

JAMSHEDPUR WOMENS COLLEGE

B. Sc. Mathematics (Honours)

SEM-1

PAPER-GE1

M-GE-I Calculus (Except Mathematics hons.)

Full Marks-80

Time:3 Hours

Question paper will have two sections.

Section-1(Compulsory) This section consists of eight short answer type questions of two marks each($8 \times 2 = 16$ marks) from the entire syllabus uniformly.

Section-2: In this section eight long type question will be set divided into two parts (a) and (b) of eight marks each out of which candidates are requested to answer any four questions($16 \times 4 = 64$ marks) selecting at least one from each unit/ group.

UNIT- I

Limit And continuity, types of discontinuities, differentiability of functions, successive differentiation Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions. **(2 questions)**

UNIT- II

Tangents & Normal's, curvature, Asymptote, Singular Points, Tracing of Cartesian curves, tracing of parametric curves, tracing of polar curves **(3 questions)**

UNIT-III

Reduction Formulae, Length of curves, volume and area of surface of revolution. **(3 questions)**

J. Ahmed
29.1.20

JAMSHEDPUR WOMENS COLLEGE

B. Sc. Mathematics (Honours)

SEM-2

PAPER-GE2

M-GE-2 Differential Equations (Except Mathematics Hons.)

Full Marks-80

Time:3 Hours

Question paper will have two sections.

Section-1(Compulsory) This section consists of eight short answer type questions of two marks each($8 \times 2 = 16$ marks) from the entire syllabus uniformly.

Section-2: In this section eight long type question will be set divided into two parts (a) and (b) of eight marks each out of which candidates are requested to answer any four questions($16 \times 4 = 64$ marks) selecting at least one from each unit/ group.

UNIT-I

First order exact differential equations, rules to find & integrating factors, first and higher degree equations solvable for x , y , p , Methods for solving higher order differential equations. Basic theory of linear differential equations. Wronskian and its properties for a differential equations by reducing its order

(2 Question)

UNIT-II

Linear Homogeneous equations with constant coefficient, linear nonhomogeneous equations, The method of variation of parameters, The Cauchy's Euler's equations, Simultaneous differential equation, Total differential equation

(3 Questions)

UNIT-III

Order and degree of partial differential equation, concept of linear and non linear partial differential equations, formation of first order partial differential equations, linear partial differential equation of first order, Lagrange's method, Charpit's method

(3 Questions)

Books Recommended

1. Shepley L. Ross, Differential equation, John Wiley and sons
2. I. Sneddon, elements of partial differential equations, McGraw-Hill
- 3.

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JAMSHEDPUR WOMENS COLLEGE

B. Sc. Mathematics (Honours)

SEM-3

PAPER-GE3

M-GE-3 Real Analysis(Except mathematics hons.)

Full Marks-80

Time:3

Hours Question paper will have two sections.

Section-1(Compulsory) This section consists of eight short answer type questions of two marks each($8 \times 2 = 16$ marks) from the entire syllabus uniformly.

Section-2: In this section eight long type question will be set divided into two parts (a) and (b) of eight marks each out of which candidates are requested to answer any four questions($16 \times 4 = 64$ marks) selecting at least one from each unit/ group.

UNIT-I

Finite and infinite sets, example of countable and uncountable sets, Real line bounded sets suprema and infima, completeness property of $\mathbb{R}$. Archimedean property of $\mathbb{R}$. intervals, Concept of cluster points and statement of Bolzano- weierstrass theorem. **(2 Questions)**

UNIT-II

Real sequence, Bounded sequence, Cauchy's convergence criterion for sequence, cauchy's theorem on limits , order preservation and squeeze theorem, ,monotone sequences and their convergence(monotone sequences theorem without proof) **(3 Questions)**

UNIT-III

Infinite series ,Cauchy's criterion for the convergence of series, positive term series, convergence of geometric series, comparison test, convergence of p-series, root test, ratio test, Leibnitz test for the convergence of alternating series ,definition & examples of absolute & conditional convergence. **(3 Questions)**

BOOKS RECOMMENDED

1-T.M.Apostle,Calculus,Jhon Willey & sons(ASIA) Pvt. Ltd.

2. R.G. Bartle and D.R Sherbert , introduction to Real Analysis, John Wiley and Sons(Asia) P.Ltd, 2002

3.E.Fischer, Intermediate Real Analysis , Springer Verlag, 1983

4. K.A.Ross , Elementry Analysis – The Theory of calculus series- Undergraduate Texts in Mathematics , Springer Verlag, 2003

JAMSHEDPUR WOMENS COLLEGE

B. Sc. Mathematics (Honours)

SEM-4

PAPER-GE4

M-GE-4 Algebra (Except Mathematics Hons.)

Full Marks-80

Time:3 Hours

Question paper will have two sections.

Section-1(Compulsory) This section consists of eight short answer type questions of two marks each($8 \times 2 = 16$ marks) from the entire syllabus uniformly.

Section-2: In this section eight long type question will be set divided into two parts (a) and (b) of eight marks each out of which candidates are requested to answer any four questions($16 \times 4 = 64$ marks) selecting at least one from each unit/ group.

UNIT-I

Definition and example of group, Example of abelian and non -abelian groups, The group Z_n of integer under addition modulo n and the group $U(n)$ of units under multiplication modulo n , Cyclic groups from number system, Complex roots of unity, circle group, The general linear group $GL(n, R)$ (2 Questions)

UNIT-II

Subgroups, Cyclic Subgroups, The concept of a subgroup generated by a subset and the commutator subgroup of group, example of subgroups including the center of a group. Cosets index of subgroup, Lagrange's theorem, order of an element, Normal Subgroups: their definition, example and characterization, Quotient groups (3 Questions)

UNIT-III

Definition and example of Rings, Example of commutative and non - commutative rings; rings from number system, Z_n the ring of integer modulo n , ring of real quaterions rings of matrices, Polynomial rings, and rings of continous function. Subrings and ideals, integral domain and field, example of fields: Z_p , Q , R and C (3 Questions)

Books Recommended

- 1 John B.Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002
- 2 M. Artin, Abstract, 2nd Ed. Pearson, 2011
- 3 Joseph A Gallian, Contemporary Abstract Algebra, 4th Ed. , Narosa, 1999
- 4 George E Andrews, Number Theory, Hindustan Publishing Corporation, 1984

J. Almu
28.1.20