S.R.R. & C.V.R. GOVT. DEGREE COLLEGE
(AUTONOMOUS)
VIJAYAWADA-520004, KRISHNA DISTRICT

Minutes of the Meeting Board of Studies
Department of Mathematics
Dated: 23-07-2022

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous)
NAAC accredited with 'B++' Grade
Machavaram, Vijayawada – 520 004, Krishna District.
Ph. No. 0866-2430060 Fax. 0866-2441092
www.srrcvr.org srrandcvr@gmail.com

MINUTES OF THE MEETING OF DEPARTMENT OF MATHEMATICS (BOS)

A meeting on Board of studies of Department of Mathematics held on 23-07-2022 in the Department of Mathematics for I[st] & II[nd] Semester of I[st] B.Sc, III[rd] & 4[th] Semester of II[nd] B.Sc, V[th] & VI[th] Semester of III[rd] B.Sc Syllabus under the chairmanship of K.V. Naga Lakshmi, Head of the Mathematics Department. The following members are present

1. University Nominee :

Prof. K.Jaya Lakshmi,
Head of the Department of Mathematics
Krishna University,
Machilipatnam.

2. Subject Expert :

Sri.P.N.V.Prasada Rao,
HOD of Mathematics,
Social welfare Residential Government Degree College,
Kanchikacherla,
Krishna District.

3. Subject Expert :

Dr. Dasari Madhusudhan Rao,
Department of Mathematics,
GDC for Women(A)
Guntur.

4. Chairman :

Smt.K.V. Naga Lakshmi,
HOD of Mathematics,
SRR & CVR Govt. Degree College (A),
Vijayawada.

23/7/2022

5. Alumni : R. Pushpa Sai

Kum. R. Pushpa Sai,

Agenda:

- To approve Mathematics Syllabus, Question Paper,Blue Print for Vth / VIth Semester of IIIrd B.Sc per for the academic year 2022-2023.
- Re-approval for Sem I & II and Sem-III & IV Mathematics Syllabus, Question Paper, Blue Print of Ist & IInd B.Sc, and Maths for Data Science Sem I of Ist B.Sc (D.S.Cs) for the academic year 2022-2023.
- To divide the syllabus into 5 units.
- To approve Model papers, Blue print.
- To divide 100 marks into two components.
- a) i) External 60 Marks, ii) Internal 40 Marks.

  b) External 60 Marks further divided into two sections. Section-A consisting - 20 Marks, Section-B consisting – 40 Marks, Max. Time-3 hours is to be approved.

- To evaluate Internal Assessment as follows :-

(a) Internal exams (two)	- 10
(b) Assignments (two)	- 10
(c) Project	- 10
(d) Seminar	- 10
Total	= 40

  In the Question paper Section-A consisting Questions of weightage 4 marks each. Five questions to be answered i.e. 5×4 = 20 marks and Section-B consisting of questions of weightage 8 marks each, Five questions to be answered 5×8 = 40 Marks is to be approved.

- To pass the exam, student must get 40% of 60 (external) and 40% of 40 (internal) and overall 40% combining both internal and external.

- To approve the model paper for Sem V / VI of IIIrd B.Sc and Re approval of Ist & IInd Semester of Ist B.Sc and and Sem-III & IV of IInd B.Sc and Maths for Data Science Ist B.Sc (D.S.Cs).
- To approve the Syllabus, Blue print and Model Paper for II B.A./B.Com. /B.Sc., III Sem Analytical Skills (Max Marks 50).
- To divide the Syllabus into three Units.
- The question paper is divided into two sections, Section A consisting 20 Marks, Section B consisting 30 Marks.
- The pass mark is 20.
- To approve paper setters.
- To approve Syllabus & Question paper for conducting Certificate course on Reasoning & Arithmetic for competitive Exams.
- To approve other Academic activities of the Department.
- To give permission to the Chairman for any small changes.

Resolutions:

In BOS meeting the committee has unanimously resolved and approved the following items:-

- The syllabus for the Mathematics, Question Paper, Blue Print for Vth / VIth Semester of IIIrd B.Sc, for the academic year 2022-2023 is approved.
- Sem Ist& II nd of Ist B.Sc. and Sem III & IV Mathematics Syllabus of IInd B.Sc and Maths for Data Science Ist B.Sc (D.S.Cs) for the academic year 2022-2023 is Re-approved.

- To divide 100 marks into two components.
  a) i) External 60 Marks,
  ii) Internal 40 Marks.
  b) External 60 marks further divided into two sections. Section-A consisting 20 marks, Section-B consisting – 40 marks, Max. Time-3 hours is approved.

- Internal exams(two) - 10
  Assignments (two) - 10
  Project - 10
  Seminar - 15
  Total = 40 is approved.

- In the Model paper Section-A consisting Questions of weightage 4 marks each. Five questions to be answered i.e. 5×4 = 20 marks and Section-B consisting of questions of weightage 8 marks each, Five questions to be answered 5×8 = 40 Marks is approved.

- To pass the exam student must get 40% of 60 and overall 40% combining both internal and external is approved.

- Workload for each paper is 6 hours is approved.

- The Syllabus, Blue print and Model Paper for II B.A./B.Com. /B.Sc., III Sem Analytical Skills (Max Marks 50) is approved.

- The pass mark 20 is approved.

- The panel of paper setter is approved.

- Syllabus & Question paper for conducting Certificate course on Reasoning & Arithmetic for competitive Exams is approved.

- The controller of examinations is given empowerment for any changes in selecting paper setter in case if non-availability if examiners as are listed.

1. Prof. K.Jaya Lakshmi :

2. Sri.P.N.V.Prasada Rao :

3. Dr. Dasari Madhusudhan Rao :

4. Smt. K.V. Naga Lakshmi :

5. Smt. R. Pushpa Sai (Alumni) : R. Pushpa Sai

6. Sri. M. L. Das :

6. Dr. MD. Masthan :

7. Dr. .G. Lalitha :

8. Dr. Sk.Sajana :

9. Dr.K. Rajinikanth :

Students:

10. N. Priyanka, (II[nd] M.S.Cs.) : N. Priyanka

11. S. Umamahesh, (II[nd] M.S.Cs.) : S. Uma Mahesh

PRINCIPAL
SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous)
Machavaram, VIJAYAWADA-4.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B++' Grade

DEPARTMENT OF MATHEMATICS

STRUCTURE OF NEW C.B.C.S. MODEL CURRICULUM IN MATHEMATICS

SEMESTER-I, II, III & IV

Year	Semester	Paper	Subject	Hours	Credits	IA	EA	Total
I	SEM-I	I	DIFFERENTIAL EQUATIONS	6	5	40	60	100
I	SEM-II	II	THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY	6	5	40	60	100
II	SEM-III	III	ABSTRACT ALGEBRA	6	5	40	60	100
II	SEM-IV	IV	REAL ANALYSIS	6	5	40	60	100
		V	LINEAR ALGEBRA	6	5	40	60	100

Structure of SECs for Semester–V /VI

(To choose One pair from the Three alternate pairs of SECs)

Year	Semester	Paper	Subject	Hours	Credits	IA	EA	Total
III	V / VI	6A	Numerical Methods	6	5	40	60	100
III	V / VI	7A	Mathematical Special Functions	6	5	40	60	100

OR

Year	Semester	Paper	Subject	Hours	Credits	IA	EA	Total
III	V / VI	6B	Multiple integrals and Applications of Vector Calculus	6	5	40	60	100
III	V / VI	7B	Integral transforms with Applications	6	5	40	60	100

OR

Year	Semester	Paper	Subject	Hours	Credits	IA	EA	Total
III	V / VI	6C	Partial Differential Equations and Fourier Series	6	5	40	60	100
III	V / VI	7C	Number theory	6	5	40	60	100

Note: For Semester V/VI, for the domain subject Mathematics, any one of the three pairs of SECs shall be chosen as courses 6 and 7, i.e., (6A & 7A) or (6B & 7B) or (6C & 7C), the pair shall not be broken. A, B, C allotment is random, not on any priority basis.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

I[st] B.Sc MATHEMATICS SYLLABUS

SEMESTER-I, PAPER-1

DIFFERENTIAL EQUATIONS

Sl. No.	Title of Unit	Sub Topics	References
1	**UNIT–I (12 Hours)** Differential Equations of first order and first degree:	Linear Differential Equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors; Change of variables.	**Text Book :** Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd. New Delhi-Second edition.
2	**UNIT–II (12 Hours)** Orthogonal Trajectories Differential Equations of first order but not of the first degree:	Equations solvable for p; Equations solvable for y; Equations solvable for x; Equations that do not contain x (or y); Equations homogeneous in x and y;Equations of the first degree in x and y – Clairaut's Equation.	**Reference Books :** 1. A text book of Mathematics for B.A/B.Sc, Vol 1, by N. Krishna Murthy & others, published by S.Chand & Company, New Delhi. 2. Ordinary and Partial Differential Equations by Dr. M.D,Raisinghania, published by S. Chand & Company, New Delhi. 3.Differential Equations with applications and programs – S. Balachandra Rao &
3	**UNIT–III (12 Hours)** 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, 1/f(D) is expressed as partial fractions. P.I. of f(D)y = Q when Q= be^{ax} P.I. of f(D)y = Q when Q is b sin ax or b cos ax.	
4	**UNIT– IV (12 Hours)** 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 = bx^k P.I. of f(D)y = Q when Q= $e^{ax}V$, where V is a function of x.	

		P.I. of f(D)y = Q when Q= xV, where V is a function of x. P.I. of f(D)y = Q when Q= x^n V, where V is a function of x.	HR Anuradha-Universities Press. 4. Differential Equations -Srinivas Vangala & Madhu Rajesh, published by Spectrum University Press.
5	**UNIT– IV (12 Hours)** Higher order linear differential equations-III:	Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation, Legendre's linear equations, miscellaneous differential equations.	

Bibliography :

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

2. Ordinary and Partial Differential Equations by Dr. M.D,Raisinghania, published by S. Chand & Company, New Delhi.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving.

Bridge Course (15 Hours)

Formation of Differential Equations, Degree and order of an ordinary differential equations, Solving Differential equations, variable and separable methods, Homogeneous differential equations, Non Homogeneous differential equations

COURSE OUTCOMES:

After successful completion of this course, the student will be able to;

1.Solve linear differential equations

2.Convertnonexact homogeneous equations to exact differential equations by using integrating factors.

3.Know the methods of finding solutions of differential equations of the first order but not of the first degree.

4.Solvehigher-order linear differential equations, both homogeneous and non homogeneous, with constant coefficients.

5. Understand the concept and apply appropriate methods for solving differential equations.

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DEPARTMENT OF MATHEMATICS

I[st] B.Sc MATHEMATICS

SEMESTER-I, PAPER-I

DIFFERENTIAL EQUATIONS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No. of Questions	Weightage
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

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(Autonomous) NAAC "B" Grade

DEPARTMENT OF MATHEMATICS

I[st] B.Sc MATHEMATICS

SEMESTER – I, PAPER – I

DIFFERENTIAL EQUATIONS

MODEL QUESTION PAPER

Time : 3 hours Max. Marks: 60

Section – A

Answer any FIVE questions **(5 x 4 = 20 marks)**

1. Solve $2xy\,dy - (x^2+y^2+1)\,dx = 0$
2. Solve $(1+y^2)dx = (\tan^{-1}y - x)dy$
3. Solve $x = y + p^2$
4. Solve $4y^2p^2 + 2xy(3x+1)p + 3x^2 = 0$.
5. Solve $(D^2 - 3D + 2)y = \text{Cos h } x$.
6. Solve $(D^3 + 4D)y = \sin 2x$
7. Solve $(D^2 - 4D + 4)y = x^3$
8. Solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 8e^{3x}\sin 2x$
9. Solve $[(1+x)^2D^2 + (1+x)D + 1]y = 4\cos\log(1+x)$.
10. Solve $\frac{d^2y}{dx^2} + y = \text{cosec } x$ by the method of variation of parameters

Section - B

Answer ALL questions **(5 x 8 = 40 marks)**

11 (a). Solve $x(1+xy)\,dy + y(1-xy)\,dx = 0$

(OR)

(b). Solve $x\frac{dy}{dx} + y = y^2\log x$

12 (a). Solve $(py+x)(px-y) = 2p$

(OR)

(b). Find the orthogonal trajectories of family of curves $r = a(1 - \cos\theta)$ whose 'a' is a parameters

13. (a). Solve $(D^3 - 2D + 4)y = 8(x^2 - e^{2x} + \sin 2x)$

(OR)

(b). Solve $(D^2 - 3D + 2)y = 2x^2$

14. (a). Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = xe^x \sin x$

(OR)

(b). Solve $(D^2 + 4)y = x \sin x \, dx$

15. (a). Solve $(x^2D^2 - xD + 2)y = x \log x$

(OR)

(b). Solve $\frac{d^2y}{dx^2} + 4y = 4 \tan 2x$ by the method of variation of parameters

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DEPARTMENT OF MATHEMATICS

I[st] B.Sc MATHEMATICS SYLLABUS

SEMESTER-II, PAPER-2

THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY

Sl. No.	Title of Unit	Sub Topics	References
1	**UNIT–I (12 Hours)** The Plane:	Equation of plane in terms of its intercepts on the axis; Equations of the plane through the given points; Length of the perpendicular from a given point to a given plane; Bisectors of angles between two planes; Combined equation of two planes; Orthogonal projection on a plane.	**Text Book :** Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, published by S. Chand & Company Ltd. 7th Edition.
2	**UNIT–II (12 Hours)** The 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; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.	**Reference Books :** 1. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, published by S. Chand & Company, New Delhi. 2. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley

3	**UNIT–III (12 Hours)** The Sphere:	Definition 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; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;	Eastern Ltd., 1999. 3. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi. 4. Solid Geometry by B.Rama Bhupal Reddy, published by Spectrum University Press.
4	**UNIT–IV (12 Hours)** The Sphere and Cone:	Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres. Definitions of a cone, vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone;	
5	**UNIT–V (12 Hours)** The Cones:	Enveloping cone of a sphere; right circular cone: equation of the right circular cone with a given vertex, axis and semi vertical angle: Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.	

Reference Books :

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

2. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley Eastern Ltd., 1999.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving.

Course outcomes:

After successful completion of this course, the student will be able to;

1. Get the knowledge of planes.
2. Basic idea of lines, sphere and cones.
3. Understand the properties of planes, lines, spheres and cones.
4. Express the problems geometrically and then to get the solution.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

I[st] B.Sc MATHEMATICS SYLLABUS

SEMESTER-II, PAPER-2

THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY

BLUE PRINT

DURATION : 3 HRS **Total Marks:60M**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

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(Autonomous) NAAC 'B++' Grade

DEPARTMENT OF MATHEMATICS

SEMESTER – II, PAPER – II

THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY

MODEL QUESTION PAPER

Time : 3 Hrs. Max. Marks : 60

SECTION – A

Answer any Five questions. Each question carries 04 Marks. 5 x 4M = 20 Marks

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

2.A variable plane is at a constant distance 3p from the origin and meets the coordinate axes in A,B,C. Show that the locus of the centroid of the triangle ABC is $x^{-2}+y^{-2}+z^{-2}=p^{-2}$

3.Find the foot of the perpendicular from (2,-2,3) to the plane $2x-y-2z-9=0$

4.Find the image of the point (1,3,4) in the plane $2x-y+z+3=0$.

5.Find the equation of spheres passing through the circle $x^2+y^2+z^2=4$, $z=0$ and is intersected by the plane $x+2y+2z=0$ in a circle of radius3.

6.Find the pole of the plane $x-y+5z-3=0$ w .r .t the sphere $x^2+y^2+z^2=9$.

7. . Find the length of the Tangent line from the point (3, 1, -1) to the Sphere $x^2+y^2+z^2-3x+5y+7=0$.

8.Find the vertex of the cone $2x^2+2y^2+7z^2-10yz-10zx+2x+2y-26z-17=0$.

9.Find the Enveloping cone of sphere $x^2 + y^2 + z^2 + 2x - 2y = 2$ with its vertex(1,1,1)

10. Find the equation of right circular cone whose vertex is origin, axis as the line $x=t$, $y=2t$, $z=3t$ and whose semi-vertical angle is 60^0

SECTION – II

Answer all questions. Each question carries 08 Marks. 5 x 8M = 40 Marks

11. (a). Find the equation to the plane through the intersection of the planes

$x+2y+3z+4=0, 4x+3y+3z+1=0$ and perpendicular to the plane $x+y+z+9=0$.

OR

(b) Find the bisecting plane of the acute angle between

the planes $3x-2y+6z+2=0$, $2x-y+2z+2=0$.

12 (a) Prove that the lines $x+2y+3z-4=0=2x+3y+4z-5$, $2x-3y+3z-5=0=3x-2y+4z-6$ are coplanar & also find their point of intersection and the plane containing lines.

OR

(b) Find the S.D between the lines $\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$, $\frac{x+3}{-3}=\frac{y+7}{2}=\frac{z-6}{4}$ and also find the equation of S.D between the lines.

13. (a) A plane passes through a fixed point (a,b,c) and cuts the axis in A, B,C show that the locus of centre of the sphere OABC is $\frac{a}{x}+\frac{b}{y}+\frac{c}{z}=2$.

OR

(b) Show that two circles $x^2+y^2+z^2-y+2z=0$, $x-y+z-2=0$ and $x^2+y^2+z^2+x-3y+z-5=0$, $2x-y+4z-1=0$ lies on the same sphere and find its equation.

14. (a) Find the limiting points of coaxal system of spheres $x^2+y^2+z^2+4x-2y+2z+6=0$ and $x^2+y^2+z^2+2x-4y-2z+6=0$

OR

(b) If $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ represents one of a set of three mutually perpendicular generators of the cone $11yz+6zx-14xy=0$ find the equation of the other two.

15 (a) Find the equation of the tangent plan at the point (-3,0,-1) of the cone $4x^2-y^2+2z^2+2xy-3yz+12x-11y+6z+4=0$.

OR

(b) Find the equation of the right circular cone whose vertex is (1,-2,-1), axis the line $\frac{x-1}{3}=\frac{y+2}{4}=\frac{z+1}{5}$ and the semi vertical angle 60^0.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

II[nd] B.Sc. MATHEMATICS SYLLABUS

SEMESTER – III, PAPER – 3

ABSTRACT ALGEBRA

60Hrs

UNIT – I: (12Hrs) GROUPS:-

Binary Operation – Algebraic Structure – Semi group – Monoid – Group definition and elementary properties Finite and infinite groups – examples – order of a group. Composition tables with examples.

UNIT-2: (12Hrs) SUBGROUPS:-

Complex Definition-Multiplication of two complexes Inverse of a complex-Subgroup definition –examples-criterion for a complex to be a subgroups.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem:-

Cosets Definition – Properties of Cosets – Index of a subgroups of a finite groups – Lagrange's Theorem.

UNIT-3: (12 Hrs) NORMAL SURGROUPS & HOMOMORPHISM:-

Definition of normal subgroups-proper and improper normal subgroup-Hamilton group-criterion for a subgroup to be a normal subgroup-intersection of two normal subgroups-Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties – Kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

UNIT-4: (12 Hrs) PERMUTATIONS AND CYCLC GROUPS:-

Definitions of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley's theorem.

Cyclic Groups:-

Definition of cyclic group – elementary properties – classification of cyclic groups.

UNIT-5: (12 Hrs) RINGS:

Definition of Ring and basic properties, Boolean Rings, divisions of zero ad cancellation laws Rings, Integral Domains, Division Ring and Fields, The Characterises of a Ring The characterises of an Integral Domain, The characteristic of a Field, Sub Rings, Ideals.

Reference Books:

1. Abstract Algebra by J.B. Fraleigh, Published by Narosa Publishing house.

2. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, Published by S. Chand & Company, New Delhi.

3. **Modern Algebra by M.L. Khanna.**

Suggested Activities:

Seminar/Quiz/Assignments/Project on Group theory and its applications in Graphics and Medical image Analysis.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to:

1. Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
2. Get the significance of the notation of a normal subgroups.
3. Get the behavior of permutations and operations on them.
4. Study the homomorphisms and isomorphisms with applications.
5. Understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
6. Understand the applications of ring theory in various fields.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

II[nd] B.Sc MATHEMATICS

SEMESTER-III, PAPER-3

ABSTRACT ALGEBRA

BLUE PRINT

DURATION : 3 HRS **Total Marks:60M**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous) NAAC 'B' Grade
DEPARTMENT OF MATHEMATICS

II nd B.Sc MATHEMATICS

PAPER – III SEMESTER – III

<u>ABSTRACT ALGEBRA</u>

MODEL QUESTION PAPER

Time: 3 Hours **Max.Marks:60**

Section-A

Answer any FIVE Questions **(5x4=20Marks)**

1. In a group, inverse of any element is unique

2. Prove that the set of integers Z is an abelian group for the operation * defined by $a*b=a+b+1 \forall a,b \in z$

3. Show that intersection of two subgroups is also a subgroup

4. If H is any subgroup of a group G, then prove that $H^{-1}=H$

5. Show that every subgroup of an abelian group is normal.

6. Prove that the homomorphic image of a group is a Sub-group.

7. Express the permutation $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 5 & 4 & 3 & 1 & 2 \end{pmatrix}$ as the product of disjoint cycles.

8. G is a cyclic group of order n and 'a' is a generator of G. Show that a^m is a generator
of G if and only if $(m,n)=1$

9. Prove that every filed is an Integral domain.

10. Prove that the characteristic of a Boolean ring is 2.

Section-B

Answer any ALL Questions **(5x8=40Marks)**

11. (a) If G is a group and a,b∈G then prove that the equations ax=b and ya=b have unique solutions in G

(or)

(b) Prove that the set G or real numbers other than -1 with operation * such that $a*b=a-b-ab \ \forall \ a, b \in G$ is an abelian group.

12. (a) State and prove langrange's theorem for finite groups

(or)

(b) Let H be a subgroup of a group G and a,b∈ G then prove that
(i) $Ha=Hb \Leftrightarrow ab^{-1} \in H$, (ii) $aH=bH \Leftrightarrow a^{-1}b \in H$

13. (a) If H is a subgroup of G and N is normal subgroup of G, then show that (a) H∩N is a normal subgroup of H and (b) N is a normal subgroup of HN.

(or)

(b) Prove that every homomorphic image of a group G is isomorphic to some quotient group of G.

14. (a) Let S_n be a symmetric group of n symbols and left A_n be the group of even permutations then show that A_n is a normal is S_n and $O(A_n)=\frac{1}{2}n!$

(or)

(b) Prove that every subgroup of a cyclic group is cyclic

15. (a) Prove that the characteristic of an Integral domain is either zero or prime number.

(or)

(b) Prove that Union of two sub rings is also a sub ring if and only if one is contained another.

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DEPARTMENT OF MATHEMATICS

II[nd] B.Sc MATHEMATICS SYLLABUS

SEMESTER – IV, PAPER – 4

REAL ANALYSIS

60Hrs

UNIT – I: (12Hrs) REAL NUMBERS:-

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

Real Sequences: Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent Sequence.

The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem-Cauchy Sequence –Cauchey's general principal of convergence theorem.

UNIT –II: (12Hrs) INFINTE SERIES:-

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 n^{th} root test or Root Test.

3. D- Alemberts' Test or Ration Test.

4. Alternating Series – Leibnitz Test.

Absolute convergence and conditionnl convergence, semi convergence.

UNIT –III: (12Hrs) CONTINUITY:-

Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept. Infinite Limits. Limit 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: (13Hrs) 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 Derivation, Mean value Theorems; Role's Theorem, Lagrange's Theorem, Cauchhy's Mean value Theorem.

UNIT –V: (12Hrs) REMANN INTEGRATION:-

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Reference Books:

1. Real Analysis by Rabert & Bartely and D.R. Sherbart, published by John Wiley.

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

3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania Published by S. Chand & Company Pvt. Ltd., New Delhi.

Suggested Activities:

Seminar//Quiz/Assignments/Project on Real Analysis and its applications

Course outcomes:

After successful completion of this course, the student will be able to

1. Get clear idea about the real numbers and real valued functions.
2. Obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. Test the continuity and differentiability and Riemann integration of a function.
4. Know the geometrical interpretation of mean value theorems.

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DEPARTMENT OF MATHEMATICS

II[nd] B.Sc MATHEMATICS

SEMESTER – IV, PAPER – 4

REAL ANALYSIS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries 4 Marks. 5×4 = 20M

Question	Topics	No.of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL**Questions.Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

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DEPARTMENT OF MATHEMATICS

II^nd B.Sc MATHEMATICS

SEMESTER-IV, PAPER – IV

REAL ANALYSIS

MODEL QUESTION PAPER

Time: 3Hrs **Max.Marks:60**

SECTION-A

Answer any FIVE questions **(5x4=20Marks)**

1. Show that every Cauchy sequence is convergent.
2. Prove that the sequence $\{S_n\}$ where $S_n = \frac{1}{n+1} + \frac{1}{n+2} + \ldots\ldots + \frac{1}{n+n}$ is convergent.
3. Test for the convergence of $\sum \frac{1}{2^n+3^n}$
4. Show that the series $\sum(-1)^n\left(\sqrt{n^2+1}-n\right)$ is conditionally convergent
5. If f:[a,b]→R is continuous on [a,b] then prove that f is bounded on [a,b]
6. Discuss the continuity of f defined by $f(x)=\frac{e^{\frac{1}{x}}-1}{e^{\frac{1}{x}}+1}$, $x\neq 0$ and $f(0)=1$ at $x=0$
7. Verify Cauchy's Mean Value Theorem for $f(x)=x^2$, $g(x)=x^3$ in [1,2]
8. Discuss the applicability of Lagrange's mean value theorem for $f(x)=x(x-1)(x-2)$ on $[0, \frac{1}{2}]$
9. Prove that the function defined on [0,1] by f(x)=1 when x is rational, f(x)=-1 when x is irrational, is not integrable.
10. Evaluate $\int_0^{\frac{\pi}{4}}(sec^4 x - Tan^4 x)dx$

SECTION – B

Answer ALL questions **(5x8=40Marks)**

11. (a) State and Prove Cauchy's first theorem on Limits

(OR)

(b) Show that the sequence $\{S_n\}$ defined by $S_n=1+\frac{1}{1!}+\frac{1}{2!}+\cdots\ldots+\frac{1}{n!}$ is convergent.

12. (a) State and prove Ratio Test

(OR)

(b) State and prove Leibnitz Test

13. (a) Examine the continuity of the function f defined by $f(x)=|x-1|+|x-2|$ at x=1 and 2

(OR)

(b) If a function f is continuous on [a,b] then f is uniformly continuous on [a,b]

14. (a) State and prove Rolle's mean value theorem.

(OR)

(b) Show that $f(x)=|x|+|x-1|$ is not derivable at x=0 and x=1.

15. (a) A bounded function $f:[a,b]\to R$ is Reimann integrable on [a,b] if and only if for each $\epsilon>0$ there exists a partition P of [a,b] such that $U(p,f)-L(p,f)<\epsilon$.

(OR)

(b) State and prove fundamental theorem of Integral Calculus.

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DEPARTMENT OF MATHEMATICS

II[nd] B.Sc MATHEMATICS SYLLABUS
SEMESTER-IV, PAPER-5
LINEAR ALGEBRA

60 Hours

UNIT – I (12 Hours)

Vector Spaces-I:
Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linearly independence and Linearly dependence of Vectors.

UNIT –II (12 Hours)

Vector Spaces-II:
Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III (12 Hours)

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.

UNIT –IV (12 Hours)

Matrix :
Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic equations, Characteristic Values & Vectors of a square matrix, Cayley – Hamilton Theorem.

UNIT –V (12 Hours)

Inner product space :
Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process, Bessel's inequality and Parseval's Identity.

Co-Curricular Activities (15 Hours)
Seminar/ Quiz/ Assignments/ Linear algebra and its applications / Problem Solving

Course outcomes:

After successful completion of this course, the student will be able to:

1. Understand the concepts of vector spaces, subspaces, basises, dimension and their properties
2. Understand the concepts of linear transformations and their properties
3. Apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. Learn the properties of inner product spaces and determine orthogonality in inner product spaces.

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DEPARTMENT OF MATHEMATICS

II[nd] B.Sc. MATHEMATICS

SEMESTER-IV, PAPER-5

LINEAR ALGEBRA

BLUE PRINT

DURATION : 3 HRS

Total Marks:60

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No.of Questions	Weightage
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

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DEPARTMENT OF MATHEMATICS

II[nd] B.Sc. MATHEMATICS

SEMESTER-IV, PAPER-5

LINEAR ALGEBRA

MODEL QUESTION PAPER

Time: 3 Hrs **Maximum : 60 Marks**

SECTION A – (5 X 4 = 20 Mark)

Answer any FIVE questions.

1. Let p, q, r be the fixed elements of a field F. Show that the set W of all triads (x,y,z) of elements of F, such that $px + qy + rz = 0$ *is a vector space of* $V_3(F)$.

2. If S is a subset of a vector space V(F) then prove that
(a) S is a subspace of $V \Leftrightarrow L(S) = S$
(b) L(L(S) = L(S)

3. If α, β, γ are linearly independent vectors of a vector space V(F), show that $\alpha + \beta, \beta + \gamma, \gamma + \alpha$ are also linearly independent.

4. Show that the set $\{(1,0,0), (1,1,0), (1,1,1)\}$ *is a basis of* $C^3(C)$ hence find the co – ordinates of the vector $(3 + 4i, 6i, 3 + 7i)$ *in* $C^3(C)$.

5. If the mapping $T: V_3(R) \to V_2(R)$ is defined by $T(x, y, z) = (x - y, x + z)$ then show that T is a linear transformation.

6. *If* $T: V_3(R) \to V_3(R)$ is a linear transformation defined by $T(a, b, c) = (3a, a - b, 2a + b + c)$ *then show that* $(T^2 - I)(T^2 - 3I) = 0$.

7. Find the characteristic roots of the matrix
$$A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$

8. Prove that the characteristic vectors corresponding to distinct characteristic roots of a matrix are linearly independent

9. Find the unit vector orthogonal to $(4, 2, 3)$ *in* R^3.

10. State and prove Triangle inequality

SECTION – B – (5 X 8 = 40 Marks)
Answer the following questions.

UNIT I

11. a) Show that the necessary and sufficient condition for a non empty subset W of a vector space V(F) to be a subspace of V is that $a, b \in F, \alpha, \beta \in W \Rightarrow a\alpha + b\beta \in W$.

Or

b) If W_1 and W_2 are subspaces of a vector space V(F) then show that $W_1 + W_2$ is a subspace of V(F) and $L(w_1 \cup w_2) = w_1 + w_2$.

12. a) Let W_1 and W_2 be two subspaces of R^4 given by $W_1 = \{(a,b,c,d)/b - 2c + d = 0\}$ $W_2 = \{(a,b,c,d)/a = db = 2c\}$. Find the basis and dimension of
(i) W_1
(ii) W_2
(iii) $W_1 \cap W_2$ and hence find
(iv) $\dim(W_1 + W_2)$

Or

b) Let V(F) be a finite dimension vector space and $S = \{\alpha_1, \alpha_2 \ldots \alpha_3\}$ is L.I. subset of V. Then either S itself a basis of V or S can be extended to form a basis of V.

13. a) State and prove Rank – Nullity theorem.

Or

b) Find the null space, range, rank and nullity of the transformation $T: R^2 \to R^3$ defined by $T(x,y) = (x+y,\ x-y,\ y)$.

14. a) State and prove Cayley – Hamilton theorem.

Or

b) Solve $x + y + z = 6,\ x - y + z = 2,\ 2x - y + 3z = 9$ by matrix inversion method. $x + y + z = 6,\ x - y + z = 2,\ 2x - y + 3z = 9$

15. a) State and prove Cauchy – Schwarz's inequality.

Or

b) Applying Gram – Schmidt orthogonalisation process obtain an orthonormal basis of R^3 from the basis $[(1,0,1),\ (1,0,-1),\ (0,3,4)]$

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DEPARTMENT OF MATHEMATICS

III^rd B.Sc MATHEMATICS SYLLABUS
SEMESTER-V/VI, PAPER 6A
NUMERICAL METHODS

60 Hrs

UNIT – I: (12h)

Finite Differences and Interpolation with Equal intervals:

Introduction, Forward differences, Backward differences, Central Differences, Symbolic relations, nth Differences of Some functions, Advancing Difference formula, Differences of Factorial Polynomial, Summation of Series. Newton's formulae for interpolation. Central Difference Interpolation Formulae.

UNIT – II: (12h)

Interpolation with Equal and Unequal intervals:

Gauss's Forward interpolation formulae, Gauss's backward interpolation formulae, Stirling's formula, Bessel's formula. Interpolation with unevenly spaced points, divided differences and properties, Newton's divided differences formula. Lagrange's interpolation formula, Lagrange's Inverse interpolation formula.

UNIT – III: (12h)

Numerical Differentiation:

Derivatives using Newton's forward difference formula, Newton's back ward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT – IV: (12h)

Numerical Integration:

General quadrature formula one errors, Trapezoidal rule, Simpson's1/3- rule, Simpson's 3/8 – rule, and Weddle's rules. Euler – McLaurin Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (12h)

Numerical solution of ordinary differential equations:

Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

References:

1. S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., New Delhi-110001, 2006.
2. P.Kandasamy, K.Thilagavathy, Calculus of Finite Differences and Numerical Analysis, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.
3. R.Gupta, Numerical Analysis, Laxmi Publications (P) Ltd., New Delhi.
4. H.C Saxena, Finite Differences and Numerical Analysis, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
5. S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr.V.Ramesh Babu, Numerical Analysis, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to

1. Understand the subject of various numerical methods that are used to obtain approximate solutions
2. Understand various finite difference concepts and interpolation methods.
3. Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
4. Find numerical solutions of ordinary differential equations by using various numerical methods.
5. Analyze and evaluate the accuracy of numerical methods.

Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates
2. Visits to research organizations, Statistical Cells, Universities, ISI etc.
3. Invited lectures and presentations on related topics by experts in the specified area.

23/01/2022

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DEPARTMENT OF MATHEMATICS

III^rd B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER-6A

NUMERICAL METHODS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No.of Questions	Weightage
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

23/07/22

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DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS

SEMESTER – V/VI, PAPER – 6A

NUMERICAL METHODS

MODEL QUESTION PAPER

Time: 3 Hrs Maximum : 60 Marks

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** **5×4 = 20M**

1. Given f(0) =3, f(1) = 12, f(2) =81, f(3) =200, f(4) =100 and f(5) =8. Form a difference table and find $\Delta^5 f(0)$.

2. Show that i) $(1+\Delta)(1-\nabla)=1$ ii) $E\nabla=\Delta$ iii) $\Delta-\nabla=\Delta\nabla$

3. Using Gauss forward interpolation formula, find f(25) given that f(20) =14, f(24)=32, f(28) = 35, f(32) =40.

4. Use Gauss Backward Interpolation formula, find f(32) given that that f(25) =0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794.

5. Using the following table, compute $\frac{dy}{dx}$ at $x=1$.

x	1	2	3	4	5	6
y	1	8	27	64	125	216

6. Find $f'(1.5)$ from the following table.

x	1.5	2.0	2.5	3.0	3.5	4.0
f(x)	3.375	7.000	13.625	24.000	38.875	59.000

7. By using Simprons $\frac{1}{3}$ *rule, evaluate* $\int_{-3}^{3} x^4\,dx$ by taking 7 equidistance ordinates.

8. Evaluate $\int_{-3}^{3} x^4\,dx$ *by Trapezoidal Rule with* $h=1$.

9. Solve the differential equation $\frac{dy}{dx}=x+y$, *with* $y(0)=1$, $x\in[0,1]$ by Taylor series expansion to obtain y for x =0.1.

10. Using Taylor series expansion solve the equation $\frac{dy}{dx} = x^2 + y^2$ for $x=0.4$ given that $y=0$ when $x=0$.

SECTION – B – (5 X 8 = 40 Marks)
Answer the following questions.

UNIT I

11. a) Evaluate i) $\Delta^2(3e^x)$ ii) $\Delta^2(ab^x)$

Or

b) Given $u_0 + u_8 = 1.9243$, $u_1 + u_7 = 1.9590$, $u_2 + u_6 = 1.9823$
$u_3 + u_5 = 1.9956$. Find u_4.

UNIT II

12. a) Using Stirling's formula, to find y_{28}, given $y_{20} = 49225$, $y_{25} = 48316$,
$y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.

Or

b) Apply Bessel's formula to find the value of $f(27.4)$ from the table.

x	25	26	27	28	29	30
$f(x)$	4.000	3.846	3.704	3.571	3.448	3.333

UNIT III

13. a) Find $\frac{dy}{dx}$ at $x = 1.76$ from the table.

x	1.72	1.73	1.74	1.75	1.76
y	0.17907	0.17728	0.17552	0.17377	0.17204

Or

b) Find $f'(0.6)$ from the following table.

UNIT IV

x	0.4	0.5	0.6	0.7	0.8
$f(x)$	1.5836	1.7974	2.0442	2.3275	2.6510

14. a) By using Simpson's 3/8 rule, evaluate $\int_0^1 \frac{1}{1+x}\,dx$ with $h = \frac{1}{6}$.

Or

b) Evaluate $\int_0^{\pi/2} \sqrt{\sin x}\, dx$ by weddle's Rule.

UNIT V

15. a) Solve the equations $y' = -y$ with the condition $y(0) = 1$ for $x=0.04$ in 4 steps by Euler's method.

Or

b) Apply Rungo – Kutta method find the solution of the differential equation $y^1 = 3x + \frac{1}{2}y$ *with* $y_0 = 1$ *at* $x = 0.1$.

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III^rd B.Sc MATHEMATICS SYLLABUS
SEMESTER-V/VI, PAPER-7A
MATHEMATICAL SPECIAL FUNCTIONS

60 Hrs

UNIT – I (12 hrs)

BETA AND GAMMA FUNCTIONS:

Euler's Integrals - Beta and Gamma Functions, Elementary properties of Gamma Functions, Transformation of Gamma Functions, Another form of Beta Function, Relation between Beta and Gamma Functions, Other Transformations. (CHAPTER: 2.9 to 2.15)

UNIT – II (12 hrs)

LAGUERRE POLYNOMIALS:

Laguerre's Differential equation, Solution of Laguerre's equation, Laguerre Polynomials, Generating function, Other forms for the Laguerre Poynomials, To find first few Laguerre Polynomials, Orthogonal property of the Laguerre Polynomials, Recurrence formula for Laguerre Polynomials, Associated Laguerre Equation. (CHAPTER: 7.1 to 7.9)

UNIT – III (12 hrs)

HERMITE POLYNOMIALS:

Hermite Differential Equations, Solution of Hermite Equation, Hermite's Polynomials, Generating function, Other forms for Hermite Polynomial, To find first few Hermite Polynomials, Orthogonal properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials. (CHAPTER: 6.1 to 6.8)

UNIT – IV (12 hrs)

LEGENDRE POLYNOMIALS:

Definition, Solution of Legendre's Equation, Definition of $P_n(x)$ and $Q_n(x)$, General solution of Legendre's Equation(derivationis not required), To show that $P_n(x)$ is the coefficient of h^n in the expansion of $(1-2xh+h^2)^{1/2}$, Orthogonal properties of Legendre's Equation, Recurrence formulae, Rodrigue's formula. (CHAPTER: 2.1 to 2.8, 2.12)

UNIT – V (12 hrs)

BESSEL'S EQUATION:

Definition, Solution of Bessel's General Differential Equations, General solution of Bessel's Equation, Integration of Bessel's equation in series for $n=0$, Definition of $J_n(x)$, Recurrence formulae for $J_n(x)$, Generating function for $J_n(x)$. (CHAPTER: 5.1 to 5.7)

Co-Curricular Activities(15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

Prescribed text book: Special Functions by J.N. Sharma and Dr. R.K. Gupta.

Reference Books:

1. Dr.M.D.Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. J.N.Sharma and Dr.R.K.Gupta, Differential equations with special functions, Krishna Prakashan Mandir.
3. Shanti Narayan and Dr.P.K.Mittal, Integral Calculus, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
4. George F.Simmons, Differential Equations with Applications and Historical Notes, Tata McGRAW-Hill Edition, 1994.
5. Shepley L.Ross, Differential equations, Second Edition, John Willy & sons, New York, 1974.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to:

1. Understand the Beta and Gamma functions; their properties and relation between these two functions, understand the orthogonal properties of Chebyshev polynomials and recurrence relations.
2. Find power series solutions of ordinary differential equations.
3. Solve Hermite equation and write the Hermite Polynomial of order (degree) n, also find the generating function for Hermite Polynomials, study the orthogonal properties of Hermite Polynomials and recurrence relations.
4. Solve Legendre equation and write the Legendre equation of first kind, also find the generating function for Legendre Polynomials, understand the orthogonal properties of Legendre Polynomials.
5. Solve Bessel equation and write the Bessel equation of first kind of order n, also find the generating function for Bessel function understand the orthogonal properties of Bessel function.

Suggested Co-Curricular Activities

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates
2. Visits to research organizations, Statistical Cells, Universities, ISI etc.
3. Invited lectures and presentations on related topics by experts in the specified area

23/07/2022

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B+' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS

SEMESTER-V/ VI - PAPER-9A

MATHEMATICAL SPECIAL FUNCTIONS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** **5×4 = 20M**

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** **5×8 = 40M**

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

//Add//

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS

SEMESTER-V/ VI - PAPER-7A

MATHEMATICAL SPECIAL FUNCTIONS

MODEL QUESTION PAPER

Time: 3Hrs **Max.Marks:60**

SECTION-A

Answer any FIVE questions **(5x4=20Marks)**

1. Evaluate $\int_0^a x^4\sqrt{a^2-x^2}\,dx$.
2. Prove that $\int_0^1 x^m(\log x)^n dx = \frac{(-1)^n n!}{(m+1)^{n+1}}$.
3. Show that $L_2(x) = \frac{1}{2!}(2-4x+x^2)$.
4. Show that $L_n(x) = \frac{e^x}{n!}\frac{d^n(x^n e^{-x})}{dx^n}$.
5. Find Hermite Polynomials for n=0, 1, 2.
6. Evaluate $\int_{-\infty}^{\infty} xe^{-x^2} H_n(x).H_m(x)dx$.
7. Prove that $P_3(x) = \frac{1}{2}(5x^3-3x)$.
8. Show that $P_n(x)$ is the coefficient of h^n in the expansion in ascending powers of $(1-2xh+h^2)^{-1/2}$.
9. Prove that $J_{-n}(x) = (-1)^n J_n(x)$.
10. Prove that $\frac{d}{dx}[x^{-n}J_n(x)] = -x^{-n}J_{n+1}(x)$.

SECTION – B

Answer ALL questions **(5x8=40Marks)**

11. (a) When n is a positive integer, prove that $\Gamma\left(-n+\frac{1}{2}\right) = \frac{(-1)^n 2^n\sqrt{\pi}}{1.3.5...(2n-1)}$.

(OR)

(b) Prove that $B(l,m) = \frac{\Gamma(l)\Gamma(m)}{\Gamma(l+m)}$.

12. (a) Prove that $\frac{1}{1-t} e^{-tx/(1-t)} = \sum_{n=0}^{\infty} t^n L_n(x)$

(OR)

(b) Prove that $xL_n''(x) + (1-x)L_n'(x) + nL_n(x) = 0$.

13. (a) State and Prove Rodrigue's formula for $H_n(x)$.

(OR)

(b) State and Prove Orthogonal Properties of Hermite Polynomials.

14. (a) Prove that $(2n+1)xP_n = (n+1)P_{n+1} + nP_{n-1}$.

(OR)

(b) Show that $\int_{-1}^{1} P_m(x).P_n(x)\,dx = 0$ *if* $m \neq n$.

15. (a) Prove that $xJ_n'(x) = nJ_n(x) - xJ_{n+1}(x)$.

(OR)

(b) Show that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x$.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC "B" Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS SYLLABUS

SEMESTER-V/VI, PAPER- MAT N-5306B1

MULTIPLE INTEGRALS AND APPLICATIONS OF VECTOR CALCULUS

60 Hrs

UNIT – I (12 hrs)

Multiple integrals-I

Introduction, Double integrals, Evaluation of double integrals, Properties of double integrals, Region of integration, double integration in Polar Co-ordinates, Change of variables in double integrals, change of order of integration.

UNIT – II (12 hrs)

Multiple integrals-II

Triple integral, region of integration, change of variables. Plane areas by double integrals, surface area by double integral. Volume as a double integral, volume as a triple integral.

UNIT – III (12 hrs)

Vector differentiation

Vector differentiation, ordinary derivatives of vectors. Differentiability, Gradient, Divergence, Curl operators, Formulae involving the separators.

UNIT – IV (12 hrs)

Vector integration

Line Integrals with examples. Surface Integral with examples. Volume integral with examples.

UNIT – V (12 hrs)

Vector integration applications

Gauss theorem and applications of Gauss theorem. Green's theorem in plane and applications of Green's theorem. Stokes's theorem and applications of Stokes theorem.

Co-Curricular Activities (15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

23/7/2022 23/7/22

Reference Books:

1. Dr.M Anitha, Linear Algebra and Vector Calculus for Engineer, Spectrum University Press, SR Nagar, Hyderabad-500038, INDIA.
2.Dr.M.Babu Prasad, Dr.K.Krishna Rao, D.Srinivasulu, Y.AdiNarayana, Engineering Mathematics-II, Spectrum University Press, SR Nagar, Hyderabad-500038,INDIA.
3. V.Venkateswararao, N. Krishnamurthy, B.V.S.S.Sarma and S.Anjaneya Sastry, A text Book of B.Sc., Mathematics Volume-III, S. Chand & Company, Pvt. Ltd., Ram Nagar,NewDelhi-110055.
4. R.Gupta,Vector Calculus, Laxmi Publications.
5. P.C.Matthews, Vector Calculus, Springer Verlag publications.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to

1. Learn multiple integrals as a natural extension of definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.
2. Learn applications in terms of finding surface area by double integral and volume by triple integral.
3. Determine the gradient, divergence and curl of a vector and vector identities.
4. Evaluate line, surface and volume integrals.
5. Understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)

23/7/2022

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B'' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306B1

MULTIPLE INTEGRALS AND APPLICATIONS OF VECTOR CALCULUS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** **5×4 = 20M**

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** **5×8 = 40M**

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

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SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B'' Grade

DEPARTMENT OF MATHEMATICS

III^rd B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306B1

MULTIPLE INTEGRALS AND APPLICATIONS OF VECTOR CALCULUS

MODEL QUESTION PAPER

Time: 3Hrs **Max.Marks:60**

SECTION-A

Answer any FIVE questions **(5x4=20Marks)**

1	
2	
3	
4	
5	
6	
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8	
9	
10	

SECTION – B

Answer ALL questions **(5x8=40Marks)**

11	(a) or (b)
12	(a) or (b)
13	(a) or (b)
14	(a) or (b)
15	(a) or (b)

23/7/22

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS SYLLABUS

SEMESTER-V/VI, PAPER- MAT N-5306B2

INTEGRAL TRANSFORMS WITH APPLICATIONS

60 Hrs

UNIT – I (12 hrs)

Laplace transforms- I

Definition of Laplace transform, linearity property-piecewise continuous function. Existence of Laplace transform, functions of exponential order and of class A. First shifting theorem, second shifting theorem and change of scale property.

UNIT – II (12 hrs)

Laplace transforms- II

Laplace Transform of the derivatives, initial value theorem and final value theorem. Laplace transforms of integrals. Laplace transform of t^n. f (t), division by t, evolution of integrals by Laplace transforms. Laplace transform of some special functions- namely Dirac delta function, error function, Bessel function and Laplace transform of periodic function.

UNIT – III (12 hrs)

Inverse Laplace transforms

Definition of Inverse Laplace transform, linear property, first shifting theorem, second shifting theorem, change of scale property, use of partial fractions. Inverse Laplace transforms of derivatives, inverse, Laplace transforms of integrals, multiplication by powers of 'p', division by 'p'. Convolution, convolution theorem proof and applications.

UNIT – IV (12 hrs)

Applications of Laplace transforms

Solutions of differential equations with constants coefficients; solutions of differential equations with variable coefficients. Applications of Laplace transforms to integral equations- Abel's integral equation. Converting the differential equations into integral equations, converting the integral equations into differential equations

23/7/22

UNIT – V (12 hrs)

Fourier transforms

Integral transforms. Fourier integral theorem (without proof), Fourier sine and cosine integrals. Properties of Fourier transforms, change of scale property, shifting property, modulation theorem. Convolution. Convolution theorem for Fourier transform, Parseval's identify, finite Fourier transforms.

Co-Curricular Activities (15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

Reference Books:

1. Dr. S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr. V.Ramesh Babu, Fourier series and Integral Transforms, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. A.R. Vasistha, Dr. R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd. Meerut.
3. M.D.Raisinghania, H.C. Saxsena , H.K. Dass, Integral Transforms, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
4. Dr. J.K. Goyal, K.P. Gupta, Laplace and Fourier Transforms, Pragathi Prakashan, Meerut.
5. Shanthi Narayana , P.K. Mittal, A Course of Mathematical Analysis, S. Chand & Company Pvt.Ltd. Ram Nagar, New Delhi-110055.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to

1. Evaluate Laplace transforms of certain functions, find Laplace transforms of derivatives and of integrals.
2. Determine properties of Laplace transform which may be solved by application of special functions namely Dirac delta function, error function, Bessel function and periodic function.
3. Understand properties of inverse Laplace transforms, find inverse Laplace transforms of derivatives and of integrals.
4. Solve ordinary differential equations with constant/ variable coefficients by using Laplace transform method.
5. Comprehend the properties of Fourier transforms and solve problems related to finite Fourier transforms.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B+' Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306B2

INTEGRAL TRANSFORMS WITH APPLICATIONS

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** **5×4 = 20M**

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** **5×8 = 40M**

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

23/7/22

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306B2

INTEGRAL TRANSFORMS WITH APPLICATIONS

MODEL QUESTION PAPER

Time: 3Hrs **Max.Marks:60**

SECTION-A

Answer any FIVE questions **(5x4=20Marks)**

1	
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SECTION – B

Answer ALL questions **(5x8=40Marks)**

11	(a) or (b)
12	(a) or (b)
13	(a) or (b)
14	(a) or (b)
15	(a) or (b)

23/7/22

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS SYLLABUS

SEMESTER-V/VI, PAPER- MAT N-5306C1

PARTIAL DIFFERENTIAL EQUATIONS & FOURIER SERIES

60 Hrs

UNIT – I (12 hrs)

Introduction of partial differential equations

Partial Differential Equations, classification of first order partial differential equations, Rule I, derivation of a partial differential equations by the elimination of arbitrary constants. Rule II, derivation of a partial differential equation by the elimination of arbitrary function φ from the equations $\Phi(u, v) = 0$ where u and v are functions of x, y and z. Cauchy's problem for first order equations

UNIT – II (12 hrs)

Linear partial differential equations of order one

Lagrange's equations, Lagrange's method of solving Pp+Qq=R, where P, Q and R are

Functions of x, y and z, type 1 based on Rule I for solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ type 2 based on Rule II for solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

Type 3 based on Rule III for solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

Type 4 based on Rule IV for solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

Integral Surface passing through a given curve, the Cauchy problem, Surfaces orthogonal to a given system of Surfaces

UNIT – III (12 hrs)

Non-linear partial differential equations of order one-I

Complete integral, particular integral, singular integral and general integral, geometrical interpretation of integrals of f (x, y, z, p, q) = 0, method of getting singular integral from the PDE of first order, compatible system of first order equations

Chur pit's method, Standard form I, only p and q present.

Standard form II, Clairaut equations.

23/7/22

UNIT – IV (12 hrs)

Non-linear partial differential equations of order one-II

Standard Form III, only p, q and z present.
Standard Form IV, equation of the form $f_1(x, p) = f_2(y, q)$.

Jacobi's method, Jacobi's method for solving partial differential equations with three or more independent variables, Jacobi's method for solving a non-linear first order partial differential equations in two independent variables.

UNIT – V (12 hrs)

Fourier series

Introduction, Euler's formulae for Fourier series expansion of a function f(x).
Dirichlet's conditions for Fourier series, convergence of Fourier series.
Functions having arbitrary periods. Change of interval, Half range series.
Parseval's theorem, illustrative examples based on Parseval's theorem, some particular series.

Co-Curricular Activities (15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

Reference Books:

1. Dr.M.D.Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. Dr. S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr. V.Ramesh Babu, Fourier Series and Integral Transforms, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
3. Prof T.Amaranath, An Elementary Course in Partial Differential Equations Second Edition, Narosa Publishing House, New Delhi.
4. Fritz John, Partial Differential Equations, Narosa Publishing House, New Delhi, 1979.
5. I.N.Sneddon, Elements of Partial Differential Equations by McGraw Hill, International Edition, Mathematics series.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to

1. Classify partial differential equations, formation of partial differential equations and solve Cauchy's problem for first order equations.
2. Solve Lagrange's equations by various methods, find integral Surface passing through a given curve and Surfaces orthogonal to a given system of Surfaces.
3. Find solutions of nonlinear partial differential equations of order one by using Char pit's method.
4. Find solutions of nonlinear partial differential equations of order one by using Jacobi's method.
5. Understand Fourier series expansion of a function f(x) and Parseval's theorem.

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SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B++' Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306C1

PARTIAL DIFFERENTIAL EQUATIONS & FOURIER SERIES

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No. of Questions	Weightage
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

23/7/22

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306C1

PARTIAL DIFFERENTIAL EQUATIONS & FOURIER SERIES

MODEL QUESTION PAPER

Time: 3Hrs Max.Marks:60

SECTION-A

Answer any FIVE questions (5x4=20Marks)

1	
2	
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SECTION – B

Answer ALL questions (5x8=40Marks)

11	(a) or (b)
12	(a) or (b)
13	(a) or (b)
14	(a) or (b)
15	(a) or (b)

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous) NAAC 'B' Grade
DEPARTMENT OF MATHEMATICS

III^rd B.Sc MATHEMATICS SYLLABUS

SEMESTER-V/VI, PAPER- MAT N-5306C2

NUMBER THEORY

60 Hrs

UNIT – I (12 hrs)

Divisibility

Introduction, Divisibility, Greatest Common Divisor.
Prime numbers, The fundamental theorem of arithmetic, The series of reciprocals of the primes.
The Euclidean algorithm, The greatest common divisor of more than two numbers.

UNIT – II (12 hrs)

Arithmetical Functions and Dirichlet Multiplication

Introduction, The Mobius function$\mu(n)$, The Euler totient function$\varphi(n)$, A relation
The Dirichlet product of arithmetical functions, Dirichlet inverses and Mobius inversion formula, The Mangoldt function$\Lambda(n)$.

Multiplicative functions, Multiplicative functions and Dirichlet multiplication, The inverse of a completely multiplicative function, Liouville's function $\lambda(n)$, The divisor functions $\sigma_\alpha(n)$.

UNIT – III (12 hrs)

Averages of Arithmetical Functions

Introduction, The big oh notation, Asymptotic equality of functions, Euler's summation formula, some elementary asymptotic formulas.
The average order of d(n), The average order of the divisor functions$\sigma_\alpha(n)$, The average order of $\varphi(n)$.
The average order of $\mu(n)$ and $\Lambda(n)$, The partial sum of a Dirichlet product, Applications of $\mu(n)$ and $\Lambda(n)$

UNIT – IV (12 hrs)

Congruences

Definition and basic properties of congruences, Residue classes and complete residue systems, Linear congruences, reduced residue systems and the Euler-Fermat theorem, Polynomial congruences modulo p. Lagrange's theorem.

Applications of Lagrange's theorem, Simultaneous linear congruences, The Chinese remainder theorem, Applications of the Chinese remainder theorem.

UNIT – V (12 hrs)

Quadratic Residues and the Quadratic Reciprocity Law

Quadratic Residues, Legendre's symbol and its properties, Evaluation of (-1/p) and (2/p), Gauss lemma.

The Quadratic reciprocity law, Applications of the reciprocity law, The Jacobi Symbol.

Gauss sums and the quadratic reciprocity law, the reciprocity law for quadratic Gauss sums. Another proof of the quadratic reciprocity law.

Co-Curricular Activities (15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

Reference Books:

1. Tom M.Apostol, Introduction to Analytic Number theory, Springer International Student Edition.
2. David, M. Burton, Elementary Number Theory, 2nd Edition UBS Publishers.
3. Hardy & Wright, Number Theory, Oxford Univ. Press.
4. Dence, J. B & Dence T.P, Elements of the Theory of Numbers, Academic Press.
5. Niven , Zuckerman &Montgomery, Introduction to the Theory of Numbers.
6. Web resources suggested by the teacher and college librarian including reading material.

Course outcomes:

Students after successful completion of the course will be able to

1. Find quotients and remainders from integer division, study divisibility properties of integers and the distribution of primes.
2. Understand Dirichlet multiplication which helps to clarify interrelationship between various arithmetical functions.
3. Comprehend the behaviour of some arithmetical functions for large n.
4. Understand the concepts of congruencies, residue classes and complete residues systems.
5. Comprehend the concept of quadratic residues mod p and quadratic non residues mod p.

UNIT – V (12 hrs)

Quadratic Residues and the Quadratic Reciprocity Law

Quadratic Residues, Legendre's symbol and its properties, Evaluation of (-1/p) and (2/p), Gauss lemma.

The Quadratic reciprocity law, Applications of the reciprocity law, The Jacobi Symbol.

Gauss sums and the quadratic reciprocity law, the reciprocity law for quadratic Gauss sums, Another proof of the quadratic reciprocity law.

Co-Curricular Activities (15 Hours):

Seminar/Quiz/Assignments/Applications/Problem Solving.

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1. Tom M.Apostol, Introduction to Analytic Number theory, Springer International Student Edition.
2. David, M. Burton, Elementary Number Theory, 2nd Edition UBS Publishers.
3. Hardy & Wright, Number Theory, Oxford Univ, Press.
4. Dence, J. B & Dence T.P, Elements of the Theory of Numbers, Academic Press.
5. Niven , Zuckerman &Montgomery, Introduction to the Theory of Numbers.
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Course outcomes:

Students after successful completion of the course will be able to

1. Find quotients and remainders from integer division, study divisibility properties of integers and the distribution of primes.
2. Understand Dirichlet multiplication which helps to clarify interrelationship between various arithmetical functions.
3. Comprehend the behaviour of some arithmetical functions for large n.
4. Understand the concepts of congruencies, residue classes and complete residues systems.
5. Comprehend the concept of quadratic residues mod p and quadratic non residues mod p.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B+' Grade

DEPARTMENT OF MATHEMATICS

III[rd] B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306C2

NUMBER THEORY

BLUE PRINT

DURATION : 3 HRS **Total Marks:60**

SECTION-A

Answer any **Five questions.** Each question carries **4 Marks.** 5×4 = 20M

Question	Topics	No. of Questions	Weight age
1	UNIT-1	1	4
2	UNIT-1	1	4
3	UNIT-2	1	4
4	UNIT-2	1	4
5	UNIT-3	1	4
6	UNIT-3	1	4
7	UNIT-4	1	4
8	UNIT-4	1	4
9	UNIT-5	1	4
10	UNIT-5	1	4

SECTION-B

Answer **ALL** Questions. Each question carries **8 MARKS.** 5×8 = 40M

QUESTION	Topic	No. of questions	Marks
11.(a) or (b)	UNIT-1	2	8
12.(a) or (b)	UNIT-2	2	8
13.(a) or (b)	UNIT-3	2	8
14.(a) or (b)	UNIT-4	2	8
15.(a) or (b)	UNIT-5	2	8

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B'' Grade

DEPARTMENT OF MATHEMATICS

IIIrd B.Sc MATHEMATICS

SEMESTER-V/VI, PAPER- MAT N-5306C2

NUMBER THEORY

MODEL QUESTION PAPER

Time: 3Hrs **Max.Marks:60**

SECTION-A

Answer any FIVE questions **(5x4=20Marks)**

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

SECTION – B

Answer ALL questions **(5x8=40Marks)**

11	(a) or (b)
12	(a) or (b)
13	(a) or (b)
14	(a) or (b)
15	(a) or (b)

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B'' Grade

DEPARTMENT OF MATHEMATICS

I^st B.Sc. MATHEMATICS SYLLABUS

SEMESTER-I, PAPER-I

MATHS FOR DATA SCIENCE

UNIT – 1

Matrices and basic operation, Square matrix, Determinates properties of Determinates, Singular and Non – Singular matrix, Examples, Inverse matrix, Rank of a matrix.

UNIT -2

Eigen values and Eigen vectors, Characteristics polynomial, Cayley – Hamilton theorem, Interpretation of Eigen values and Eigen vectors.

UNIT – 3

Linear systems, Definition, Solving Linear system, Homogeneous and Non-Homogeneous equations, Linear programming-simplex method, Graphical method .

UNIT – 4

Limits and Continuity, Real valued functions, Boundedness of a function, Limit of a function, some extension of the limits concept, Infinite limits, Limits at infinity.

Continuous function – Continuity at a point, Combination of continuous function, Continuous function on intervals, uniform continuity.

UNIT – 5

Differentiation and Mean value theorem – The derivability of a function on 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.

REFERENCE BOOKS

1) Matrices by Shanti Narayana, Published by S. Chand publications.

2) A Text book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand and company Pvt. Ltd, New Delhi.

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

I[st] B.Sc. MATHEMATICS

SEMESTER-I, PAPER-I

MATHS FOR DATA SCIENCE

BLUE PRINT

DURATION : 3 HOURS **TOTAL MARKS : 60**

SECTION – A

Answer any **FIVE** questions. Each question carries 4 Marks

5x4 = 20M

Question	Topics	No.of Questions	Weightage
1	UNIT- I	1	4
2	UNIT-I	1	4
3	UNIT-II	1	4
4	UNIT-II	1	4
5	UNIT-III	1	4
6	UNIT-III	1	4
7	UNIT-IV	1	4
8	UNIT-IV	1	4
9	UNIT-V	1	4
10	UNIT-V	1	4

SECTION – B

Answer any **ALL** questions. Each question carries 8 marks

5x8 = 40M

Question	Topic	No.of questions	Marks
11(a) or (b)	UNIT-I	2	8
12(a) or (b)	UNIT-II	2	8
13(a) or (b)	UNIT-III	2	8
14a) or (b)	UNIT-IV	2	8
15(a) or (b)	UNIT-V	2	8

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B++' Grade

DEPARTMENT OF MATHEMATICS

I^st B.Sc. MATHEMATICS

SEMESTER-I, PAPER-I

MATHS FOR DATA SCIENCE

MODEL QUESTION PAPER

Time: 3 Hrs

Maximum : 60 Marks

SECTION A – (5 X 4 = 20 Mark)
Answer any FIVE questions.

1. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ Then show that $A^2-4A-5I=0$.
2. Find the Rank of the Matrix $\begin{bmatrix} -1 & 2 & 0 \\ 3 & 7 & 1 \\ 5 & 9 & 3 \end{bmatrix}$
3. Find the Eigen values of $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$
4. Verify the Matrix $A = \begin{bmatrix} 1 & -1 \\ 1 & 0 \end{bmatrix}$ satisfies its characteristic equation.
5. Show that the system of equations $2x + 3y = 1,\ x + y = 0,$ $6x + 5y = 1$ are inconsistent
6. Solve the equation $2x - y + 3z = 8, -x + 2y + z = 4,\ 3x + y - 4z = 0.$
7. If a function f is continuous on [a, b] then show that, f is bounded on [a,b].
8. Let 'a' be a limit point of an aggregate A & f: A →R. If $\lim_{x\to a} f(x)$ exists then show that it is unique.
9. Verify Cauchy's Mean value theorem for $f(x) = x^2, g(x) = x^3$ in [1,2].
10. Show that $f(x) = |x| + |x-1|$ is not derivable at $x = 0$.

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SECTION – II – (5 X 8 = 40 Marks)
Answer the following questions.

11. a) Show that det of $\begin{bmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{bmatrix} = (a-b)(b-c)(c-a)$

OR

b)Find the inverse of the Matrix A= $\begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$ by using Elementary Transformations

12. a) State and prove Caley Hamilton Theorem.

OR

b) Prove that the Matrix A, A^1 have same Eigen values. Give an example

13. a) State and prove System of equations $x + 2y + z = 3$, $3x + y + 2z = 1$, $2x + 2y + 3z = 2$, $x + y + z = -1$, is consistent and solve them

OR

b) For what values of λ, the equations $x + y + z = 1$, $x + 2y + 4z = \lambda$, $x + 4y + 10z = \lambda^2$ have solution? Solve them completely in each case.

14. a) State and prove Sandwich theorem for Limits.

OR

b) If f is continuous on [a, b] then it is uniformly continuous on [a, b]

15 a) State and prove Lagrange's Mean value theorem.

OR

b) State and prove Cauchy's Mean value theorem.

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous) NAAC 'B' Grade
DEPARTMENT OF MATHEMATICS

II year Degree Examinations - III Semester
LIFE SKILLS
ANALYTICAL SKILLS

Course Objective: Intended to inculcate quantitative analytical skills and reasoning as an inherentability in students.

Course Outcomes:

After successful completion of this course, the student will be able to

- Understand the basic concepts of arithmetic ability, quantitative ability, logical reasoning, business computations and data interpretation and obtain the associated skills.
- Acquire competency in the use of verbal reasoning.
- Apply the skills and competencies acquired in the related areas
- Solve problems pertaining to quantitative ability, logical reasoning and verbal abilityinside and outside the campus.

UNIT – I (10 Hrs)

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

Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – II (10 Hrs)

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

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

UNIT – III (10 Hrs)

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs: Venn diagrams.

Recommended Co-Curricular Activities (03 Hrs)

Surprise tests / Viva-Voice / Problem solving/Group discussion.

Text Book:

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

Reference Books:

1. Analytical skills by Showick Thorpe, published by S. Chand And Company Limited, Ramnagar,New Delhi-110055.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw HillPublication

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC 'B' Grade

DEPARTMENT OF MATHEMATICS

II year Degree Examinations - III Semester

LIFE SKILLS

ANALYTICAL SKILLS

BLUE PRINT FOR QUESTION PAPER PATTERN

Unit	TOPIC	Questions
I	Arithmetic ability & Verbal reasoning	4
II	Quantitative aptitude & Business computations	3
III	Data interpretation	3

Each question carries 10 marks

Questions : 5X 10 = 50M

.....

Total Marks = 50

.....

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous) NAAC 'B' Grade
DEPARTMENT OF MATHEMATICS

II year Degree Examinations - III Semester
Life skills
Analytical Skills
MODEL QUESTION PAPER

Time: 2 hours Total Marks: 50 M

Answer any 5 questions. Each question carries 10 marks 5×10 = 50M

1). (i) Simplify $18-[5-\{6+2(7-\overline{8-5})\}]$.

(ii) What is the value of $\frac{(p+q)}{(p-q)}$ if $\frac{p}{q}=7$

(iii) The expression $(12.86\times 12.86+12.86\times p+0.14\times 0.14)$ will be a perfect square for p equal to?

(iv) What is the lowest common multiple of 12, 36 and 20?

(v) The expression $(12.86\times 12.86+12.86\times p+0.14\times 0.14)$ will be a perfect square for p equal to?

2). a) Explain BODMAS rule.
(b) LCM of two numbers is 120 and their HCF is 10. What is the sum of those two numbers?

3) i). A is B's sister. C is B's mother. D is C's father. E is D's mother. Then, how is A related to D?

ii). Pointing out to a lady, a girl said, "She is the daughter-in-law of the grandmother of my father's only son." How is the lady related to the girl ?

iii). At what angle the hands of a clock are inclined at 15 minutes past 5?

iv). At what time between 2 and 3 o'clock will the hands of a clock be together?

v). What was the day on 15th august 1947?

4).

i). 11,13,17,19,23,25,?

a)26 b)27 c)29 d)37

ii). 6,11,21,36,56,?

a)42 b)51 c)81 d)91

iii). 10,18,28,40,54,70,?

a)85 b)86 c)87 d)88

iv). 22,24,28,?,52,84

a)36 b)38 c)42 d)46

4). 28,33,31,36,?,39

a)32 **b)34** c)38 d)40

5). a) Explain Ratio and proportion

b). Rohit was 4 times as old his son 8 years ago. After 8 years, Rohit will be twice as old as his son. What are their present ages?

6). a) The ratio of the present ages of P and Q is 3 : 4. Five years ago, the ratio of their ages was 5: 7. Find their present ages.

b) The average age of 15 students of a class is 15 years. Out of these, the average age of 5 student is 14 year and that of the other 9students is 16 years. The age of the 15th student is?

7). a) Chetan and Suman started a business in partnership by investing Rs.15000 and Rs.18000 respectively. If at the end of the year, Chetan's share in the profit was Rs.1200, what was the amount of total profit?

b). A sum of Rs 1600 gives a simple interest of Rs352 in 2years and 4months. The rate of interest per annum is?

8). a) Explain types of Venn diagrams.

b). Population in Millions

City	Total Population	Male Population
A	12	6.5
B	15	7.2
C	17	9.0
D	19	9.8
E	22	10.8

What is the average female population in million?

9). Study the following table carefully answer the questions percentage of marks obtained by 6 students in 6 different subjects.

Sub/stu	History (out of 50)	Geography (out of 50)	Maths (out of 150)	Science (out of 100)	English (out of 75)	Hindi (out of 75)
Amit	76	85	69	73	64	88
Bharat	84	80	85	78	73	92
Umesh	82	67	92	87	69	76

Nikhil	73	72	78	69	58	83
Pratiksha	68	79	64	91	66	65
Ritesh	79	87	88	93	82	72

a). What is the approximately the integral % of marks obtained by Umesh in all the subjects?

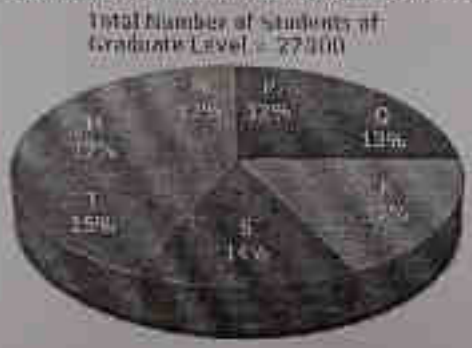
b). What is the avg % of marks obtained by all the students in Hindi (approximated to two places of decimal)

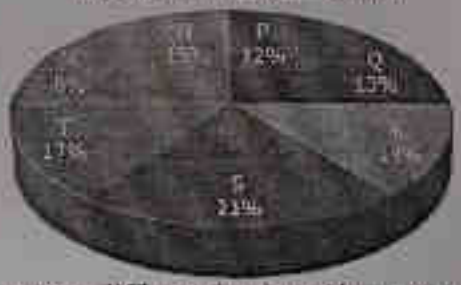
c). What are the average marks of all the students in Mathematics?

d). What are the average marks obtained by all the students in geography?

e). What are the total marks obtained by pratiksha in all the subjects taken together?

10). The following pie-charts show the distribution of students of graduate





and post-graduate levelsin seven different institutes in a town. Distribution of students at graduate and post-graduate levels in seven institutes:

i). What is the total number of graduate and post-graduate level students is institute R?

ii). What is the ratio between the number of students studying at post- graduate and graduate levels respectively from institute S?

iii).How many students of institutes of M and S are studying at graduate level?

iv). What is the ratio between the number of students studying at post-graduate level from institutes S and the number of students studying at graduate level from institute Q?

v).Total number of students studying at post-graduate level from institutes N and P is?

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SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous) NAAC 'B' Grade
DEPARTMENT OF MATHEMATICS

CERTIFICATE COURSE ON ARITHMETIC AND REASONING FOR COMPETITIVE EXAMS
SEMESTER -IV
SYLLABUS

UNIT – I (10 Hrs)

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

UNIT – II (10 Hrs)

Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – III (10 Hrs)

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

UNIT – IV (10 Hrs)

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

UNIT – V (10 Hrs)

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs, Venn diagrams.

Text Book:

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

Reference Books:

1. Analytical skills by Showick Thorpe, published by S. Chand And Company Limited, Ramnagar,New Delhi-110055.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw HillPublication

SRR & CVR GOVT. DEGREE COLLEGE

(Autonomous) NAAC "B" Grade

DEPARTMENT OF MATHEMATICS

CERTIFICATE COURSE ON ARITHMETIC AND REASONING FOR COMPETITIVE EXAMS

SEMESTER -IV

MODEL QUESTION PAPER

Time : 2Hrs

Max Marks : 50

Answer all questions

50 X 1 M = 50 M

SECTION – A (Unit – I & II)

1. Find the sum of first 100 natural numbers.
   మొదటి 100 సహజ సంఖ్యల మొత్తము
   (a) 5020 (b) 5050 (c) 5030 (d) 5000

2. Simplify 2 – [3 – {6 – (5 – $\overline{4-3}$)}] సూక్ష్మీకరించుము.
   (a) 5 (b) 2 (c) 1 (d) 3

3. Simplify 0.6 × 0.6 + 0.6 ÷ 6 సూక్ష్మీకరించుము.
   (a) 0.46 (b) 0.48 (c) 0.52 (d) 0.32

4. Find the sum of $\frac{7}{9}-\frac{11}{12}+\frac{13}{15}-\frac{1}{8}$ ల మొత్తమును కనుగొనుము.
   (a) $\frac{79}{144}$ (b) $\frac{81}{100}$ (c) $\frac{82}{143}$ (d) $\frac{79}{144}$

5. 1088.88 + 1800.08 + 1880.80 = ?
   (a) 8790.86 (b) 6890.86 (c) 5588.80 (d) 4769.76

6. Find the least value of '*' so that the number 7*421 is divisible by 3
   3 చేత భాగింపబడునటువంటి సంఖ్య 7*421 అయితే * యొక్క చిన్న విలువను కనుగొనుము.
   (a) 4 (b) 2 (c) 3 (d) 1

7. How many numbers upto 500 are divisible by 18
   500 వరకు పూర్ణ సంఖ్యలలో 18చే భాగింపబడే సంఖ్యలు ఎన్ని
   (a) 29 (b) 72 (c) 14 (d) 27

8. Determine the *LCM* of $\frac{2}{5}, \frac{3}{16}$ and $\frac{6}{25}$
   $\frac{2}{5}, \frac{3}{10}$ మరియు $\frac{6}{25}$ యొక్క క.సా.గు ను రాయుము.
   (a) $\frac{6}{5}$ (b) $\frac{12}{5}$ (c) $\frac{6}{5}$ (d) $\frac{2}{5}$

9. If H.C.F, L.C.M of two numbers are 16 and 240 respectively and one number is 40. Find the other number.
   గ.సా.భా, క.సా.గు లు రెండు సంఖ్యలు వరుసగా 16 మరియు 240లు మరియు ఒక సంఖ్య 40 అయితే వేరే సంఖ్యను కనుగొనుము.
   (a) 81 (b) 108 (c) 98 (d) 96

10. What is the H.C.F of 27, 18 and 36
36, 27, 18 మరియు 36ల గ.సా.భా. ను కనుగొనుము.
(a) 7 (b) 11 (c) 9 (d) 8

11. 4, 8, 12, 16, 20, ?
(a) 18 (b) 21 (c) 19 (d) 24

12. 2, 3, 5, 8, 12, 17, ?
(a) 23 (b) 19 (c) 18 (d) 25

13. AC, FH, KM, PR ______
(a) XZ (b) UV (c) UW (d) XY

14. 2B, 4C, 6E, 8H ______
(a) 10L (b) 9P (c) 8F (d) 13M

15. Introducing Alekya to guest, Sita said "Her father is the only son of my father" How is Alekya related to Sita ?
అతిథికి అలేఖ్య పరిచయం చేస్తూ, సీత చెప్పింది, "వాళ్ళ తండ్రి మా తండ్రిగారికి ఒకే కొడుకు అన్నమాట" అయితే సీతకు అలేఖ్య ఏమవుతుంది
(a) Daughter (కూతురు) (b) Mother (తల్లి)
(c) Sister (సోదరి) (d) Niece (మేన కోడలు)

16. C is the mother of A and B. If D is the husband of B, then what is C to D.
A మరియు B లకు C తల్లి . B కు D భర్త అయితే D కి C ఏమవుతుంది
(a) Mother (తల్లి) (b) Niece (మేన కోడలు)
(c) Mother-in-Law (అత్తయ్య) (d) Sister (సోదరి)

17. At what time between 4 and 5 O' Clock the hands of a clock coincide
ఏ సమయంలో వద్ద 4 మరియు 5 గంటల ముళ్ళు ఏకీభవిస్తాయి.
(a) $21\frac{9}{11}$ (b) $22\frac{7}{11}$ (c) $20\frac{9}{11}$ (d) $18\frac{9}{11}$

18. If a clock takes 22 sec to strike 12, how much time will it take to strike 6
గడియారంలో 12 పట్ల ముళ్ళు కొట్టడానికి 22 సెకన్లు తీసుకుంటే, 6 పట్లకు ఎన్ని సెకన్లు తీసుకుంటుంది
(a) 10 (b) 9 (c) 8 (d) 7

19. Find the number of odd days in 200 days
200 రోజులలో ఎన్ని బేసి రోజుల సంఖ్య వున్నాయి.
(a) 3 (b) 4 (c) 5 (d) 6

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20. Today is Wednesday. After 149 days it will be
ఈ రోజు బుధవారము అయిన 149 రోజుల తర్వాత రోజు
(a) Monday (సోమవారము) (b) Wednesday (బుధవారము)
(c) Friday (శుక్రవారము) (d) Sunday (ఆదివారము)

21. The average of first five multiples of 6 is
6 యొక్క మొదటి 5 గుణిజాలు సగటు
(a) 18 (b) 54 (c) 60 (d) 66

22. The average of first 10 prime number is
మొదటి 10 ప్రధాన సంఖ్యల సగటు
(a) 10 (b) 12.9 (c) 12.5 (d) 15.5

23. If A:B = 2:3, B:C = 3:4, C:D = 4:5 (అయితే) then find D:A ని కనుగొనుము.
(a) 2:5 (b) 5 :2 (c) 3:4 (d) 3 : 5

24. The fourth proportioned to 4, 9, 12
4, 9, 12 ల నాల్గవ దామీ
(a) 27 (b) 30 (c) 20 (d) 15

25. The sum of the ages of A and B is 50 years and the ratio between their ages is 7:3 then the age of A is ____ years.
A మరియు Bల వయస్సు మొత్తము 50 సంవత్సరములు మరియు వారి వయస్సుల నిష్పత్తి 7:3 అయితే A యొక్క వయస్సు సంవత్సరములలో
(a) 15 (b) 35 (c) 20 (d) 25

26. The present ages of geetha and usha are 24 and 36 years respectively. What was the ratio between the ages of Geetha and Usha respectively 8 years ago.
గత మరియు ఉషల వయస్సు ప్రస్తుతం 24 మరియు 36 సంవత్సరములుగా, అయితే 8 సంవత్సరము ముందు వారి వయస్సుల నిష్పత్తి ఎంత.
(a) 7:4 (b) 4:7 (c) 11:8 (d) 8:11

27. The speed of a Car is 36km ph. What is the differonce in Kms covered by the car in 3 hours.
కారు యొక్క వేగము36 kmph అయితే కారు 3గంటలలో ఎన్ని కి.మీ. దూరాన్ని తెలుపుతుంది.
(a) 99 k.m. (b) 108 k.m. (c) 106 k.m. (d) 101 k.m.

28. A Car cab covers a distance of 630 km in 14 hours. Find its speed in kmph
ఒక కారు ప్రయాణ 630 కిమీ.లను 14 గంటలలో వెళ్ళిన kmph లో వేగమెంత.
(a) 45 (b) 30 (c) 28 (d) 24

Keetaa
23/11/2012

29. Express a speed of 36kmph in metres per second.
36kmph వేగమును మీటరు సెకనులో తెల్పుము.
(a) 10 (b) 12 (c) 14 (d) 17

30. The speed of a Car of a Car in 54 kmph. What is its speed in metre per second.
ఒక కార్ వేగము 54 kmph అయిన వేగము మీటర్ సెకనులో ఎంత
(a) 1.5 (b) 150 (c) 15 (d) 16

31. Find 20 % of 500.
500 లో 20 % కనుగొనుము
(a) 120 (b) 100 (c) 90 (d) 110

32. What is 20% of 25%.
25% నందు 20% ఎంత
(a) 0.05 (b) 0.02 (c) 0.01 (d) 0.03

33. A person buys a toy for Rs.50 and sells it for Rs.75 what will be his gain percent.
ఒక వ్యక్తి రూ.50 కొని మరియు 270 వద్ద అమ్మిన అతనికి వచ్చు లాభశాతమెంత
(a) 20% (b) 40% (c) 50% (d) 30%

34. Find the Sp when CP is Rs.80 and loss is 20%
రూ. 80 కొని మరియు నష్టము 20% అయితే అమ్మిన వెల ఎంత
(a) 56 (b) 60 (c) 62 (d) 64

35. A, B,C started a business by investing Rs.1,20,000 Rs.1,35,000 and Rs.1,50,000 respectively find the share of 'A' at an annul profit of Rs.56,700.
A,B,C లు వ్యాపారములో వరుసగా 1,20,000 రూ॥ 1,35,000 రూ॥ మరియు 1,50,000 రూ॥ లతో ప్రారంభించిరి అయితే సంవత్సర లాభము 56,700 రూ॥ వచ్చే దానిలో
A వాటా ఎంత
(a) 18,900 (b) 21,000 (c) 16,800 (d) 16,000

36. If 3(A's Capital) = 4 (B's Capital) = 5 (C is Capital) then the ratio of their capital's is
3(A యొక్క వాటా) = 4 (B యొక్క వాటా) = 5(C యొక్క వాటా) అయితే వాటానిష్పత్తి ఎంత
(a) 12 : 15 : 20 (b) 20 : 15 : 12 (c) 15 : 20 : 12 (d) 15 : 12:20

37. Find the simple interest on Rs.4000 for 4 years at 5% per annum.
సంవత్సరమునకు 5% వడ్డ 4 సంవత్సరములకు 4000 రూ॥ సరళ వడ్డీని కనుగొనుము
(a) 800 (b) 600 (c) 700 (d) 400

38. Find the simple interest on Rs. 5000 for 219 days at 10% p.a.
సంవత్సరమునకు 10% వడ్డ 219 రోజులకు రూ.5000 సరళ వడ్డీని కనుగొనుము.
(a) 400 (b) 300 (c) 200 (d) 100

39. Find the compound interest on Rs. 3000 for 2 years at 10% p.a.
[illegible]
(a) 610 (b) 600 (c) 630 (d) 620

40. Find the amount on Rs. 18,750 in 2 years, the rate of interest being 4% for the first year and 8% for the second year.
[illegible] రూ.18,750 [illegible]
(a) 16,020 (b) 19,000 (c) 21,060 (d) 22,000

SECTION – B (Unit – III)
(Q. No. 41 – 45)

Study the following table carefully and answer the questions given below.

41. The following table gives the sales of different types of batteries manufactured by a Company over the years (numbers in thousands)
[illegible]

TYPES OF BATTERIES

YEAR	4AH	7AH	32AH	35AH	55AH	TOTAL
1992	75	144	114	102	108	543
1993	90	126	102	84	126	528
1994	96	114	75	105	135	525
1995	105	90	150	90	75	510
1996	90	75	135	75	90	465
1997	105	60	165	45	120	495
1998	115	85	160	100	145	605

41. The total sales of all the seven years is the maximum for which battery
[illegible]
(a) 4AH (b) 7AH (c) 32AH (d) 35AH

42. What is the difference in the number of 35 AH batteries sold in 1993 and 1997
[illegible] 1993 [illegible] 1997 [illegible] 35AH [illegible]
(a) 24,000 (b) 28,000 (c) 35,000 (d) 39,000

43. The percentage of 4AH batteries sold to the total number of batteries sold was maximum in the year
4 AH [illegible]
(a) 1994 (b) 1995 (c) 1996 (d) 1997

44. In the case of which battery there was a continuous decrease in the sales from 1992 to 1997.
1992, 1997ల మధ్య ఏ రకం బ్యాటరీల అమ్మకం క్రమంగా తగ్గింది?
(a) 4AH (b) 7AH (c) 32 AH (d) 35 AH

45. What is the approximate percentage increase in the sales of 35AH batteries in 1998 compared to that in 1992.
1992 సంవత్సరంతో పోల్చినే 1998లో 35AH బ్యాటరీల విక్రయాల శాతము సుమారుగా
(a) 28% (b) 31% (c) 33% (d) 34%

(Q No. 46 – 50)

Company / Year	A	B	C	D	E	F
2002	45	35	48	42	50	49
2003	40	32	52	46	48	45
2004	48	36	50	43	56	48
2005	49	37	45	48	52	44
2006	46	30	55	50	54	50
2007	52	38	47	40	51	52

46. What is the instrument average of "C"
కంపెనీ "C" పన్నుల లేని ఇన్‌స్ట్రుమెంట్స్ సగటు.
(a) 29,50,000 (b) 49,50,000 (c) 56,40,000 (d) 6,50,000

47. Ratio between all 2007 company and 2006 company
2007 అన్ని కంపెనీల మరియు 2006 అన్ని కంపెనీల మధ్య నున్న నిష్పత్తి.
(a) 56 : 57 (b) 57:56 (c) 59:54 (d) 56 : 53

48. What is the sum of "F" in 2004 when compared to others
2004 సంవత్సరం "F" కంపెనీ పన్నుల & మొత్తం అన్ని కంపెనీల పన్నుల మొత్తంలో ఎంత శాతం ఉంది.
(a) 40% (b) 20% (c) 10% (d) 80%

49. What is ratio of 2002 company and 2004 company
2002 సంవత్సరానికి 2004 సంవత్సరానికి వివిధ కంపెనీల సగటుల నిష్పత్తి
(a) 269 : 281 (b) 281 : 264 (c) 265 : 278 (d) 278 :241

50. In the year 2003, the average of all the company (in lakhs)
2003 సంవత్సరంలో వివిధ కంపెనీల సగటు (లక్షలలో)
(a) 44 823 (b) 43.833 (c) 41.832 (d) 41.843

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S.NO	NAME OF THE LECTURER	DESIGNANTION	COLLEGE
1	Sri. P.N.V. Prasada Rao	Lecturer in Mathematics	Social welfare Residential Government Degree College
2	Dr. Dasari Madhusudhan Rao	Lecturer in Mathematics	GDC for Women(A),
3	K. Nirmala Kumari	Lecturer in Mathematics	GDC for Women(A),
4	Dr.Ch. Srinivasa Rao	Lecturer in Mathematics	GDC,Mandapet
5	Ch.S. Haranadh	Lecturer in Mathematics	GDC, Akiveedu,W.G.Dt.
6	P. Hari Krishna	Lecturer in Mathematics	GDC, Eluru
7	Dr. P. Kavya Sri	Lecturer in Mathematics	GDC, Eluru
8	M. Maha Lakshmi Naidu	Lecturer in Mathematics	GDC(A), Tuni
9	A. Surya Narayana	Lecturer in Mathematics	GDC(A), Rajahmundry
10	BVN. Srirama Murthy	Lecturer in Mathematics	GDC(A), Rajahmundry
11	I. Lakshmi Gayatri	Lecturer in Mathematics	GDC(A), Rajahmundry
12	S. Jaganmohan Rao	Lecturer in Mathematics	GDC, Jaggampea, E.G.Dt.
13	K. Hari Babu	Lecturer in Mathematics	GDC, Mylavaram.
14	K. Naveen Kumar	Lecturer in Mathematics	GDC(A), Rajahmundry

Naveen

23/11/2022