill Publications

MODEL PAPER

4432

B.Sc. Mathematics (Hons.), II Year Degree Examinations

IV Semester, DSE: Mathematics
Core Paper-IX: Riemann Integration and Series of Functions

(With effect from 2018-2019)

Max. Marks: 60

PART-A

Answer any TWO out of FIVE Questions.2 x 5=10MEach question carries 5 marks.

- 1. If and are any two partitions of [a, b] then U (L (.
- 2. State and prove Weier-strass M- test for uniform convergence.
- 3. Test for convergence of.
- 4. S.T is Convergent.
- 5. Find the radius of convergence of the series

<u>PART-B</u>

5 x10=50M

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

- 6. State and prove the necessary and sufficient condition for integrability.
- 7. State and prove the Fundamental theorem of integral calculus.

UNIT-II

- 8. State and prove the necessary and sufficient condition for uniform convergence.
- 9. State and prove -test.

UNIT-III

- 10. Show that the Beta function converges 🖨
- 11. Show that is convergent and hence evaluate it.

<u>UNIT-IV</u>

- 12. Every absolute convergent integral is convergent.
- 13. Show that the gamma function is convergent ⇔

UNIT-V

- 14. State and prove the Taylor's theorem.
- 15. State and prove the first form of the Abel's theorem.

Time: 3 hours

D.R.W. Autonomous College: Gudur 4433

SECOND YEAR B.Sc. MATHEMATICSHONOURS SYLLABUS

Semester-IV, Paper-X: Ring Theory and Linear Algebra-I

UNIT-I: Rings-I

Definition of Ring and basic properties, Boolean Rings, Zero Divisors of Ring - Cancellation

laws in a Rings - Integral Domain Division Ring - Fields Examples.

UNIT-II: Rings- II

Characteristic of Ring, Characteristic of an Integral Domain – Characteristic of Field Characteristic of Boolean Ring. Sub Ring Definition – Sub ring test – Union and Intersection of sub rings – Ideal Right and left Ideals – Union and Intersection of Ideals -- Excluding Principal, prime and maximal Ideals.

UNIT-III: Rings-III

Definition of Homomorphism – Homomorphism Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism – Ring isomorphism theorems I, II and III.

UNIT-IV:Vector Space

Definitions of Vector space, vector subspaces - Algebra of subspaces - Linear combinations of vectors - Linear span - Linear sum of two subspaces - Linear independence and dependence of vectors - Basis and Dimension - Dimension of subspace.

UNIT-V:Linear Transformations

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

Prescribed Text book: N.Krishna Murthy & others "A text book of B.Sc Mathematics Volume III", S.chand & company, New Delhi.

Reference books:

- 1. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.
- 2. G.Shankar Rao a text book of mathematics for B.Sc Vol III. Himalaya Publishing House.
- 3. Matrices by Shanti Narayana, published by S.Chand Publications.

MODEL PAPER

4433

B.Sc. Mathematics (Hons.), II Year Degree Examinations

IV Semester, DSE: Mathematics

Core Paper X: RING THEORY & LINEAR ALGEBRA -I

(With effect from 2018-2019)

Time: 3 hours

PART-A

Answer any TWO out of FIVE Questions.2x 5=10MEach question carries 5 marks.

- 1. Define a ring, integral domain and field.
- 2. If R is a non zero ring so that $a^2=a$, Prove that the characteristic of a ring is two
- 3. If f is a homomorphism of a ring R in to the ring R^1 then f is an in to Isomorphism iff kerf = $\{0\}$.
- 4. The set W of ordered triads (x, y, 0) where x, y \in F is a subspace of V₃ (F).
- 5. Express the vector (1,-2, 5) as a linear combination of the vectors. $e_1 = (1,1,1), e_2 = (1,2,3), e_3 = (2,-1,1).$

<u>PART-B</u> 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT –I</u>

6. If R is a Boolean ring then (i) a+a=oaR

(ii) $a+b=o \Rightarrow a=b$ and

(iii) R is commutative under multiplication.

7. Every finite integral domain is a field.

<u>UNIT-II</u>

- 8. Let S be a non empty subset of a ring R. Then S is a sub ring of R iff a-b S and ab S, a, b S.
- 9. An ideal in Z is a maximal ideal iff it is generated by a prime integer.

<u>UNIT-III</u>

10. State and prove Fundamental theorem of homomorphism

11. Every quotient ring of a ring is a homomorphism image of the ring.

<u>UNIT-IV</u>

12. If W_1 and W_2 are two subspaces of vector space V(F) then $L(W_1W_2) = W_1 + W_2$.

13. S.T the system of vectors are L.I or L.D{(1,2,-1,1),(0,1,-1,2),(2,1,0,3),(1,1,0,0)}.

UNIT-V

- 14. Let T: $V_3(R)V_3(R)$ be defined by T (a, b, c)=(3a, a-b,2a+b+c). Prove that $(T^2-I)(T-3I) = 0$.
- 15. If T is a linear transformation from a vector space U(F) into a vector space V(F) and U is finite dimensional then rank(T) + nullity(T) = dim U.

Matrix Algebra: Introduction-Basic definitions- Matrix operations –Symmetric Matrix- Skew symmetric matrix –Cofactors matrix - Transpose of a matrix - The Inverse of a Matrix (order 2).

Unit-II:

Linear Equations: (3 order only)

Ad joint of a square matrix - Inverse of square matrix by using Adj A - Rank of Matrix.

Unit-III: Solution of Linear Systems:

Direct Methods-Matrix Inversion Method- Gaussain Elimination Method-Method of Factorization.

Unit-IV: Numerical Methods:

Introduction- Solution of algebraic and transcendental equations:

Bisection method - Method of false position - Newton- Raphson method.

Unit – V: Finite Differences and Interpolation:

Finite Differences - Forward differences - Backward differences – Newton's forward interpolation formula – Newton's backward interpolation formula - Lagrange's Interpolation formula and problems.

Note: 1. Proofs of theorems and derivations of Expressions are omitted.

Prescribed text book: Scope as in "Introductory Methods of Numerical Analysis" by S.S.Sastry, Prentice Hall India (4thEdition)

Reference Books:

- 1. "A Text Book of Matrices" by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 2. Numerical Methods by P. Kandaswamy, K. Thilagavathy, K. Gunavathy by S.Chand.
- 3. Finite Differences and Numerical Analysis by H.C.Saxena S.Chand and Company, New Delhi

MODEL PAPER

B.Sc.Computer Science (Hons.) First Year Degree Examinations - 2017

I Semester –Generic Elective-I

PAPER – VI: ELEMENTARY MATHEMATICS

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 60 marks

PART-A

Answer any TWO out of FIVE Questions.2x5=10MEach question carries 5 marks.

- 1. If A = , B = compute AB and BA?
- 2. Find the ad-joint of the matrix
- 3. Solve the equations 3x+y+2z=3; 2x-3y-z=-3; x+2y+z=4 by the inversion method.
- 4. Find a real root of the equation $x=e^{-x}$ by using Newton Raphson Method.
- Construct a Newton's divided differences for the function x³+5x-7 for x = -1, 0, 1, 2, 3, 4, 5

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

<u>UNIT-I</u>

- 6. Given that A = .Verify that $-4A + 5 \square \blacksquare 0$.
- 7. Solve the following system x + 2y = 1, 2x 3y = 4

<u>UNIT –II</u>

- 8. Find the rank of the matrix .
- 9. Find the inverse of the matrix

<u>UNIT –III</u>

- 10. Solve the following system by the method of Factorization: 2x-3y+10z=3; x+4y+2z=20; 5x+2y+z=-12.
- 11. Solve the following system: 8x+y+z=8; 2x+4y+z=4; x+3y+5z=5.

<u>UNIT –IV</u>

- 12. Find a real root of the equation $f(x) = x^3-2x-5$ by using Regular Flasi Method.
- 13. Find a real root of the equation x^3-x-1 by using Bisection Method.

<u>UNIT –V</u>

14. Construct the forward and backward differences tables from the following data

Х	10	15	20	25	30	35
Y	19.97	21.51	22.47	23.52	24.65	25.89

15. Using Lagranges formula , Calculate f(3) from the following table

х	0	1	2	4	5	6
f(x)	1	14	15	5	6	19

B.Sc. (Honors) COMPUTER SCIENCE 2223-A

Generic Elective 2: Semester II

Differential Equations 60 Hrs

Unit-I: Differential equations of first order and first degree (12 Lectures)

Introduction, Homogeneous functions, Homogeneous differential equations, Equations reducible to homogeneous form, exact differential equations and orthogonal trajectories.

Unit-II: Integrating factors (12 Lectures)

Equations reducible to exact form, Definition-Methods of find integrating factors of Mdx+ Ndy=0; Linear Differential Equations; Bernoulli's equation.

Unit-III: Differential equations of the first order but not of the first degree (12 Lectures)

Equations solvable for p; Equations solvable for y; Equations solvable for x Equation that do not contain x (or y); Equations of the degree in x and y- Clairaut's equation.

Unit-IV: Higher order linear differential equations – I (12 Lectures)

Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General solution of f(D) y = 0

General solution of f(D) y = Q when Q is a function of x

is expressed as partial fractions.

P.I of f(D) y = Q when Q = b

P.I of f(D) y = Q when Q is b or b

Unit-V: Higher order Linear Differential Equations – II (12 Lectures)

Solution of the non homogeneous linear differential equations with constant coefficients.

P.I. of
$$f(D) y = Q$$
 when $Q = b$

P.I. of f(D) y = Q when Q = V

P.I. of f(D) y = Q when Q = xV

P.I. of f(D) y = Q when Q =

Prescribed Text books:

Scope as in V.VenkateswaraRao &others "A text book of B.Sc.Mathematics Vol I, First year first semester, S.Chand & Company, New Delhi.

Reference Books:

- 1. Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol I, S.Chand & Company, New Delhi.
- 2. Scope as in Dr.A.Anjaneyulu "I B.Sc. A Text book of Mathematics SEM-I&SEM-II, Deepthi Publication.
- 3. G.Shankar Rao" A text book of Mathematics for B.Sc Vol I, Himalaya Publishing House.
- 4. Differential equations with applications and programs- S.Balachandra Rao & H.R.Anuradha, universities press.

MODEL PAPER

B.Sc. Computer Science (Hons.)., I Year Degree Examinations - 2018

II Semester, GE 2: Mathematics

GE Paper 2: Differential Equations

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

PART-A

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

- 1. Solve: $x^2y dx (x^3+y^3) dy = 0$.
- 2. Solve: $(x^2+y^2+x) dx +xy dy=0$
- 3. Solve: y + px =
- 4. Solve: =
- 5. Solve: $(D^2-5D+6) y = e^{4x}$.

<u>PART-B</u>

5x10=50M

Answer any FIVE Questions. Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

6. Solve:

7. Show that the family of Confocal conics + = 1 is self orthogonal, where \times is parameter.

UNIT-III

- 8. Solve (1+xy) x dy + (1-xy) y dx = 0
- 9. Solve $+ = x^2y^6$

UNIT-III

- 10. Solve: $y^2 \log y = xpy + p^2$
- 11. Solve: $p^2+2pycotx=y^2$, where p=

UNIT-IV

- 12. Solve: $(D^2+4) y=+\sin 2x+\cos 3x$.
- 13. Solve: (- 4D +3) y =

<u>UNIT-V</u>

- 14. Solve: $(D^2-2D+2) y=e^x tanx.$
- 15. Solve: (- 4D +4) y =

I B.Sc. (Honors) COMPUTER SCIENCE 2222 -A

Core Paper 4: Semester II

Discrete Structures 60 Hrs

Unit–I: Set Theory (12 Lectures)

Introduction-Basic Concepts of Set Theory - finite and infinite sets, uncountable Infinite Sets; Functions-Inverse function, Composite function, Relations-Properties of Binary Relations, Closure, Partial Ordering Relations.

Unit–II: Mathematical Logic (12 Lectures)

Connectives: Negation-Conjunction- Disjunction-Statement Formulas and Truth Tables-Conditional and Bi conditional -Well-formed Formulas, Tautologies- Equivalences Formulas-Duality Law. **Unit-III: Normal forms** (12 Lectures)

Disjunctive Normal Forms – Conjunctive Normal Forms- Principal Disjunctive Normal Forms - Principal Conjunctive Normal Forms- Ordering and Uniqueness of Normal Forms.

Unit-IV: The Theory of Inference for the Statement Calculus: (12 Lectures)

Validity Using Truth Tables- Rules of Inferences- Consistency of Premises and Indirect Method of Proof– Automatic theorem proving.

Unit–V: Graph Theory (12 Lectures)

Basic Concepts of Graph Theory– Basic definitions- Paths, Reachability and Connectedness –Matrix representation of Graphs-Trees.

Prescribed Text books:

Scope and standard as in the book" Discrete Mathematical structures with applications to computer science" by Tremblay, J.P and Manohar.R-Published by McGraw-Hill International Edition 1987 edition.

Recommended Books:

 C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill
Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006
COMPUTER SCIENCE LAB (C-IV): Discrete Structures Practical

Practicals based on the theory

Note: Total-150Marks

Theory- 60Marks, Practicals- 50Marks, Internal assessment- 40Marks

MODEL PAPER

B.Sc. Computer Science (Hons.)., I Year Degree Examinations - 2018

II Semester, DSE: Mathematics

Paper IV: Discrete Structures

(With effect from 2017-2018)

Time: 3 Hours

Max Marks: 60

<u>PART-A</u>

Answer any TWO out of FIVE Questions 2x5=10M

Each question carries 5 marks

1. Prove that = .

- 2. Explain Disjunction & Conjunction with truth table.
- 3. Construct the truth table for $(P \lor Q) \lor \neg P$.
- 4. Obtain disjunctive normal form of $(P \lor Q) \Leftrightarrow P \land Q$.
- 5. Determine whether the conclusion C follows logically from the premises H_1 and H_2 .
 - (i) H₁: $P \rightarrow Q$, H₂: P, C: Q
 - (ii) $H_1: P \rightarrow Q, H_2: Q \rightarrow R, C: P \rightarrow R.$

<u>PART-B</u> 5x10 = 50M

Answer any FIVE Questions. Choosing at least ONE question from each unit. Each question carries 10 marks

$\underline{UNIT} - \underline{I}$

6. Prove that A B)

7. Let f(x) = x + 2, g(x) = x - 2 and h(x) = 3x, then find gof, fog, fof, gog, foh, hog, hof and fogoh.

<u>UNIT – II</u>

8. Explain Conditional and Bi-Conditional.

9. Show that $((\mathbb{P} \lor \mathbb{Q}) \land \widehat{(\mathbb{P} \land (\mathbb{Q} \lor \mathbb{R}))}) \lor (\mathbb{P} \land \mathbb{Q}) \lor (\mathbb{P} \land \mathbb{R})$ is tautology.

<u>UNIT – III</u>

10. Explain PCNF and PDNF

11. Obtain the product sums canonical form of $(P \land Q \land R) \lor (\neg P \land R \land Q) \lor (\neg P \land \neg Q \land \neg R)$.

$\underline{UNIT} - IV$

12. Show that $R \land (P \lor Q)$ is valid conclusion from the premises

 $P \lor Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\rceil M$

13. Show that the following premises are inconsistent:

(i) If Jack misses many classes through illness then he fails high school.

(ii) If Jack fails high school, then he is uneducated.

(iii) If Jack reads a lot of books, then he is not uneducated.

(iv) If Jack misses many classes through illness and reads a lot of books.

$\underline{UNIT - V}$

14. (a). Explain Warshall's algorithm.

(b). Draw the 6 non-isomorphic trees with 6 vertices.

15. Explain tree traversals.

II B.Sc.Computer Science (Hons.) 3324

Generic Elective 3: Semester III

Vector Calculus

Unit–I: Derivative of Vector function (12 Lectures)

Definitions: Vector function of a scalar variable, interval, limit of vector function, continuity of vector function, Derivative-Higher order derivatives- Derivative of Constant Vector-Vector with constant magnitude- Composite Vector function- Partial Differentiation.

Unit-II: Differential Operators (12 Lectures)

Definitions: Scalar point function, Vector point function, Delta neighborhood, Limit, Continuity-Directional derivative at a point- Level surface- Operators- Gradient, Divergence, Curl operators-Formulae Involving these operators- Divergence of a vector.

Unit–III: Vector Identities (12 Lectures)

Solenoidal vector- Curl of a vector- Irrotational vector- Vector identities- Theorems based on vector identies.

Unit–IV: Vector Integration (12 Lectures)

Line Integral, Surface Integral and Volume integral with examples.

Unit–V: Integral Transformations (12 Lectures)

Gauss's divergence theorem- Deductions from Gauss's theorem- Green's theorem in a plane-Stokes theorem- Stokes theorem in a plane.

Prescribed Text books:

Scope as in N.Krishna Murthy &others "A text book of Mathematics for B.Sc Vol III, S.Chand & Company, New Delhi.

Reference Books:

- 1. Dr.A.Anjaneyulu "III B.Sc. A Text book of Mathematics", Deepthi Publication.
- 2. G.Shankar Rao" A text book of Mathematics for B.Sc Vol III, Himalaya Publishing House.
- 3. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
- 4. Vector Calculus by R. Gupta, Published by Laxmi Publications.

MODEL PAPER

B.Sc.Computer Science (Hons.) Second Year Degree Examinations – 2017

II Semester – Generic Elective-3

Vector Calculus

(With effect from 2017-2018)

Time: 3 Hours

Max.Marks: 70

PART-A

Answer any FIVE out of EIGHT Questions. 5x4=20M Each question carries 4 marks.

1. If r=xi+yj+zk and x=2sin3t,y=2cos3t,z=8t then prove that $\parallel=10$ and $\parallel=18$.

2. If A =.

3. Find the directional derivative of the function in the direction of the vector+2j+2k at the point (1, 2, 0).

4. Find grad f at the point (1, 1, -2), where.

5. If f=(x+3)i+(y-2z)j+(x+pz)k is a solenoidal find p.

- 6. Prove that curl (AB)=A divB –B div A +(B.)A (A.)B
- 7. If A= and B=. Find .
- 8. Compute dv over the sphere = 1.

PART-B

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks 5x10=50M

<u>UNIT – I</u>

9. If $r=a \cot i + a \sin j + at \tan k$, find and.

10. If and "a" is constant vector prove that.

(i) (a.r)k =

(ii)(ar).k=0

$\underline{UNIT - II}$

11. If ; prove that

[grad a, grad b, grad c]=0.

12. Find the directional derivative of the function along the tangent to the curve x = t, y =, z = at the point (1,1,1)

<u>UNIT – III</u>

13. If is a constant Vector, prove that curl = + (a.)

14. (a) Prove that div (A.

(b) If A= and find .

$\underline{UNIT - IV}$

15. If F=4xzi -j+yzk, evaluate where S is the surface of the cube bounded by x=0,x=a, y=0,y=a, z=0,z=a.

16. If F=2xzi-xj+k Evaluate .dv where v is the region bounded by the surface x=0,x=2,y=0,y=6,z=,z=4.

UNIT –V

17. State and prove stokes theorem.

18. Verify Gauss's divergence theorem to Evaluate

Over the surface of a cube bounded by the

Co-ordinate planes x=y=z=a

II B.Sc.Computer Science (Hons.) 4424-A Generic Elective 4: Semester IV Fundamentals of Mathematical Statistics

Unit–I

Introduction: Scope and limitations of statistical methods – classification of data - Tabulation of data - Diagrammatic and Graphical representation of data- Graphical determination of percentiles and quartiles.

Unit–II

Measures of location: Arithmetic Mean- Median- Mode- Geometric Mean and Harmonic Mean and their properties.

Unit-III

Measures of dispersion: Range- Quartile deviation- Mean deviation- Standard deviation-Combined standard deviation- Co-efficient of variation and Simple problems.

Unit-IV

Skewness: Measures of Skewness Karl Pearson's-Bowley's, Kelly's and co-efficient of Skewness and kurtosis based on moments. And simple problems.

Unit–V

Correlation and Regression: Correlation definition, types of correlation . Karl Pearson - spearman's rank correlation - concurrent deviation methods. Regression Analysis: Simple Regression Equations.

Prescribed Text books:

Fundamental of Mathematical Statistics by V.K. Kapoor & S.C. Gupta, Sultan Chand.

Reference Books:

1. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII

- 2. Elements of Statistics Mode . E.B. Prentice Hall
- 3. Statistical Methods Dr. S.P. Gupta Sultan Chand & Sons

4.BA/BSC I Year Statistics -descriptive statistics, Probability Distribution : telugu Academy

MODEL PAPER

B.Sc.(computer Honors), II Year Degree Examinations

IV-SEMESTER, DSC: Mathematics

G.E - Paper-IV: Fundamental Mathematical Statistics

(w.e.f: 2018-2019)

TIME: 3 Hrs Max marks:60

Answer any TEN questions, choosing at least TWO from each unit.

Each question carries SIX marks.

UNIT-I

- 1. Define Statistics, scope and limitations of Statistics?
- 2. Explain about tabulation of data?
- 3. Explain about bar diagram briefly ?
- 4. Draw a histogram and frequency polygon?

Wag	es	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. o	of	7	10	12	15	18	12	9	3
work	ers								

UNIT-II

- 5. What is measures of central tendency and write its characteristics ?
- 6. Define median ?Also write its merits and demerits?
- 7. Calculate mode to the following data.

C.I	10-20	20-30	30-40	40-50	50-60	60-70
Frequencies	10	3	23	20	12	11

8. Calculate harmonic mean to the following data.

C.I	10-15	15-20	20-25	25-30	30-35	35-40
Frequencies	3	9	13	22	12	11

UNIT-III

9. Define Standard deviation .Also write its merits and demerits?

10. Calculate mean deviation about mean to the following data.

C.I	20-30	30-40	40-50	50-60	60-70
Frequencies	5	12	21	8	2

11. Define Quartile deviation . What are the advantages and disadvantages ?

12. Calculate co-efficient of variance to the following data

C.I	0-10	10-20	20-30	30-40
f	9	3	12	16

UNIT-IV

- 13. Explain about Skewness?
- 14. Show that .
- 15. Calculate Karl person coefficient of skewness to the following data.

CI	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
frequency	2	6	11	20	40	75	45	25	18	8

16. Explain about Kurtosis.

UNIT-V

- 17. Explain Fitting of regression line X on Y.
- 18. Distinguish between correlation and regression.
- 19. Define Correlation. And their types with examples.
- 20. The data is given below is marks in two subjects mathematics and statistics of B.Sc.

Students.

	mathematics	statistics
Average marks	39.5	49.5
Standard deviation	10.8	16.8

The correlation coefficient between marks in two subjects is 0.4 .Estimate the marks in statistics if the marks in mathematics is 52.

D.R.W. (Autonomous) College: Gudur 1130

B.Sc. Food Technology and Management First Year Degree Syllabus

Branch: Mathematics, Semester-I

Paper: APPLIED MATHEMATICS-1

(With effect from 2017-2018)

<u>Matrix</u>

Matrices: Introduction to matrices, types of matrices, addition, subtraction and multiplication of matrices, transpose, cofactor, ad joint of matrices.

Unit - II

Inverse of 3×3 -matices, solutions of simultaneous equations in 2 and 3 unknown's variables by using matrix inversion methods.

Differentiation

Unit- III

Differential calculus: Introduction to differentiation, evaluation of derivatives of Xⁿ, U+V,

U-V, U+V+W, UV, U/V.

Unit – IV

Growth rates for exponential and logarithmic and periodic (trigonometrically) functions, Function of a function role.

Unit- V

Differentiation of a function w.r.to another function- logarithmic differentiation-implicit differentiation- parametric differentiation.

Prescribed Book:

Intermediate mathematics Telugu Academic Mathematics IA&IB Text books

References:

- 1. Intermediate mathematics S. Chand & Co. New Delhi volume –I & II
- 2. A Text book of Matrices: Shanthi Narayan 1990 S.Chand & Co. New Delhi.
- 3. Differential calculus: Shanthi Narayan 1990 S.Chand & Co. New Delhi.

Model Paper

D.R.W. (Autonomous) College: Gudur 1130

B.Sc. Food Technology and Management First Year Degree Syllabus

Branch: Mathematics, Semester-I, 2017

Paper: APPLIED MATHEMATICS-1

(With effect from 2017-2018)

PART-A

Answer any TWO out of FIVE questions.

2x5=10M

Each question carries 5 marks.

- 16. Given that A = . Verify that $-4A + 5 \square \blacksquare 0$.
- 17. Find the co-factor matrix of the matrix A=
- 18. Find , if y =
- 19. Find the derivative of log(
- 20. If $x = a \cos^3 t$, $y = a \sin^3 t$ then find

<u>PART-B</u> 5x10=50M Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks.

<u>UNIT-I</u>

- **21.** Find the ad-joint of the matrix
- **22.** If $A = \text{ then find } (A')^{-1}$

<u>UNIT-II</u>

- 23. Find the inverse of the matrix
- 24. Solve 3x+4y+5z=18; 2x-y+8z=13 and 5x-2y+7z=20 by using Matrix inversion method.

UNIT-III

- 25. Find the derivative of by using first principal derivative.
- 26. Find derivative:

UNIT-IV

- 27. Find , if y=
- 28. If then prove that =

<u>UNIT-V</u>

- 29. If = a(x-y) then show that
- 30. If x=, y= then find

D.R.W. (Autonomous) College: Gudur

B.Sc. Food Technology and Management, I Year Degree 2254

II Semester – GE 2: Mathematics

Paper: Applied Mathematics- II

(With effect from 2017-2018)

UNIT-I

Trigonometry: Measurement of angle, trigonometric rations of compound angles.

UNIT-II

Increasing and decreasing function, maxima and minima of functions, applications of maxima& minima.

UNIT-III

Quadratic equations: The quadratic formula, sum, product of roots, nature of roots of $ax^{2}+bx+c=0$.

UNIT-IV

Sign of quadratic expressions, change in signs and maximum minimum values, quadratic inequality.

UNIT-V

Integration- introduction- integration as the inverse process of differentiation- standard form-Method of substitution-integration of algebraic- exponential, logarithmic, trigonometric and inverse trigonometric functions.

<u>Prescribed Text Books:</u> Intermediate telugu academic books volume I&II

Reference Books:

Intermediate telugu academic books papers IA&B, IIA&B text books Intermediate IA&B, IIA&B text books, Chand Publications

MODEL PAPER

2254

B.Sc. Food Technology and Management, I Year Degree Examinations - 2018

II Semester – GE 2: Mathematics

Paper: Applied Mathematics- II

(With effect from 2017-2018)

Time: 3 Hours

Max. Marks: 60

<u>PART-A</u>

Answer any TWO out of FIVE Questions. 2x5=10M

Each question carries 5 marks.

1. Find $sin^2 82 - sin^2 22$

2. Find two positive integers x and y such that x + y = 60 and xy^3 is maximum.

- 3. Find the nature of the roots $x^2-7x+12=0$
- 4. Find the value of x at which the expression have maximum or minimum x^2+5x+6
- 5. dx on I⊂ [2nπ, (2n+1)π], n⊠⁄Ω

<u>PART-B</u>

Answer any FIVE Questions, Choosing at least ONE Question from each unit. Each Question carries 10 marks. 5x10=50M

UNIT –I

- 6. Let ABC be a triangle such that + =
- 7. If tan 20° = p then prove that =

UNIT –II

- 8. A window is in the shape of a rectangle surmounted by a semi- circle. If the perimeter of the window be 20 feet then find maximum area?
- 9. If the curved surface of right circular cylinder inscribed in a sphere of radius r is maximum, show that the height of the cylinder is r.

UNIT –III

- 10. Find the values of m for x^2 -15- m (2x- 8) = 0 equations have equal roots.
- 11. If x is real, prove that lies between 1 and

UNIT –IV

- 12. Find the maximum value of the function over R.
- 13. Prove that+-does not lie between 1 and 4, if x is real.

UNIT –V

- 14. dx on R
- 15. dx on (-1,∞)

Foundation Course - 8

4404-1-A

ANALYTICAL SKILLS Common Syllabus for all Second Year Degree W.e.f. 2015-16 (Revised in April, 2016) Semester – IV

UNIT – 1

Data Analysis:-The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT – 2

Sequence and Series: - Analogies of numbers and alphabets completion of blank spaces following the pattern in A: b::C: d relationship odd thing out; Missing number in a sequence or a series.

UNIT - 3

Arithmetic ability:-Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF).

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

UNIT - 4

Quantitative aptitude: - Averages, Ratio and proportion, Problems on ages, Time-distance – speed.

UNIT – 5

Business computations: - Percentages, Profit &loss, Partnership, simple compound interest.

Reference Books:

1. Quantitative Aptitude for Competitive Examination by Dr.R. S. Aggarwal, S.Chand publications.

2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.

3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers

4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.

5. Old question Paper of the exams conducted by (Wipro, TCS, Infosys, Etc) at their recruitment process, source-Internet.

Note: The teachers/students are expected to teach /learn the contents by not converting them to the problems of algebra at the maximum possible extent, but to use analytical thinking to solve the exercises related to those topics. This is the main aim of the course.

4404-1-A

D.R.W. Autonomous College: Gudur

Common paper for all Second Year Degree

Foundation Course Examinations

Fourth Semester

Foundation Course Paper 8: ANALYTICAL SKILLS

Time: 2 Hours

Max. Marks: 50

Write any 25 questions out of 50. All questions carry equal marks.

కోరిండి 50 ప్రేర్తనతుండి 25 పరశ్నలకుమాధానములు వరాయండిఅన్ సపరశ్నలకుమార్ కులు సమానము

<u>UNIT –I</u>

Direction (సూచనలు): Q. No: 1 to 5

Study the following table carefully to answer these questions. Percentage of mark obtained by six students in six different subjects.

కోరండుట్టికనజాగ్రతతు సించి దిగువ ఇవ్ పటిడిన ప్రశేనలకు మాధానములు ఇవ్ యండిలు

Subject Student	History (చరితేథ (out of 50)	Geography (జియోగ్రాఫీ) (out of 50)	Maths (ก ะ ออง) (out of 150)	Science (సైన్ న్) (out of 100)	English(ఇంగ్లీష) (out of 75)	Hindi (హిందీ) (out of 75)
Amit (అమిత్)	76	85	69	73	64	88
Bharat (భరత్)	84	80	85	78	73	92
Umesh (ఉమేష్)	82	67	92	87	69	76
Nikhil (సికల్)	73	72	78	69	58	83
Pratiksha (ప్ రతీక్ర్ ష	68	79	64	91	66	65
Ritesh (రితిష్)	79	87	88	93	82	72

పిభిన్నసబ్జెక్టు ఆతోరుగురు పిద్యార్ థు ఆట్ చిన మార్ కులు కోరండుట్ టికలో ఇవ్ వబడినపి.

1. What is approximately the integral percentage of marks obtained by Umesh in all subject? ఉమేష్ అనే పిద్**యార్**థి**జుల**న్సి సబ్జెక్ట్ టులరోసమగ్**రహాట్**షిన మార్క్ కులు శాతం ఎంత ?

(a) 80% (b) 84 % (c) 86 % (d) 78%

2. What is the average percentage of marks obtained by all students in Hindi? (approximated to two places of decimal)

పొందీ సబ్జెక్టులలోఅండింద్యార్థుతుంచిన మార్కులు శాతం యొక్క సరాసర ఎంత ?

(a) 77.45 % (b) 79.33 % (c) 75.52 % (d) 73.52%

- 3. What is the average mark of all the students in mathematics? గణితంలో అందరు పిద్యార్థమాంధించిన సరాసరి మార్కులు ఎంత ?
 - (a) 128 (b) 112 (c) 119 (d) 138
- 4. What is the average mark obtained by all students in Geography? జియోగ్రాఫీలో అందరు పిదయార్థ మూర్రించిన సరాసరి మార్ కులు ఎంత ?
 - (a) 38.26 (b) 37.26 (c) 37.16 (d) 39.16

5. What are the total marks obtained by Pratiksha in all the subjects taken together?

అన్సి సబ్జెక్టుల్లోరతక్ష్మోతేతంనాధించిన మార్ కులు ఎంత ?

(a) 401.75 (b) 410.75 (c) 420.75 (d) 402.75

Direction (సూచనలు): Q. No: 6 to 10

Product of Fertilizers by a company (in 10000 tones) over the years

ఇచేషిన Bar- Graph ను పరిశీలించి కోరండిర్ఈనలకుమాధానం ఇవ్యండింపినీలో పిపిధ సంవత్సరాలలో ఎరుమల ఉత్పత్**టి**వేల టన్నులలో).

- 6. In how many of the given years was the production of fertilizers more than the average production of the given years? ఇచచిన సంవత్సరాలలో ఎరుమల సగటు ఉత్పత్తింటె ఎన్సి సంవత్సరంలో ఉత్పత్తిక్ కువగా ఉన్నది?
 - (a) 1 (b) 2 (c) 3 (d) 4
- 7. The average production of 1996 and 1997 was exactly equal to the average production of which of the following pairs of years? 1996, 1997 సంవత్సరాలలో సగటు ఉత్పత్తితోరండుంవత్సరాలజంటలోని దీసిలో సగటు ఉత్పత్ఊచేచితంగా సమానము? (a) 2000 and 2001(2000 మరయు 2001) (b) 1995 and 2001(1995 మరియు 2001) (c) 1998 and 2000 (1998 మరియు 2000) (d) 1995 and 1999 (1995 మరియు 1999)
- 8. What was the percentage decline in the production of fertilizers from 1997 to 1998? 1997 మరియు 1998 వరకు ఎరుమల ఉత్పతోతలోకోషిణుతతము? (a) 33 % (b) 30% (c) 25% (d) 21%
- 9. In which year was the percentage increase in production as compared to the previous year the maximum?

ముందు సంవత్సరంలో పోలిస్తేమి సంవత్సరంలో ఉత్పత్ తియేంపుదల శాతము గిరష్టటము

- (a) 2002 (b) 1999 (c) 1996 (d) 1997
- 10. What was the percentage increase in production of fertilizers in 2002 compared to that in 1995? 1995 తో వోలన్తే2002 సంవత్సరాలలో ఎరుమల ఉత్పత్**పి** శాతము మేరకు పొరిగింది? (a) 320% (b) 300% (c) 200% (d) 220%

<u>UNIT –II</u>

Complete the following series:

కోరండికేరేణులనుపురించండి

11	. 45, 54, 63, (a) 32	(b) 55	(c) 18	(d) 64
12	. 29 ,37, 43 , (a) 45	(b) 80	(c) 40	(d) 47
13.	MN: OP			
	(a) AD: PR	(b) CE: TQ	(c) QR: ST	(d) RS: TV
14.	B: 16:: D:			
	(a) 120	(b) 190	(c) 200	(d) 256
15.	20, 40, 60, 80,			
	(a) 90	(b) 85	(c) 100	(d) 110
16.	2B, 4C, 6E, 8H,			
	(a) 10L	(b) 9P	(c) 8F	(d) 13M
17.	D -4, F-6, H-8, J-10),		
	(a) Z-1	(b) N-10	(c) M- 16	(d) L- 12
18.	Find out the odd o	one		
	కొరండూటిలోతప్ మప	దం కనుక్కోండి		
	(a) 19	(b) 17	(c) 13	(d) 12
19.	Girl : Beautiful :: E	3oy:?		
	బాలికా : అందమైన :	: బాలుడు : ?		
	(a) Smart	(b) handsome	e (c) heroic	(d) pretty

20. Find the odd word

కోరండూటిలోతప్ పుప ద	ం కనుక్కోండి		
(a) Orange	(b) Apple	(c) guava	(d) Grapes
		<u>UNIT –III</u>	
21. The sum of the first 6	60 natural numbers	s is	
మొదటి 60 సహజస	ంఖ్ యటొత్ తం		
(a) 1830	(b) 1803	(c) 1083 (e	d) 1820
22. If then find the va అయితే యొక్క షి	alue of రలువ ఎంత ?		
(a)	(b)	(c)	(d)
23. Simplify 2– [3– {6 2– [3– {6– (5- }] ;	ఏ– (5- }] సూక్ష్ మౌరకరంచు:	ము	
(a) 5	(b) 2	(c) 1	(d) 0
24. Simplify 0.6 0.6 + 0.6	5 6		
0.60.6+0.6 6 సూకీ	కేష్ మొరకరంచుము		
(a) 0.02	(b) 0.46	(c) 0.004 (d) 0.03	
25. Which of the followi	ng fraction is the si	mallest?	
కోరందిభీననాలలో చినన	ාස් බස් ?		
(a)	(b)	(c)	(d)
26. Which is the result = ? దీసి పిలువ ఎ	c of =?) ං త?		
(a) 1 27. Simplify of 0.176 , 0.176 సూక్ష్ మొర	(b) 2 కోరంచుము	(c)	(d)
(a) 0.48	(b) 0.048	(c) 480	(d) 4800
28. What is the HCF o 27, 18 మరియు 36	of 27, 18 and 36? 5 ల గిరష్ణుమానం	భాజకము ఎంత?	
(a) 7	(b) 11	(c) 9	(d) None of these (ఏదీకాదు)
29. Determine the LCI	M of , and?		

, మరియు	ల క .సా .గు. ఎం	త ?	
(a)	(b)	(c)	(d) None of these (ఏదీకాదు)
30. Find the HCF 36 مىكامى 8	F of 36 and 84 4 ల యొక్క గ .సా.	భా. ఎంత?	
(a) 4	(b) 6	(c) 12	(d) 18

<u>UNIT -IV</u>

31. Average of 3, 7, 9 and 13						
3, 7, 9 మరియు 13 ల యొక్ క సరాసరి						
(a) 7	(b) 8	(c) 2	(d) 4			
32. The average of first	t 100 natural numb	pers is				
మొదటి 100 సహక	జ సంఖ్యతురాసిం	ర ఎంత?				
(a) 52.5	(b) 50.5	(c) 51.5	(d) 5.1			
33. The fourth proportional to 4, 9, 12						
4, 9, 12 ల చతుర్ డు నుహత సంఖ్ య ంత?						
(a) 27	(b) 30	(c) 20	(d) 15			
34. Divide Rs. 672 in the ratio 5: 3 then the second part value						
రూ. 672 ను 5: 3 పిభజించిన రెండవ భాగం ఎంత?						
(a) 251	(b) 250	(c) 248	(d) 252			
35. If 12 : 15 :: x : 15 th	nen x =?					
12 : 15 :: x : 15 అయితేn x =?						
(a) 0.12	(b) 12	(c) 1.2	(d) 1.12			
36. If then (x+5): (y+8) is equal to ංකාන් (x+5): (y+8)						
(a) 3 : 5	(b) 13:8	(c) 8:5	(d) 5:8			
37. The sum of the ages of father and his son is 88 years. If the ratio between their ages is 7: 4.						
Then find their age	es					

తండిర్త కొడుకుల వయస్^{*}సు7: 4 పార వయస్^{*}సలమొత్తం88 అయితే పార వయస్^{*}సులుఎంత? (a) 56, 30 (b) 56, 28 (c) 56, 32 (d) 56, 26

38. Sachin is younger than Rahul by 4 years. If their ages are in the respective ratio of 7:9 how

Old is Sachin?

(a) 16 years (b) 18 years (c) 28 years (d) None of these సెటినే, రాహుల్ కంటే 4 సం లు టిన్న పారి వరుస వయసులు 7: 9 గా ఉంటే సెటినే వయనేసుఎంత? (b) 18 సంలు (c) 28 సంలు (d) ఏదీకాదు (a) 16 సంలు 39. How many minutes' does Aditya take to cover a distance of 400m. If he runs at a speed of 20 Km/hr? (a) 72 sec (b) 64 sec (c) 92sec (d) 70sec ఆదిత్య కి.మీ/గం వేగంతో 400 మీ. దూరం పోవడానికి ఎన్సిసిమేషాలు పడుతుంది? (a) 72 నోకానుకు (b) 64 నోకానుకు (c) 92 నోకానుకు (d) 70 నెకానుకు 40. A car moves at the speed of 80 km/hr. What is the speed of the car in meters per sound? (a) 8m/sec(b) 20 m/sec(c) 22 m/sec (d) None of these కారు వేగం 80 కి.మీ / గం అది ఎన్సి మీ/ నెకానుకు సంమానము (a) 8 మీ/ నెకానుకు (b) 20 మీ/ నెకానుకు (c) 22 మీ/ నెకానుకు (d) ఏదీకాదు <u>UNIT –V</u> 41. 45 % of 750 - 25% of 480 =? (b) 217.50 (c) 236.50 (a) 216 (d) 245 42. If 75% of a number is added to 75 then the result is the number itself. The number is ఒక సంఖ్యలో5% కు 75 కలిపితే పలితం ఆ సంఖ్యాయోమతుంది. అపుడు సంఖ్యంత? (a) 50 (b) 60 (c) 300 (d) 400 43. A shopkeeper expects a gain of 22 ½ % on his cost price. If in a week, his sale was of Rs.392, What was his profit? (a) Rs.18.20 (b) Rs.70 (c) Rs. 72 (d) Rs.88.25 దుకాణదారు పెట్టుభాడివై 2 1/2 % లాభం ఆశించి , పారంలో రూ. 392 లకు అమ్మకజిరిపాడు. అప్పుడు అతసి లాబం ఎంత ? (a) రూ.18.20 (b) రూ.70 (c) రూ. 72 (d) රා.88.25 44. Successive discount of 10%, 12 % and 15% amount to a single discount of (a) 32.68 % (b) 35.28% (c) 36.68 % (d) None of these 10%, 12 % మరియు 15% వరకు తగోగంపులుకోరిండినే తగోగింపుకాతానికి సమానము (d) ఏదీకాదు (a) 32.68 % (b) 35.28% (c) 36.68 %

45. A, B and C enter into partnership. A invests 3 times as much as B invests and B invests two Third of what C invests. At the end of the year, the profit earned is Rs. 6,600. What is the Share of B? (a) Rs.1,000 (b) Rs.1,200 (c) Rs.1,100 (d) Rs. 1,400 A,B,C లు భాగస్వామ్యంటేరారు. B మూలధనాసికి 3 రెట్లుA, C మూలధనంలో వంతు మూలదనంలో B పెట్**టుభాడపెట్**టగాసింవత్**సరం**చివర రూ. 6,600 లాభం వచేచింది. వాటా ఎంత ? (a) රා.1,000 (b) රා.1,200 (c) が.1,100 (d) රూ. 1,400 46. Find the simple interest on Rs. 68,000 at 16 % per annum for 9 months. (a) Rs.8,500 (b) Rs. 6,000 (c) Rs. 4,000 (d) Rs. 8,000 16 % p.a (సంవత్సరాసికి) S.I. తో రూ. 68,000 అసలు 9 నెలలో ఎంత వడేడొందుతుంది ? (d) రూ. 8,000 (a) රා.8,500 (b) రూ. 6,000 (c) రూ. 4,000 47. A person buys a toy for Rs.50 and sells for Rs.75 what will be his gain percent? ఒకడు టీమ్మనురూ. 50 కొని, రూ. 75 అమ్మేతీతని లాబ శాతమెంత? (a) 40 % (b) 30 % (c) 50 % (d) 60 % 48. Find the simple interest on Rs. 4,000 for 4 years 5 % per annum. (a) Rs.800 (b) Rs.500 (c) Rs.300 (d) Rs.1,000 5% p.a. S.I. తో రూ. 4.000 అసలు 4 సంవత్సరాలో ఎంత వడోడొందుతుంది? (a) రూ.800 (b) రూ.500 (c) **ひ**^{*}.300 (d) රා.1,000 49. Find compound interest on Rs.7,500 at 4 % per annum for 2 years compounded annually. (a) Rs.8,111 (b) Rs.8,110 (c) Rs.8,113 (d) Rs.8,112 ప్రతిసింవతేసరంవడేడుమ్మేళనంచేస్తేరూ7,500 పై 4 % p.a తో 2 సం లకు అయ్యాిక్రవడేడిత? (a) రూ.8,111 (b) రూ.8,110 (c) రూ.8,113 (d) රා.8,112 50. Find compound interest on Rs.20, 480 at 6 % per annum for 2 years 73 days is (d) Rs.3,636 (a) Rs.2,929 (b) Rs.3,000 (c) Rs.3,1313 రూ. 20,480 పై 2 సం 73రోజులలో 6 % p.a తో అయ్యాిక్రవడడి (a) රා.2,929 (b) රා.3,000 (c) రూ.3, 1313 (d) රා.3,636