SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
I B.Sc Mathematics (for 2018-2021 batch, w.e.f 2016-17)
Paper I, Syllabus for I semester
Differential Equations

UNIT - I: (12 Hours)**Differential equations of first order and first degree** (10 Marks-2,5 Marks-2)
Linear differential equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors; Change of variables.

UNIT – II (12 Hours) **Orthogonal Trajectories, Differential Equations of first order but not of the first degree :** (10Marks-2, 5Marks- 1)
Equations solvable for p, Equations solvable for y, Equations solvable for x, Equations that do not contain x (or) y, Equations of the first degree in x and y- Clairaut's Equation.

UNIT-III: (12 Hours) **Higher order linear differential equations I** (10Marks-2, 5Marks-1)
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.

$\frac{1}{f(D)}$ 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 = b sin ax or b cos ax.

UNIT-IV: (12 Hours) **Higher order linear differential equations II** (10Marks-2, 5Marks-2)
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= $e^{ax}V$
P.I. of f(D)y = Q when Q= xV
P.I. of f(D)y = Q when Q= x^mV

UNIT-V: (12 Hours) **Higher order linear differential equations III** (10Marks-2, 5Marks-2)
Method of Variation of Parameters; Linear Differential Equations with Non-Constant Coefficients, The Cauchy-Euler equation.

Prescribed Text Book: (1) A Text Book of B.Sc Mathematics Volume-I (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

Reference Books: (1) Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
(2) Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha- universities press.
(3) Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi- Second edition.

Suggested Activities:
Seminar/ Quiz/ Assignments

27.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED A GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/6/18

23/06/18

APPROVED

SEMESTER-I
BLUE PRINT

Max. Marks:75

Time: 3Hrs.

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Differential equations of first order and first degree	: 2 questions
Differential equations of the first order but not of the first degree	: 1 question
Higher order Linear differential equations I	: 1 question
Higher order Linear differential equations II	: 2 questions
Higher order Linear differential equations III	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.

SECTION-A

Differential equations of the first order and first degree	: 2 questions
Differential equations of the first order but not of the first degree	: 2 questions
Higher order Linear differential equations I	: 1 question

SECTION-B

Higher order Linear differential equations I	: 1 question
Higher order Linear differential equations II	: 2 questions
Higher order Linear differential equations III	: 2 questions

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23/6/18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED A GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
I B.Sc. Mathematics – Paper I
Differential Equations
Model Question Paper (for 2018-21 batch w. e. f 2016-2017)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Solve $\left[y\left(1+\frac{1}{x}\right)+\text{Cos}\,y\right]dx+[x+\log x-x\,\text{siny}]dy=0.$
2. Solve $(1-x^2)\frac{dy}{dx}+2xy=x\sqrt{1-x^2}.$
3. Solve $x^2(y-px)=p^2y.$
4. Solve $(D^2-3D+2)y=\text{Cosh}x.$
5. Solve $(D^2-4D+3)y=x^3.$
6. Solve $(D^2+4)y=x\sin x$
7. $(x\sin x+\cos x)\frac{d^2y}{dx^2}-x\cos x\frac{dy}{dx}+y\cos x=0.$
8. Solve $(x^2D^2+2xD-12)y=x^3(\log x).$

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Solve $(2x^2y-3y^2)\,dx+(2x^3-12xy+\log y)dy=0.$
10. Solve $\frac{dy}{dx}+\frac{y}{x}=y^2\,x\sin x, x>0.$
11. Show that the family of confocal conics $\frac{x^2}{(a^2+\lambda)}+\frac{x^2}{(b^2+\lambda)}=1$ is self orthogonal, where λ is a parameter.
12. Solve $p^2+2py\cot x=y^2.$
13. Solve $(D^2+a^2)y=\sec ax.$

SECTION-B

14. Solve $(D^2+9)y=\cos^3x.$
15. Solve $(D^2+3D+2)y=xe^x\text{Sin}x.$
16. Solve $(D^2-4D+1)y=e^{2x}\cos^2x.$
17. Solve $(x+2)\frac{d^2y}{dx^2}-(2x+5)\frac{dy}{dx}+2y=(x+1)e^x$, given that $y=e^{2x}$ is a part of C.F.
18. Solve $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=x^2e^x$ by the method of variation of parameters.

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED A GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23.6.18

CHAIRMAN BOARD OF STUDIES DEPARTMENT OF MATHEMATICS SRI Y.N. COLLEGE (AUTONOMOUS) (NAAC ACCREDITED A GRADE COLLEGE) NARSAPUR - 534 275

23/06/18

APPROVED

23/6/18

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
I B.Sc Mathematics (for 2018-2021 batch, w.e.f 2016-17)
Paper II, Syllabus for II semester
Solid Geometry

UNIT – I (12 hrs) : The Plane : (10 Marks-2,5 Marks-1)

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.

UNIT – II (12 hrs) : The Line : (10Marks-2, 5Marks- 2)

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.

UNIT – III (12 hrs) : Sphere : (10Marks-1, 5Marks-2)

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.

UNIT – IV(12 hrs):Sphere&Cones : (10Marks-3, 5Marks-2)(**10 Marks Questions from Sphere 2 and Cone 1)**

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified form of the equation of two spheres, limiting points.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators.

UNIT – V (12 hrs) Cones: (10Marks-2, 5Marks-1)

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; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle.

Prescribed Text Book: (1) A Text Book of B.Sc Mathematics Volume-I (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.
2. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley 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.

Suggested Activities:
Seminar/ Quiz/ Assignments

22.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

APPROVED

23/06/18

SEMESTER-II
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Unit-I (The Plane)	: 1 question
Unit-II(The Line)	: 2 questions
Unit-III(The Sphere)	: 2 questions
Unit-IV(The Sphere & Cones)	: 2 questions
Unit-V (The Cones)	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.

SECTION-A

Unit-I (The Plane)	: 2 questions
Unit-II (The Line)	: 2 questions
Unit-III (The Sphere)	: 1 question

SECTION-B

Unit-IV (The Sphere & Cones) (From Sphere-2, Cone-1)	: 3 questions
Unit-V (The Cones)	: 2 questions

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE
DEPARTMENT OF MATHEMATICS
NARSAPUR - 534 275, W.G. Dt.

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
I B.Sc. Mathematics – Paper II
Solid Geometry
Model Question Paper (for 2018-21 batch w. e. f 2016-2017)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Prove that the equation of the plane through the points (1,-2,4) and (3,-4,5) and parallel to x-axis is y +2z =6.
2. Find the equations of the straight line passing through the point (1,0,-1) and intersecting the lines $4x - y - 13 = 0 = 3y - 4z - 1; y - 2z + 2 = 0 = x - 5$.
3. Prove that the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}; \frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ are coplanar, also find their point of intersection.
4. Find the equation of the sphere circumscribing the tetrahedron whose faces are x = 0, y = 0, z = 0 and $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$.
5. Find the pole of the plane x+2y+3z= 7 w.r.t the sphere $x^2 + y^2 + z^2 - 2x - 4y - 6z + 11 = 0$.
6. Find the equation of the sphere through the circle $x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0$, 3x-4y+5z-15=0 and cutting the sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally.
7. Find the equation to the cone whose vertex is (1,1,0) and whose guiding curve is $y = 0$, $x^2 + z^2 = 4$.
8. Show that the reciprocal cone of $ax^2 + by^2 + C^2 = 0$ is the cone $\frac{x^2}{a} + \frac{y^2}{b} + \frac{z^2}{c} = 0$.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Find the equations of the planes bisecting the angles between the planes 3x-6y+2z+5=0, 4x-12y+3z-3=0 also point out which the plane bisects the acute angle.
10. A variable plane is at a constant distance p from the origin and meets the axis in A,B,C show that the locus of the centroid of the tetrahedrom OABC is $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$.
11. Find the image of the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ in the plane x+y+z=1.
12. Find the shortest distance and equations of the line S.D between the lines 3x-9y+5z=0=x + y – z and 6x+8y+3z-10 = 0 = x+2y+z -3.
13. Find the equations of the spheres passing through the circle $x^2 + y^2 = 4, z = 0$ and is intersected by the plane $x + 2y + 2z = 0$ in a circle of radius 3.

SECTION-B

14. Show that the two circles $x^2 + y^2 + z^2 - y + 2z = 0, x - y + z = 2$ and $x^2 + y^2 + z^2 + x - 3y + z - 5 = 0, 2x - y + 4z - 1 = 0$ lie on the same sphere and find its equation.
15. If r_1, r_2 are the radii of two orthogonal spheres, then show that the radius of the circle of their intersection is $\frac{r_1 r_2}{\sqrt{(r_1^2 + r_2^2)}}$.
16. Prove that the angle between the lines of intersection of the plane $x+y+z=0$ with the cone $ayz+bzx+cxy=0$ is $\frac{\pi}{3}$ if $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$
17. Show that the equation of quadric cone which contains the three coordinate axes and the lines in which the plane $x-5y-3z=0$ cuts the cone $7x^2 + 5y^2 - 3z^2 = 0$ is $yz+10zx+18xy=0$.
18. Find the equation of the right circular cone whose vertex is the origin, axis as the line $x = t, y = 2t, z = 3t$ and whose semi-vertical angle is 60^0.

22.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

SRI Y. N. COLLEGE (AUTONOMOUS)
NAAC ACCREDITED 'A' GRADE COLLEGE
DEPARTMENT OF MATHEMATICS
NARSAPUR - 534 275, W.G. DT.

23/06/18

25/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
II B.Sc Mathematics (for 2017-2020 batch, w.e.f 2016-17)
Paper III, Syllabus for III semester
Abstract Algebra (Group Theory)

UNIT – 1 : (10 Hrs) Groups(10 Marks-2, 5 Marks-1)

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 : (14 Hrs) Subgroups, Co-Sets and Lagrange's Theorem
(10 Marks-2, 5 Marks-1)

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.

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

UNIT –3 : (12 Hrs) Normal Subgroups(10 Marks-1, 5 Marks-2)

Definition of normal subgroup – 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.

UNIT – 4 : (10 Hrs) Homomorphism(10 Marks-2, 5 Marks-2)

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 – 5 : (14 Hrs) Permutations And Cyclic Groups(10 Marks-3, 5 Marks-2)

Definition 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.

Prescribed Text Book: A Text Book of B.Sc Mathematics Volume-II (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

Reference Books :

1. A. First course in Abstract Algebra, by J.B. Fraleigh Published by Narosa Publishinghouse.
2. Modern Algebra by M.L. Khanna.

Suggested Activities:
Seminar/ Quiz/ Assignments

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

SRI Y.N. COLLEGE (AUTONOMOUS) DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/6/18

23/06/18

APPROVED

SEMESTER-II
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Groups	: 1 question
Subgroups	: 1 question
Normal Sub groups	: 2 questions
Homomorphism	: 2 questions
Permutations and Cyclic groups	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.

SECTION-A

Groups	: 2 questions
Subgroups	: 2 questions
Normal Subgroups	: 1 question

SECTION-B

Homomorphism and Isomorphism of Groups	: 2 questions
Permutations and Cyclic groups	: 3 questions

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
II B.Sc. Mathematics – Paper III
Abstract Algebra(Group Theory)
Model Question Paper (for 2017-20 batch, w. e. f 2016-2017)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Show that the set Q^+ of all positive rational numbers forms an abelian group under the composition "o" defined by $a \circ b = \frac{ab}{3} \forall a, b \in Q^+$
2. If H is any subgroup of a group G, then prove that $H^{-1}=H$.
3. If H is a subgroup of G and N is a normal sub group of G, then prove that (i) $H \cap N$ is a normal subgroup of H (ii) N is a normal subgroup of HN.
4. Prove that every sub group of an abelian group is normal.
5. Prove that every homomorphic image of an abelian group is abelian.
6. Let G be a multiplicative group and $f : G \to G$ such that for $a \in G$, $f(a)=a^{-1}$, then prove that f is one-one onto and f is homomorphism iff G is commutative.
7. Find the order of the cycle (1 4 5 7).
8. If G is a finite group of order n and if $a \in G$, then prove that $a^n=e$, where 'e' is identity in G

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Prove that in a group G, for a, b, x, $y \in G$ the equation $ax=b$ and $ya=b$ have unique solutions.
10. Define Order of an element of a group. In a group G for a, $b \in G$, $O(a)=5$, $b \neq e$ and $aba^{-1} = b^2$, then find O(b).
11. Prove that a non-empty finite subset of a group G which is closed under multiplication is a subgroup of G.
12. Prove that a non empty complex H of a group G is a subgroup of G iff (i) $a \in H, b \in H \Rightarrow ab \in H$ (ii) $a \in H \Rightarrow a^{-1} \in H$.
13. Prove that a subgroup H of a group G is a normal subgroup of G iff the product of two right cosets of H in G is again a right cost of H in G.

SECTION – B

14. Let G be a group and G^1 be a non empty set. If there exists a mapping f of G onto G^1 such that $f(ab)=f(a)f(b)$ for $a,b \in G$, then prove that G^1 is a group.
15. Prove that the necessary and sufficient condition for a homomorphism f of a group G onto a group G^1 with Kernel K to be an isomorphism of G into G^1 is that $K = \{ e \}$.
16. If f=(1 2 3 4 5 8 7 6), g=(4 1 5 6 7 3 2 8) are cyclic permutations, then show that $(fg)^{-1}=g^{-1}f^{-1}$.
17. Let S_n be a symmetric groups of n symbols and let A_n be the group of even permutations, then show that A_n is normal in S_n and $O(A_n)=\frac{1}{2}n!$
18. Prove that a group of prime order is cyclic.

23-6-18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF M...
SRI Y.N. COLLEGE (A...
(NAAC ACCREDITED 'A' GRA...
NARSAPUR - 53...

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED A GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

APPROVED

23/6/18

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
II B.Sc Mathematics (for 2017-2020 batch, w.e.f 2016-17)
Paper IV, Syllabus for IV semester
Real Analysis

UNIT – I (12 hrs) : REAL NUMBERS

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

Real Sequences (10 Marks-2, 5 Marks-2)

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 Sequences – Cauchy's general principle of convergence theorem.

UNIT –II (12 hrs) : INFINITIE SERIES(10 Marks-2, 5 Marks-2)

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

1. P-test
2. Canchy's n^{th} root test or Root Test.
3. D-Alembert's Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III (12 hrs) : CONTINUITY (10 Marks-1, 5 Marks-1)

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

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

UNIT – IV (12 hrs) : DIFFERENTIATION & MEAN VALUE THEOREMS
(10 Marks-2, 5 Marks-2)

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

ADDITIONAL INPUT:

Generalized Mean value Theorems - Taylor's Theorem(Statement Only), Maclaurin's Theorem(Statement only), Expansion of functions with different forms of remainders, Taylor's Maclaurins Series, power series representation of functions.

UNIT – V (12 hrs) : RIEMANN INTEGRATION(10 Marks-3, 5 Marks-1)

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.

Prescribed Text Book: A Text Book of B.Sc Mathematics Volume-II (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

REFERENCE TEXT BOOKS :

1. "Introduction to Real Analysis" by RABERT g BARTELY and .D.R. SHERBART Published by John Wiley.
2. Elements of Real Analysis on 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

23.6.18

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

APPROVED

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SEMESTER-III
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Real Sequences	: 2 questions
Infinite Series	: 2 questions
Continuity	: 1 question
Differentiation	: 2 questions
Riemann Integration	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

SECTION-A

Real Sequences	: 2 questions
Infinite Series	: 2 questions
Continuity	: 1 question

SECTION-B

Differentiation & Generalized Mean value theorems	: 2 questions
Riemann Integration	: 3 questions

23.6.18

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/6/18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
II B.Sc. Mathematics – Paper IV
Real Analysis
Model Question Paper (for 2017-20 batch w. e. f 2016-2017)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Prove that every convergent sequence is a Cauchy sequence.
2. Prove that $\lim\left[\frac{1}{(n+1)^2}+\frac{1}{(n+2)^2}+\cdots+\frac{1}{(n+n)^2}\right]=0$
3. Test for the convergence of $\sum_{n=1}^{\infty}\frac{2^n-2}{2^n+1}x^n$, $x>0$
4. Test for the convergence of $\sum_{n=2}^{\infty}\frac{\log n}{2n^3-1}$
5. Let f:R→R be such that $f(x)=\frac{e^{\frac{1}{x}}-e^{\frac{-1}{x}}}{e^{\frac{1}{x}}+e^{\frac{-1}{x}}}$ if $x\neq 0$ and f(0)=1 discuss the continuity at x=0.
6. If f:[a,b]→R is derivable at c∈[a,b], then prove that f is continuous at c.
7. Prove that $\tan x > x > \sin x \ \forall\, x \in (0,\frac{\pi}{2})$.
8. Prove that f(x) = sinx is integrable on $[0,\frac{\pi}{2}]$ and $\int_0^{\frac{\pi}{2}}\sin dx = 1$.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Prove that a monotone sequence is convergent iff it is bounded.
10. State and prove Cauchy's general principle of convergence.
11. State and prove D-Alembert's test.
12. State and prove Cauchy's n^{th} root test.
13. Examine the continuity of f defined by f(x) = |x| + |x − 1|at x=0,1.

SECTION-B

14. State and prove Darboux's theorem.
15. Using Lagrange's theorem, show that $x > \log(1+x) > \frac{x}{x+1}\ \forall x > 0$.
16. If f: [a, b] → R is monotonic on [a, b], then prove that f is integrable on [a, b].
17. State and prove First mean value theorem.
18. Prove that $\frac{\pi^3}{24} \le \int_0^{\pi}\frac{x^2}{5+3\cos x}dx \le \frac{\pi^3}{6}$.

22-6-18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED A GRAD. CO... DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
III B.Sc Mathematics (for 2016-2019 batch, w.e.f 2017-18)
PaperV, Syllabus for V semester

RING THEORY & VECTOR CALCULUS

UNIT – 1 (12 hrs) Rings-I (10Marks-2, 5Marks-2)

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals

UNIT – 2 (12 hrs) Rings-II(10Marks-2, 5Marks-2)

Definition of Homomorphism – Homomorphic Image – Elementary Properties of Homomorphism –Kernel of a Homomorphism – Fundamental theorem of Homomorhphism – Maximal Ideals – Prime Ideals.

UNIT –3 (12 hrs) Vector Differentiation (10Marks-2, 5Marks-2)

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

UNIT – 4 (12 hrs) Vector Integration (10Marks-2, 5Marks-1)

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) Vector Integration Applications (10Marks-2, 5Marks-1)

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

Prescribed book:

(1) A Text Book of B.Sc Mathematics Volume-III (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Vector Calculus by R. Gupta, Published by Laxmi Publications.
4. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications.
5. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

22.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275

23/06/18

APPROVED

SEMESTER-III
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Rings – I	: 2 questions
Rings – II	: 2 questions
Vector Differentiation	: 2 questions
Vector Integration	: 1 question
Vector Integration Applications	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.

SECTION-A

Rings – I	: 2 questions
Rings – II	: 2 questions
Vector Differentiation	: 1 question

SECTION-B

Vector Differentiation	: 1 question
Vector Integration	: 2 questions
Vector Integration Applications	: 2 questions

SRI Y.N. COLLEGE (AUTONOMOUS) DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'

III B.Sc. Mathematics – Paper V

RING THEORY AND VECTOR CALCULUS

Model Question Paper (for 2016-19 batch w. e. f 2017-2018)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. If R is a Boolean ring , then prove that (i) $a + a = 0 \forall a \in R$, (ii) $a + b = 0 \Rightarrow a = b$ and (iii) R is commutative under multiplication.
2. Prove that the intersection of two sub rings of a ring R is a sub ring of R.
3. If f is a homomorphism of a ring R into a ring R^1, then prove that Ker f is an ideal of R.
4. Prove that in the ring Z of integers the ideal generated by prime integer is a maximal ideal.
5. Find the directional derivative of the function $xy^2 + yz^2 + zx^2$ along the tangent to the curve $x = t, y = t^2, z = t^3$ at the point (1,1,1).
6. Find div $\bar{f}$ and curl $\bar{f}$ where $\bar{f} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$
7. If $\bar{F} = (x^2 + y^2)\bar{i} - 2xy\bar{j}$, evaluate $\oint_C \bar{F}.d\bar{r}$, where the curve C is the rectangle in the xy-plane bounded by $y = 0, y = b, x = 0, x = a$.
8. Evaluate $\oint_C (\cos x \sin y - xy)dx + \sin x \cos y\, dy$, by Green's theorem where C is the circle $x^2 + y^2 = 1$.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Prove that the set $Z[i] = \{a + ib \mid a, b \in Z, i^2 = -1\}$ of Gaussian integers is an integral domain w.r.t addition and multiplication of numbers.
10. If U_1 and U_2 are two ideals of a ring R , then prove that $U_1 \cup U_2$ is an ideal of R iff $U_1 \subset U_2$ or $U_2 \subset U_1$.
11. Prove that every quotient ring of a ring is a homomorphic image of the ring.
12. Prove that every maximal ideal of a commutative ring R with unity is a prime ideal.
13. If $\bar{a}$ is a constant vector, then prove that $\text{curl}\frac{\bar{a}\times\bar{r}}{r^3} = -\frac{\bar{a}}{r^3} + \frac{3\bar{r}}{r^5}(\bar{a}.\bar{r})$

SECTION-B

14. If f and g are two scalar point functions, then prove that $\text{div}(f\nabla g) = f\nabla^2 g + \nabla f.\nabla g$
15. If $\bar{F} = 4xz\bar{i} - y^2\bar{j} + yz\bar{k}$, evaluate $\int \bar{F}.\bar{N}dS$ where S is the surface of the cube bounded by $x = 0, x = a, y = 0, y = a, z = 0, z = a$.
16. If $\bar{F} = 2xz\bar{i} - x\bar{j} + y^2\bar{k}$ evaluate $\int_V \bar{F}.dV$ where V is the region bounded by the surfaces $x = 0, x = 2, y = 0, y = 6, z = x^2, z = 4$.
17. Verify Gauss's divergence theorem to evaluate $\int_S ((x^3 - yz)\bar{i} - 2x^2y\bar{j} + z\bar{k}).\bar{N}dS$ over the surface of a cube bounded by the co ordinate planes $x = y = z = a$.
18. State and prove Stokes theorem.

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade with CGPA of 3.41
Recognized by UGC as 'College with potential for Excellence'
III B.Sc Mathematics (for 2016-2019 batch, w.e.f 2017-18)
Paper VI, Syllabus for V semester

LINEAR ALGEBRA

UNIT – I (12 hrs) : Vector Spaces-I(10Marks-2, 5Marks-2)

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 Linear independence and Linear dependence of Vectors.

UNIT –II (12 hrs) : Vector Spaces-II(10Marks-2, 5Marks-1)

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 Quotientspace.

UNIT –III (12 hrs) : Linear Transformations (10Marks-2, 5Marks-2)

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 hrs) : Matrix(10Marks-2, 5Marks-1)

Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT –V (12 hrs) : Inner product space(10Marks-2, 5Marks-2)

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

Prescribed Text Books:

(1) A Text Book of B.Sc Mathematics Volume-III (S.Chand & Company)
(V.Venkateswara Rao, N.Krishnamurthy, B.V.S.S.Sarma, S.Anjaneya Sastry)

Reference Books :

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.
2. Matrices by Shanti Narayana, published by S.Chand Publications.
3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer Sciences"

22-6-18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR-534 275

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

28/6/18

APPROVED

SEMESTER-V
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Vector Spaces-I	: 2 questions
Vector Spaces – II	: 1 question
Linear Transformations	: 2 questions
Matrix	: 1 question
Inner Product Spaces	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.

SECTION-A

Vector Spaces-I	: 2 questions
Vector Spaces-II	: 2 questions
Linear Transformations	: 1 question

SECTION-B

Linear Transformations	: 1 question
Matrix	: 2 questions
Inner Product Spaces	: 2 questions

22.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade with CGPA of 3.41
Recognized by UGC as 'College with potential for Excellence'
III B.Sc. Mathematics – Paper VI
Linear Algebra
Model Question Paper (for 2016-19 batch w. e. f 2017-2018)

Time: 3Hrs Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Prove that the intersection of any two sub spaces of vector space is also a subspace.
2. Determine whether the set of vectors {(1,-2,1),(2,1,-1),(7,-4,1)} are L.D or L.I.
3. Show that the set {(1,2,1),(2,1,0),(1,-1,2)} forms a basis of $V_3(F)$.
4. Show that the mapping $T:V_3(R)\rightarrow V_2(R)$ is defined by T(x,y,z) = (x-y, x-z) is a linear transformation.
5. Let U(F) and V(F) be two vector spaces and $T : U \rightarrow V$ is a linear transformation, then prove that the null space N(T) is a subspace of U(F).
6. Prove that square matrices A and A^1 have the same characteristic values.
7. If α, β are two linearly dependent vectors in an inner product space, then show that $|<\alpha,\beta>| = \|\alpha\|\|\beta\|$
8. Prove that in an inner product space any orthogonal set of non-zero vectors is linearly independent.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Let V(F) be a vector space. A non empty set $W \subseteq V$. Prove that the necessary and sufficient condition for W to be a subspace of V is a, $b \in F$ and $\alpha,\beta \in V \Rightarrow a\alpha+b\beta \in W$.
10. If W_1 and W_2 are two subspaces of a vector space V(F), then prove that $L(W_1 \cup W_2) = W_1 + W_2$.
11. Let V(F) be a finite dimensional vector space of a dimension n and W be the subspace of V, then prove that W is a finite dimensionai vector space with $\dim W \leq n$.
12. Let W be a subspace of a finite dimensional vector space V(F), then show that $\dim \frac{V}{W} = \dim V - \dim W$.
13. Let U(F) and V(F) be two vector spaces and $S = \{\alpha_1, \alpha_2, \ldots, \alpha_n\}$ be a basis of U. Let $\{\delta_1, \delta_2 \ldots, \delta_n\}$ be a set of vectors in V, then prove that there exists a unique linear transformation $T : U \rightarrow V$ such that $T(\alpha_i) = \delta_i$ for $i = 1,2, \ldots, n$.

SECTION-B

14. Describe explicitly of the linear transformation $T : \mathbf{R}^2 \rightarrow \mathbf{R}^2$ such that T(2,3)=(4,5) and T(1,0)=(0,0).
15. Solve the system $\lambda x + y + z = 0, x + \lambda y + z = 0, x + y + \lambda z = 0$ if the system has non zero solutions only.
16. Find the Eigen values and eigen vectors of the matrix $\begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{bmatrix}$
17. State and prove Bessel's inequality.
18. Apply Gram-Schmidt process to the vectors {(1,0,1), (1,0,-1), (0,3,4)} to obtain an orthonormal basis of $V_3(R)$ with the standard inner product.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
III B.Sc Mathematics (for 2016-19 batch w.e.f 2017-2018)
Paper VII , Syllabus for VI semester
ELECTIVE - VII- NUMERICAL ANALYSIS

UNIT- I: (10 hours)(5 Marks -2)

Errors in Numerical computations : Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II: (12 hours)(5 Marks-1, 10Marks-3)

Solution of Algebraic and Transcendental Equations: The bisection method, The iteration method, The method of false position, Newton Raphson method, Generalized Newton Raphson method. Muller's Method

UNIT – III: (12 hours) Interpolation – I(5 Marks-1 10Marks-1)

Interpolation : Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial

UNIT – IV: (12 hours) Interpolation – II(5 Marks-2, 10 Marks - 3)

Newton's formulae for interpolation. Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

UNIT – V : (14 hours) Interpolation – III(5 Marks-2, 10 Marks - 3)

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation.

PRESCRIBED TEXT BOOK:

Numerical Analysis by Dr. A Anjaneyulu, published by Deepti Publications.

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23.6.18

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23/06/18

23/6/18

APPROVED

SEMESTER-VI
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Errors in Numerical computations	: 2 questions
Solution of Algebraic and Transcendental Equations	: 1 question
Interpolation – I	: 1 question
Interpolation – II	: 2 questions
Interpolation – III	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14,15) will be given from UNIT-IV.

SECTION-A

Solution of Algebraic and Transcendental Equations	: 3 questions
Interpolation-I	: 1 question
Interpolation-II (Newton's formulae for interpolation)	: 1 question

SECTION-B

Interpolation-II (Central Difference Interpolation formulae)	: 2 questions
Interpolation-III	: 3 questions

SRI Y.N. COLLEGE (AUTONOMOUS) ★ DEPARTMENT OF MATHEMATICS ★ NARSAPUR - 534 275, W.G. Dt.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED A GRADE)
NARSAPUR - 534 275

23/06/18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
III B.Sc. Mathematics – ELECTIVE Paper VII
(Numerical Analysis)
Model Question Paper (for 2016-19 batch w.e.f 2017-2018)

Time: 3Hrs Max Marks:75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Given that $u = \frac{5xy^2}{z^3}$ Δx, Δy and Δz denote the errors in x, y and z respectively such that x=y=z=1 and $\Delta x = \Delta y = \Delta z = 1$. Find relative maximum error in u.
2. If 5/6 be represented approximately by 0.8333 find a) Relative error and b) percentage error.
3. Using Newton Raphson method establish the iterative formula $x_{n+1} = \frac{1}{2}\left[x_n + \frac{N}{x_n}\right]$ to calculate the Square root on N.
4. Estimate the missing term in the following table.

x	0	1	2	3	4
y=f(x)	1	3	9	?	81

5. Prove that $\Delta = \frac{1}{2}\delta^2 + \delta[1 + \frac{\delta^2}{4}]^{\frac{1}{2}}$
6. Compute f(1.1) from the following data.

x	1	2	3	4	5
f(x)	7	12	29	64	123

7. If $f(x) = \frac{1}{x}$ then find f (a,b).where f(a,b) is the first divided difference.
8. Using Lagrange's formula to find a polynomial which passes through the points (3, 3), (2,12), (1,15),(-1, -21).

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Solve the equation $x\log_{10} x - 1.2 = 0$, by using Regula-Falsi mehtod.
10. Find by the method of iteration a real roots of $2x - \log_x 10 = 7$.
11. Solve the equation $3x - \cos x - 1 = 0$, by using Newton Raphson method.
12. State and Prove that fundamental theorem of difference calculus on finite differences.
13. State and prove Newton's forward interpolation formula.

SECTION-B

14. State and prove Gauss backward interpolation formula.
15. Use Stirling's formula to find y_{28}, $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.
16. Using the following data find f(x) as a polynomial in powers of (x-5) by extending the table to include arguments x=5 repeated as many times as may be necessary
f(0) = 4, f(2) = 26, f(3) = 58, f(4) = 112, f(7) = 466, f(9) = 922.
17. By Lagrange's interpolation formula find the value of y at x = 5. Given that

x	1	3	4	8	10
y	8	15	19	32	40

18. Using Newton's divided difference formula, prove that

$$f(x) = f(0) + x\Delta f(-1) + \frac{(x+1)x}{2!}\Delta^2 f(-1) + \frac{(x+1)x(x-1)}{3!}\Delta^3 f(-2) + \cdots$$

29.6.18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/06/18

APPROVED

23/6/18

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
III B.Sc Mathematics (for 2016-19 batch w.e.f 2017-2018)
Paper VIII-A, Syllabus for VI semester

CLUSTER ELECTIVE - VIII-A – ADVANCED NUMERICAL ANALYSIS

Unit – I (10 Hours)(5 Marks-1, 10 Marks-2)

Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II : (12 hours) (5 Marks-2, 10 Marks-1)

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward 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- III : (12 hours) (5 Marks-2, 10 Marks-2)

Numerical Integration: General quadrature formula on errors, Trapozoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, and Weddle's rules, Euler – Maclaurin Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (14 hours) (5 Marks-2, 10 Marks-2)

Solutions of simultaneous Linear Systems of Equations: Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method ,Method of factorization, Solution of Tridiagonal Systems,. Iterative methods. Jacobi's method, Gauss-siedal method.

UNIT – V (12 Hours) (5 Marks-1, 10 Marks-3)

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.

PRESCRIBED TEXT BOOK:

Numerical Analysis by Dr. A Anjaneyulu, published by Deepti Publications.

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt.Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

22.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

APPROVED

SEMESTER-VI
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Curve fitting	: 1 question
Numerical Differentiation	: 2 questions
Numerical Integration	: 2 questions
Solutions of Simultaneous Linear system of equations	: 2 questions
Numerical Solution of Ordinary Differential equation	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.

SECTION-A

Curve fitting	: 2 questions
Numerical Differentiation	: 1 question
Numerical Integration	: 2 questions

SECTION-B

Solutions of Simultaneous Linear system of equations	: 2 questions
Numerical Solution of Ordinary Differential equation	: 3 questions

SRI Y.N. COLLEGE (AUTONOMOUS) ★ NAAC ACCREDITED 'A' GRADE COLLEGE ★ DEPARTMENT OF MATHEMATICS ★ NARSAPUR - 534 275, W.G. Dt. ★

23-6-18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/06/18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Auonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognised by UGC as 'College with potential for Excellence'
III B.Sc. Mathematics – Paper VIII A
CLUSTER ELECTIVE - VIII-A- ADVANCED NUMERICAL ANALYSIS
Model Question Paper (for 2016-19 batch w.e.f 2017-2018)

Time: 3Hrs Max Marks:75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Find the least square line y = a+bx for the following data

x_r	-2	-1	0	1	2
y_r	1	2	3	3	4

2. 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

3. Find f'(1.5) from the following table

x	0	0.5	1	1.5	2
f(x)	0.3989	0.3521	0.2420	0.1295	0.0540

4. Find the value of $\int_1^5 \log_{10} x \, dx$ taking 8 subintervals correct to 4 decimal places, by Trapezoidal rule.
5. Evaluate $\int_0^1 \frac{1}{1+x} dx$, by Boole's rule.
6. Solve the system of equations 2x+2y+4z = 16, x+3y+2z = 13, 3x+y+3z = 14, by using Gauss Elimination method.
7. Solve the system of equations x+y+z = 1, x+2y+3z = 6, x+3y+4z = 6, by using matrix inverse method.
8. Using Taylor's series expansion to find a solution of the differential equation $\frac{dy}{dx} = (0.1)(x^3 + y^3)$ with $y(0) = 1$ correct to 4 decimal places.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Determine the constants a and b by the method of least squares such the $y = a(e^{bx})$ fits thfollowing data

x	2	4	6	8	10
y	4.077	11.084	30.128	81.897	222.62

10. Fit a second degree Parabola to the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

11. Find the maximum and the minimum values of the function y = f(x) from the following data.

x	0	1	2	3	4	5
y	0	0.25	0	2.25	16	56.25

12. State and prove general quadrature formula and hence deduce Simpson's 1/3 rule.

13. Evaluate $I = \int_0^{\frac{\pi}{2}} \sin x \, dx$, using Euler-Maclaurin's formua.

SECTION-B

14. Solve the system of equations $5x+2y+z = 12$, $x+4y+2z = 15$, $x+2y+5z = 10$, by using method of factorization.
15. Solve the system of equations $10x+y+z = 12$, $2x+10y+z = 13$, $2x+2y+10z = 14$, by using Gauss- Seidel method.
16. Use Picard method to approximate y when x = 0.2 given that y = 1 when x = 0 and $\frac{dy}{dx} = x - y$.
17. Use Runge Kutta method of fourth order to find an approximate value of y when x=0.1and x=0.2 given that x=0 when y=1 and $\frac{dy}{dx} = x + y$
18. Using the Euler's modified method, find y(0.2) for $\frac{dy}{dx} = x + |\sqrt{y}|$ with y(0)=1.

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/6/18

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. DT.

23/06/18

23.6.18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
III B.Sc Mathematics (for 2016-19 batch w.e.f 2017-2018)
Paper VIII B , Syllabus for VI semester
CLUSTER ELECTIVE - VIII-B- SPECIAL FUNCTIONS

UNIT-I:(10 Marks-2)(5 Marks-2)

Hermite Polynomial: 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.

UNIT-II:(10 Marks-2)(5 Marks -2)

Laguerre Polynomials- I : Laguerre's Differential equation, Solution of Laguerre's equation, Laguerre Polynomials, Generating function, Other forms for the Laguerre Polynomials, To find first few Laguerre Polynomials, Orthogonal property of the Lguerre Polynomials, Recurrence formula for Laguerre Polynomials, Associated Laguerre Equation.

UNIT-III: (10Marks - 2)(5 Marks -1)

Legendre's equation : Definition, Solution of Legendre's equation, definition of $P_n(x)$ and $Q_n(x)$, General solution of Legendre's Equation (deviations not required) To show that $P_n(x)$ is the coefficient of h^n in the expansion of $(1 - 2xh + h^2)^{-\frac{1}{2}}$, Orthogonal properties of Legendre's Equation, Recurrence formula, Rodrigues formula.

UNIT-IV : (10Marks -2)(5 Marks -1)

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 $J_n(x)$.

UNIT-V: (10 Marks -2)(5 Marks -2)

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 Transformation.

PRESCRIBED TEXT BOOK:

Special Functions by J.N.Sharma and Dr.R.K.Gupta.

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/06/18

23.6.18

23/6/18

APPROVED

SEMESTER-VI
BLUE PRINT

Time: 3Hrs. Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Hermite Polynomial	: 2 questions
Laguerre Polynomial	: 2 questions
Legendre's Equation	: 1 question
Bessel's Equation	: 1 question
Beta and Gamma functions	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.

SECTION-A

Hermite Polynomial	: 2 questions
Laguerre Polynomial	: 2 questions
Legendre's equation	: 1 question

SECTION-B

Legendre's equation	: 1 question
Bessel's equation	: 2 questions
Beta and Gamma functions	: 2 questions

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23.6.18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognised by UGC as 'College with potential for Excellence'

III B.Sc. Mathematics – Paper VIII B

ELECTIVE - VIII-B- SPECIAL FUNCTIONS

Model Question Paper (for 2016-19 batch w.e.f 2017-2018)

Time: 3Hrs Max Marks:75

PART-I

Answer any FIVE Questions, each question carries FIVE marks. 5x5M =25M

1. Prove that $H_n^{II}(x) = 4n(n-1)H_{n-2}$
2. Prove that if $m < n$, $\frac{d^m}{dx^m}\{H_n(x)\} = \frac{2^m n!}{(n-m)!}H_{n-m}(x)$
3. Prove that $L_n^1(x) = -\sum_{r=0}^{n-1} L_r(x)$
4. Prove that $L_n^{\alpha}(x) = \frac{e^x x^{-\alpha}}{n!}.\frac{d^n}{dx^n}(e^{-x}.x^{n+\alpha})$
5. Prove that $(2n+1)xP_n = (n+1)P_{n+1} + nP_{n-1}$
6. Show that $J_{-\frac{1}{2}}(x) = \sqrt{\left(\frac{2}{\pi x}\right)}\cos x$
7. Compute $\Gamma\left(-\frac{1}{2}\right)$
8. Evaluate $\int_0^2 \frac{x^2 dx}{\sqrt{(2-x)}}$.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks. 5x10M = 50M

SECTION – A

9. Prove that $\int_{-\infty}^{\infty} e^{-x^2} H_n(x)H_m(x)dx = \begin{cases} 0 & \text{if } m \neq n \\ 2^n\sqrt{\pi}\,n! & \text{if } m = n \end{cases}$
10. Show that $\sum_{r=0}^{n} \frac{H_k(x)H_k(z)}{2^k k!} = \frac{H_{n+1(y)}H_n(x) - H_{n+1}(x)H_n(y)}{2^{n+1}n!(y-x)}$
11. Prove that $L_n(x) = \frac{e^x}{n!}\frac{d^n}{dx^n}(x^n e^{-x})$
12. Prove that $L_{n-1}^{\alpha}(x) + L_n^{\alpha-1}(x) = L_n^{\alpha}(x)$.
13. Prove that $P_n(x) = \frac{1}{n!2^n}\frac{d^n}{dx^n}(x^2-1)^n$

SECTION-B

14. Prove that(i) $\int_{-1}^{1} P_m(x)P_n(x)dx = 0$ if $m \neq n$(ii) $\int_{-1}^{1}[P_n(x)]^2 dx = \frac{2}{2n+1}$ if $m = n$
15. Prove that $J_n^1(x) = nJ_n(x) - xJ_{n+1}(x)$.
16. Prove that $\frac{d}{dx}[J_n^2 + J_{n+1}^2] = 2\left(\frac{n}{x}J_n^2 - \frac{n+1}{x}J_{n+1}^2\right)$
17. Prove that $\beta(l,m) = \frac{\Gamma(l)\Gamma(m)}{\Gamma(l+m)}$.
18. Show that $2^n\Gamma\left(n+\frac{1}{2}\right) = 1.3.5\ldots(2n-1)\sqrt{\pi}$

24.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275
23/6/18

SRI V. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE
DEPARTMENT OF MATHEMATICS
NARSAPUR - 534 275, W.G. Dt.
23/06/18

APPROVED

SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'

Foundation Course - 8
ANALYTICAL SKILLS

Syllabus, For all Degree Programmes.

Semester – IV (w.e.f. 2016-17)

(Total 30 Hrs)

UNIT – 1 : Data Analysis (10 Questions)
The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT – 2 : Sequence and Series (10 Questions)
Analogies of numbers and alphabets completion of blank spaces following the pattern in A:b::C: d relationship odd thing out; Missing number in a sequence or a series.

UNIT – 3: Arithmetic ability (10 Questions)
Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF).

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

UNIT - 4 : Quantitative aptitude (10 Questions)
Averages, Ration and proportion, Problems on ages, Time-distance – speed.

UNIT – 5 : Business computations (10 Questions)
Percentages, Profit &loss, Partnership, simple compound interest.

Reference Books:

1. Quantitative Aptitude for Competitive Examination by R S Agrawal, S.Chand publications.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers
4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.
5. Old question Paper of the exams conducted by (Wipro, TCS, Infosys, Etc) at their recruitment process, source-Internet.

SRI Y.N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23.6.18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE COLLEGE)
NARSAPUR - 534 275

23/06/18

23/6/18

APPROVED

SRI Y.N.COLLEGE(Autonomous),Narsapur
Affiliated to Adikavi Nannaya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
II B.Sc, B.A, B.Com
Analytical Skills
Model Question Paper (for 2017-20 batch w. e. f 2016-2017)

Time: 2Hrs **Max Marks: 50**

Answer ALL the questions. Each question carries ONE mark. **50 x 1 =50M**

SECTION-A(Unit-I)

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

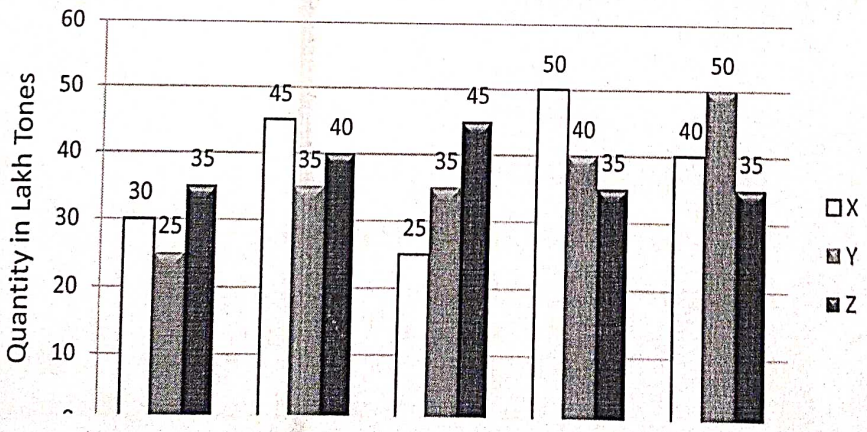
Classification of 100 students based on the marks obtained by them in Physics and Chemistry in an Examination

Marks out of 50 / Subject	40 and Above	30 and Above	20 and Above	10 and Above	0 and Above
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Average	7	27	73	87	100

1. The number of students scoring less than 40% marks in aggregate is:
   (a) 13 (b) 19 (c) 20 (d) 27 (e) 34
2. If at least 60% marks in Physics are required for pursuing higher studies in Physics, how many students will be eligible to pursue higher studies in Physics?
   (a) 27 (b) 32 (c) 34 (d) 41 (e) 68
3. What is the difference between the number of students passed with 30 as cut-off marks in Chemistry and those passed with 30 as cut-off marks in aggregate?
   (a) 3 (b) 4 (c) 5 (d) 6 (e) 7
4. The percentage of the number of students getting at least 60% marks in Chemistry over those getting at least 40% marks in aggregate, is approximately:
   (a) 21% (b) 27% (c) 29% (d) 31% (e) 34%
5. If it is known that at least 23 students were eligible for a symposium on Chemistry, the minimum qualifying marks in Chemistry for eligibility to Symposium would lie in the range :
   (a) 40 -50 (b) 30-40 (c) 20-30 (d) Below 20 (e) Cannot be determined

II. The bar graph provided below gives the data of the production of paper (in lakh tones) by three different companies X,Y and Z over the years. Study the graph and answer the questions that follow.

Production of Paper (in lakh tones) by three companies X,Y and Z over the years



6. What is the difference between the production of Company Z in 1998 and Company Y in 1996?
   (a) 2,00,000 tons (b) 20,00,000 tons (c) 20,000 tons (d) 2,00,00,000 tons
   (e) None of these
7. What is the ratio of the average production of Company X in the period 1998-2000 to the average production of Company Y in the same period?
   (a) 1 : 1 (b) 15 : 17 (c) 23 : 25 (d) 27 : 29 (e) None of these
8. What is the percentage increase in the production of Company Y from 1996 to 1999?
   (a) 30% (b) 45% (c) 50% (d) 60% (e) 75%
9. The average production for five years was maximum for which company?
   (a) X (b) Y (c) Z (d) X and Y both (e) X and Z both
10. In which year was the percentage of production of Company Z to the production of Company Y the maximum?
   (a) 1996 (b) 1997 (c) 1998 (d) 1999 (e) 2000

SECTION-B(Unit-II, III, IV & V)

11. 1 : 1: : 25 : ?
   (a)26 (b) 125 (c) 240 (d) 625
12. 5 : 100, 4 : 64 : : 4 : 80, 3 : ?
   (a) 26 (b) 48 (c) 54 (d) 60
13. WONDER PES
   CLUSTER MTF
   MUSCLE ?
   (a) LRK (b) NSM (c) TBD (d) VDF
14. $\frac{2}{3}, \frac{4}{7}, ?, \frac{11}{21}, \frac{16}{31}$
   (a) $\frac{5}{9}$ (b) $\frac{6}{11}$ (c) $\frac{7}{13}$ (d) $\frac{9}{17}$
15. 2, 1, 2, 4, 4, 5, 6, 7, 8, 8, 10, 11, ?
   (a) 9 (b) 10 (c) 11 (d) 12
16. 10, 18, 28, 40, 54 , 70, ?
   (a) 85 (b) 86 (c) 87 (d) 88
17. 2, 8, 16, 128, ?
   (a) 2042 (b) 2046 (c) 2048 (d) 2056
18. ab_d_aaba_na_badna_b
   (a) andaa (b) babda (c) badna (d) bdanb
19. abca_bcaab_ca_bbc_a
   (a) ccaa (b) bbaa (c) abac (d) abba
20. mnonopqopqrs_ _ _ _ _
   (a) mnopq (b) oqrst (c) pqrst (d) qrstu
21. $\frac{3\frac{1}{4}-\frac{4}{5}\text{ of }\frac{5}{6}}{4\frac{1}{3}\div\frac{1}{5}-\left(\frac{3}{10}+21\frac{1}{5}\right)} =$
   (a) $\frac{1}{6}$ (b) $2\frac{7}{12}$ (c) $15\frac{1}{2}$ (d) $21\frac{1}{2}$
22. $\frac{(0.1667)(0.8333)(0.3333)}{(0.2222)(0.6667)(0.1250)}$ is approximately equal to :
   (a) 2 (b) 2.40 (c) 2.43 (d) 2.50
23. Find the H.C.F of $2^3 \times 3^2 \times 5 \times 7^4$, $2^2 \times 3^5 \times 5^2 \times 7^6$, $2^3 \times 5^3 \times 7^2$
   (a) 980 (b) 400 (c) 500 (d) 680
24. Which of the following is a pair of co-primes?
   (a) (16, 62) (b) (18, 25) (c) (21, 35) (d) (23, 92)

25. What was the day of the week on 16th July, 1776?
(a) Monday (b) Wednesday (c) Tuesday (d) Saturday

26. Find the angle between the hour hand and the minute hand of a clock when the time is 3.25.
(a) $55\frac{1}{2}^0$ (b) $47\frac{1}{2}^0$ (c) $35\frac{1}{2}^0$ (d) $25\frac{1}{2}^0$

27. The angle between the minute hand and hour hand of a clock when the time is 8 : 30 is :
(a) 80^0 (b) 75^0 (c) 60^0 (d) 105^0

28. How many times in a day, are the hands of a clock in straight line but opposite in direction?
(a) 20 (b) 22 (c) 24 (d) 48

29. Looking at a portrait of a man, Harish said , "His mother is the wife of my father's son . Brothers and sisters I have none". At whose portrait was Harsh looking?
(a) His son (b) His cousin (c) His uncle
(d) His nephew (e) None of these

30. D the son-in-law of B, is the brother-in-law of A who is the brother of C. How is A related to B?
(a) Brother (b) Son (c) Father
(d) Data inadequate (e) None of these

31. The average weight of 10 oarsmen in a boat is increased by 1.8kg when one of the crew, who weighs 53kg is replaced by a new man. Find the weight of the new man.
(a) 55Kg (c) 71kg (c) 85kg (d) 95kg

32. A batsman makes a score of 87 runs in the 17th innings and thus increases his average by 3. Find his average after 17th inning.
(a)38 (b) 40 (c) 45 (d) 39

33. The average score of a cricketer for ten matches is 38.9 runs. If the average for the first six matches is 42, then find the average for the last four matches.
(a) 33.25 (b) 33.5 (c) 34.25 (d) 35

34. A motorist travels to a place 150km away at an average speed of 50 km/hr and returns at 30 km / hr. His average speed for the whole journey in km / hr is :
(a) 35 (b) 37 (c) 37.5 (d) 40

35. If $A : B = \frac{1}{2} : \frac{1}{8}$, $B : C = \frac{1}{3} : \frac{5}{9}$ and $C : D = \frac{5}{6} : \frac{3}{4}$, then the ratio A : B : C : D is :
(a) 4 : 6 : 8 : 10 (b) 6 : 4 : 8 : 10(c) 6 : 8 : 9 : 10(d) 8 : 6 : 10 : 9

36. The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?
(a) 8 : 9 (b) 17 : 18 (c) 21 : 22 (d) Cannot be determined

37. Sachin is younger than Rahul by 4 years. If their ages are in the respective ratio of 7 : 9, how old is sachin?
(a) 16 years (b) 18 years (c) 28 years
(d) Cannot be determined (e) None of these

38. In 10 years, A will be twice as old as B was 10 years ago. If A is now 9 years older than B, the present age of B is:
(a) 19 Years (b) 29 Years (c) 39 Years (d) 49 Years

39. A cyclist covers a distance of 750m in 2 min 30 sec. What is the speed in km/hr of the cyclist?
(a)18 km /hr (b) 20 km /hr (c) 22 km /hr (d) 25 km

40. A train covers a distance of 10 km in 12 minutes. If its speed is decreased by 5 km / hr the time taken by it to cover the same distance will be :
(a) 10 min (b) 11 min 20 sec (c) 13 min (d) 13 min 20 sec

41. The difference between a number and its two-fifth is 510. What is 10% of that number?
(a) 12.75 (b) 85 (c) 204 (d) None of these

42. A scored 30% marks and failed by 15 marks. B scored 40% marks and obtained 35 marks more than those required to pass. The pass percentage is :
(a) 33% (b) 38% (c) 43% (d) 46%

43. Alfred buys an old scooter for Rs.4700 and spends Rs.800 on its repairs. If he sells the scooter for Rs.5800, his gain percent is :
(a) $4\frac{4}{7}\%$ (b) $5\frac{5}{11}\%$ (c) 10% (d) 12%

44. The cash difference between the selling prices of an article at a profit of 4% and 6% is Rs.3. The ratio of the two selling prices is :
(a) 51 : 52 (b) 52 : 53 (c) 51 : 53 (d) 52 : 55

45. A,B and C jointly thought of engaging themselves in a business venture. It was agreed that A would invest Rs.6500 for 6 months, B, Rs.8400 for 5 months and C, Rs.10,000 for 3 months. A wants to be the working member for which he was to receive 5 % of the profits. The profit earned was Rs.7400. Calculate the share of B in the profit.
(a) Rs.1900 (b) Rs.2660 (c) Rs.2800 (d) Rs.2840

46. A sum of Rs.12,500 amounts to Rs.15,500 in 4 years at the rate of simple interest. What is the rate of interest?
(a) 3% (b) 4% (c) 5% (d) 6% (e) None of these

47. Rs.800 becomes Rs.956 in 3 years at a certain rate of simple interest. If the rate of interest is increased by 4%, what amount will Rs.800 become in 3 years?
(a) Rs.1020.80 (b) Rs.1025 (c) Rs.1052
(d) Data inadequate (e) None of these

48. Reena and Shaloo are partners in a business. Reena invests Rs. 35,000 for 8 months and Shaloo invests Rs.42,000 for 10 months. Out of a profit of Rs.31,750, Reena's share is :
(a) Rs.9471 (b) Rs.12,628 (c) Rs.18,040 (d) Rs.18,942

49. A sum of money invested at compound interest amounts to Rs.800 in 3 years and to Rs. 840 in 4 years. The rate of interest per annum is :
(a) $2\frac{1}{2}\%$ (b) 4% (c) 5 % (d) $6\frac{2}{3}\%$

50. Find the compound interest on Rs.15,625 for 9 months at 16% per annum compounded quarterly.
(a) Rs.1851 (b) Rs.1941 (c) Rs.1951 (d) Rs.1961

23.6.18

SRI Y. N. COLLEGE (AUTONOMOUS) NAAC ACCREDITED 'A' GRADE COLLEGE DEPARTMENT OF MATHEMATICS NARSAPUR - 534 275, W.G. Dt.

23/06/18

CHAIRMAN
BOARD OF STUDIES
DEPARTMENT OF MATHEMATICS
SRI Y.N. COLLEGE (AUTONOMOUS)
(NAAC ACCREDITED 'A' GRADE)
NARSAPUR - 534 275

23/6/18

APPROVED