

Paper-II: Web Designing

Maximum Marks: 50
Minimum Pass Marks: 18
Time: 3 Hours

External: 40
Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic Features; Web Browsers; Web Servers; Hypertext Transfer Protocol; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools

UNIT – II

Steps for Developing Website; Choosing the Contents; Home Page; Domain Names; Internet Service Provider; Planning and Designing Web Site; Creating a Website; Web Publishing: Hosting Site;

UNIT-III

Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML Tags; Header, Title, Body, Paragraph, Ordered/Unordered Line, Creating Links; Headers; Text Styles; Text Structuring; Text Colors and Background; Formatting Text; Page layouts; Insertion of Text, Movement of Text

UNIT – IV

Images: Types of Images, Insertion of Image, Movement of Image, Ordered and Unordered lists; Inserting Graphics; Table Handling Functions like Columns, Rows, Width, Colours; Frame Creation and Layouts; Working with Forms and Menus; Working with Buttons like Radio, Check Box;

TEXT BOOKS:

- Bayross Ivan, “Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP”, BPB Publication, 2005
- Powell Thomas, “The Complete Reference HTML & CSS”, Tat Mc-Graw Hill, 2010

REFERENCE BOOKS:

- Wendy Willard, “HTML Beginners Guide”, Tata McGraw-Hill
- Deitel and Goldberg, “Internet and World Wide Web, How to Program”, PHI.

Physics- PH-401

Paper VII: Statistical Physics

Max.Marks:40

Internal assessment:10

Time:3 Hours

Note:

1. The syllabus is divided into 4 units. 9 questions will be set.
2. Question no 1 will be compulsory, it contains 6 parts (from all the four units) and answer should be brief but not in yes / no.
3. Four more questions are to be attempted, selecting one question from each unit. Questions 2-9 may contain two or more parts. All questions carry equal marks.
4. 20% numerical problems are to be set.
5. Use of scientific (non-programmable) calculator is allowed.

Unit –I: Statistical Physics I

Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for $N= 2,3,4$) distinguishable and indistinguishable particles in two boxes of equal size, Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- β parameter, Entropy and Probability (Boltzman's relation).

Unit –II: Statistical Physics II

Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of σ and β), speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution.

Unit-III: Quantum Statistics

Need for Quantum Statistics: Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, Fermi-Dirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.

Unit-IV: Theory of Specific Heat of Solids

Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature, Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.

References:

1. Prakash S and Agarwal J P, Statistical Mechanics, Kedar Nath Ram Nath & co, Meerur
2. Reiff. statistical Physics, Berleley Physics Course Volume 5, Mc Graw Hill Book Co Ltd, New Delhi
3. Mc Quarrie D A. Statistical Mechanics, Viva Books Pvt Ltd, New Delhi.
4. Ashley Cmter (August 1999), Classical and Statistical Thermodynamics .
5. Richard Fitzpatrick, Thermodynamics and Statistical Mechanics: An intermediate level course Lulu.com,2007

Paper-I: Fundamentals of Database Systems

Maximum Marks: 50

Minimum Pass Marks: 18

Time: 3 Hours

External: 40

Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Basic Concepts – Data, Information, Records and files. Traditional file Based Approach-Limitations of Traditional File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS.

UNIT – II

Actors on the Scene - Data and Database Administrator, Database Designers, End users Applications Developers and Workers behind the Scene.

Database System Architecture – Three Levels of Architecture, Schemas – External, Conceptual and Internal Level, Database Languages – VDL, DDL, SDL, DML, SQL, Mappings – External/Conceptual and Conceptual/Internal, Instances, Data Independence – Logical and Physical Data Independence

UNIT – III

Data Models: High Level, Low Level and Representational – Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Models

Entity-Relationship Model – Concepts, Entity Types, Entity Sets, Attributes, Relationships, Constraints, Keys, Degree, Cardinality etc.

ER Diagrams of any Database Organization- Inventory System, Payroll System, Reservation System, Online Book Store etc.

UNIT – IV

Classification of Database Management System, Centralized and Client Server architecture
Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys – Primary, Secondary, Composite, Candidate, Alternate and Foreign Key, Domains, Integrity Constraints over Relations.

TEXT BOOKS:

- Elmasri Ramez & Navathe Shamkant B., “Fundamentals of Database Systems”, Addison & Wesley, New Delhi, 2007
- Date C.J., “Database Systems”, Prentice Hall of India, New Delhi, 2004

REFERENCE BOOKS:

- Korth H.F. & Silverschatz A., “Database Concepts”, Tata McGraw Hill, New Delhi, 2010
- Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education

Paper-I: Relational Data Base Management System

Maximum Marks: 50
Minimum Pass Marks: 18
Time: 3 Hours

External: 40
Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Relational Model Concepts, Codd's Rules for Relational Model, Hierarchical Data Model– Introduction, Features, Components, Example, Network Data Model– Introduction, Features, Components, Example, Differences between Hierarchical Data Model and Network Data Model Comparison of Relational Data Model with Hierarchical Data Model and Network Data Model Relational Algebra:-Selection and Projection, Set Operation, Join and Division.

UNIT – II

Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.
Functional Dependencies and Normalization -- Purpose, Data Redundancy, Update Anomalies, Partial/Fully Functional Dependencies, Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

UNIT – III

SQL: Data Definition and data types, Create Table, Insert Data, Viewing Data, Filtering Table Data, Sorting data, Creating Table from a Table, Destroy table, Update, View, Delete, Join, Concatenating data from Table Specifying Constraints in SQL; Primary Key, Foreign Key, Unique Key, Check Constraint, Using Functions

UNIT – IV

PL/SQL-Introduction, Advantages of PL/SQL
The Generic PL/SQL Block: PL/SQL Execution Environment; PL/SQL Character Set and Data Types, Declaration and Assignment of Variables
Control Structure in PL/SQL: Conditional Control, Iterative Control, Sequential Control

TEXT BOOKS:

- Elmasri Ramez & Navathe Shamkant B., “Fundamentals of Database Systems”, Addison & Wesley, New Delhi, 2007
- Bayross Ivan, SQL, PL/SQL, “The Programming Language of Oracle”, BPB Publication, 2002

REFERENCE BOOKS:

- Date C.J., “Database Systems”, Prentice Hall of India, New Delhi, 2004

BM-363
(Semester-VI)

Dynamics

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings.

Section-II

Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.

Section-III

Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.

Section-IV

General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

REFERENCES

- S.L.Loney : An Elementary Treatise on the Dynamics of a Particle and a Rigid Bodies, Cambridge University Press, 1956
- F. Chorlton : Dynamics, CBS Publishers, New Delhi
- A.S. Ramsey:

BM-362
(Semester-VI)
Linear Algebra

External Marks: 40/26

Internal Marks: 10/7

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.

Section-II

Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem,

Section-III

Algebra of Linear Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.

Section-IV

Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt, Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

REFERENCES

- I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
- P.B. Bhattacharya, S.K. Jain and S.R. Nagpal : Basic Abstract Algebra (2nd edition).
- Vivek Sahai and Vikas Bist : Algebra, NKarosa Publishing House.
- I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Norsa Publishing House.

Paper-II: Computer Networks

Maximum Marks: 50
Minimum Pass Marks: 18
Time: 3 Hours

External: 40
Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; TCP/IP Model;

UNIT – II

Analog and Digital Communications Concepts: Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Modems and modulation techniques;

UNIT - III

Data Link Layer Design issues; Error Detection and Correction methods; Sliding Window Protocols: One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth;

UNIT – IV

Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Application Layer: Introduction to DNS, E-Mail and WWW services; Network Security Issues: Security attacks; Encryption methods; Firewalls; Digital Signatures;

TEXT BOOKS:

- Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.
- Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.

REFERENCE BOOKS:

- Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill.
- Bhushan Trivedi, “Computer Networks”, Oxford

BM-361

(Semester-VI)

Real and Complex Analysis

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Jacobians, Beta and Gamma functions, Double and Triple integrals, Dirichlet's integrals, change of order of integration in double integrals.

Section-II

Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Coefficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals.

Section-III

Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations. Harmonic functions.

Section-IV

Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed points, Cross ratio, Inverse Points and critical mappings..

REFERENCES

- . T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
- R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970
- D. Somasundaram and B. Choudhary : A First Course in Mathematical, Analysis, Narosa Publishing House, New Delhi, 1997
- Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi
- R.V. Churchill & J.W. Brown: Complex Variables and Applications, 5th Edition, McGraw-Hill, New York, 1990
- Shanti Narayan : Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.N.
Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975

BM-353
(Semester-V)
NUMERICAL ANALYSIS

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values, Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae. Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula.

Section-II

Central Differences: Gauss forward and Gauss's backward interpolation formulae, Sterling, Bessel Formula. Probability distribution of random variables, Binomial distribution, Poisson's distribution, Normal distribution: Mean, Variance and Fitting.

Section-III

Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II. Eigen Value Problems: Power method, Jacobi's method, Given's method, Householder's method, QR method, Lanczos method.

Section-IV

Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eighth rule, Chebychev formula, Gauss Quadrature formula. Numerical solution of ordinary differential equations: Single step methods Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods. Multiple step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

Part-B (Practical)

Implementation of numerical methods, studied in the theory paper, in 'C' Programming Language.

REFERENCES

- M.K. Jain, S.R.K. Lyengar, R.K. Jain : Numerical Method, Problems and Solutions, New Age International (P) Ltd., 1996
- M.K. Jain, S.R.K. Lyengar, R.K. Jain : Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999
- C.E. Froberg : Introduction to Numerical Analysis (2nd Edition).
- Melvin J. Maaron : Numerical Analysis-A Practical Approach, Macmillan Publishing Co., Inc., New York
- R.Y. Rubnistein : Simulation and the Monte Carlo Methods, John Wiley, 1981
- Computer Oriented Numerical Methods, Practice Hall of India Pvt. Ltd.

BM-352
(Semester-V)
Groups and Rings

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences, Normal subgroups, Quotient groups,

Section-II

Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group.

Section-III

Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principal, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.

Section-IV

Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, Polynomial rings over commutative rings, Unique factorization domain, R unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$

REFERENCES

- I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
- P.B. Bhattacharya, S.K. Jain and S.R. Nagpal : Basic Abstract Algebra (2 nd edition).
- Vivek Sahai and Vikas Bist : Algebra, NKarosa Publishing House.
- I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Norsa Publishing House.

BM-351
(Semester-V)
Real Analysis

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Riemann integral, Integrability of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.

Section-II

Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter.

Section-III

Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle

Section-IV

Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness, connectedness, components, continuity in relation with connectedness.

REFERENCES

- P.K. Jain and Khalil Ahmad: Metric Spaces, 2 nd Ed., Narosa, 2004
- T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
- R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970
- D. Somasundaram and B. Choudhary : A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997
- Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi
- E.T. Copson, Metric Spaces, Cambridge University Press, 1968.
- G.F. Simmons : Introduction to Topology and Modern Analysis, McGraw Hill, 1963.

B.A/B. Sc-III

Paper-III (Practical ST-603)

Time: 3 Hours

Max. Marks: B. Sc: 100

B.A: 60

Practical

Note: Five questions will be set. The candidate will be required to attempt any three.

1. To construct \bar{X} and R-chart, and comment on the state of control of the process.
2. To construct p-chart and d-chart, and comment on the state of control of the process.
3. To obtain control limits for number of defects and comment on the state of control plotting the appropriate chart.
4. To calculate price and quantity index numbers using the formulae given by Laspyre, Paasche, Marshal- Edgeworth and Fisher.
5. To obtain cost of living index numbers for the given data using (i) Aggregate Expenditure Method. (ii) Family Budget Method
6. To test the given data whether the formulae given by Laspyre, Paasche, Marshal- Edgeworth and Fisher, satisfy reversal tests.
7. To work out trends using curve fitting method for given data.
8. To work out trends using moving average method for given data.
9. To obtain seasonal variation indices using simple average method.
10. To obtain seasonal variation indices using ratio to moving average method.
11. To calculate the crude and standardized death rates of the population using Direct Method and Indirect Method regarding one of the populations as standard population.
12. To calculate the following for the given data
CDR, CBR, Sex/Age SDR, GFR, TFR, GRR, NRR.
13. To complete the given incomplete life table by computing various elements of life table.
14. To interpolate the required value for the given data using Newton's Forward/backward interpolation formula for equal intervals.
15. To interpolate the required value for the given data of using Newton's divided difference and Lagrange's interpolation formula.
16. To evaluate the integral of the type $\int_a^b f(x) dx$ using
(i) Trapezoidal rule, (ii) Simpson's one-third rule
(iii) Simpson's three-eight rule
17. Fitting of Paretos curve to income data.
18. Estimation of price- elasticity from time series data.

Distribution of marks:

	B. Sc.	B.A
Class Record:	10	06
Viva Voce:	10	06

Practical:

80

48

B.A/B. Sc-III Semester- VI

Paper-II (ST-602)

Time: 3 Hours

M.M.:B. Sc: 40+10*

B.A: 28+7*

* Internal Assessment

Operations Research

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Objective of O.R., nature and definitions of O.R., Scope of O.R., Meaning and necessity of O.R. models, classification of O.R. models, Advantages & disadvantages of O.R. models. Steps in model formulation, principles of modeling. Characteristics of a good model, Allocation problems.

UNIT-II

Linear programming problem (LPP): Definition, objective function, constraints, graphical solution of L.P.P., limitations of graphical method, Simplex method to solve L.P.P., concept of initial basic feasible solution, computation procedure for Simplex method.

UNIT-III

Artificial variable techniques: Big-M method, Two-phase method. Duality in Linear Programming; Concept of duality, Fundamental properties of duality.

UNIT-IV

Transportation Problem (T.P.): Formulation, Basic feasible solution. Different methods to find initial feasible solution: North-West corner rule, Row minima method, column minima method, Matrix minima method (Least cost entry method), Vogel's Approximation method (or Unit cost penalty method). UV-method (Modi's method) for finding the optimum solution of T.P.

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Operations Research	Hillier F.S. & Lieberman G.J.	Tata McGraw Hill
2.	Linear Programming	Hadley G.	Narosa
3.	Operations Research: An Introduction	Taha H.A.	Macmillan Pub. Co.
4.	Operations Research	Goel B.S. & Mittal S.K.	Pragati Prakashan
5.	Operations Research	Sharma S.D.	KedarNath & Co.
6.	Operations Research	Sharma J.K.	Macmillan Pub.

B.A/ B. Sc-III Semester-V

Paper-I (ST-501)

Time: 3 Hours

M.M.:B. Sc: 40+10*

B.A: 28+7*

* Internal Assessment

Applied Statistics

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Index Number : Definition, problems involved in the construction of index numbers, calculation of index numbers- simple aggregate method, weighted aggregates method, simple average of price relatives, weighted average of price relatives, link relatives, chain indices, value index numbers, price and quantity index numbers.

UNIT-II

Laspeyre's, Paasche's, Marshall- Edgeworth and Fisher's index numbers, time and factor reversal tests of index numbers, consumer price index number and its uses. Base shifting, splicing and deflating of index numbers.

UNIT-III

Time Series Analysis : Definition, components of time series-trend, seasonal variations, cyclic variations, irregular component, illustrations, additive and multiplicative models, determination of trend: graphic method, semi- averages method, method of curve fitting by principle of least squares, moving average method. Analysis of seasonal fluctuations, construction of seasonal indices using method of simple averages, ratio to trend method and ratio to moving average method.

UNIT-IV

Demographic methods : Sources of demographic data- census, register, adhoc survey, hospital records, measurement of mortality, crude death rate, specific death rate, standardized death rates, complete life tables and its main features, assumptions, descriptions and construction of life tables, uses of life tables, stationary and stable population, measurement of fertility- crude birth rate, general fertility rate, specific fertility

rate, total fertility rate, measurement of population growth, gross reproduction rate, net reproduction rate.

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Applied General Statistics	Croxton F.E., Cowden D.J. & Kelin S.	Prentice Hall
2.	Demography	Cox P.R.	Cambridge Uni. Press
3.	Technical Demography	Ramakumar R.	New Age International
4.	Fundamentals of Applied Statistics	Gupta S.C. & Kapoor V.K.	Sultan Chand & Sons

B.A/ B. Sc-III Semester-V

Paper-II (ST-502)

Time: 3 Hours

M.M.:B. Sc: 40+10*

B.A: 28+7*

* Internal Assessment

Numerical Methods and Fundamentals of Computers

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Numerical Methods: Concept of interpolation and extrapolation, difference tables, methods of interpolation, Newton's formula for forward and backward interpolation with equal intervals, Lagrange's method of interpolation, Divided differences.

UNIT-II

Numerical integration, General quadrature formula for equidistant ordinates, Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ formulae.

UNIT-III

Basics of Computer: Introduction, origin, development, uses and limitation of computers. Types of computers, computer structure, input-unit, CPU, output unit, secondary storage, High Level and low level languages, compiler and interpreter.

Computer Arithmetic : Floating point representation of numbers, arithmetic operations with normalized floating point numbers. Number systems- Binary, decimal, octal and hexadecimal number systems and their conversions into each other. Binary arithmetic's, (Addition, subtraction, multiplication & division).

UNIT-IV

Flow charts and Algorithms: Concepts of flow chart, algorithm and programming. Flow charts and algorithms for the following: Mean, Standard Deviation, Coefficient of Correlation, Straight line fitting. Trapezoidal rule, Simpson's $1/3$ and $3/8^{\text{th}}$ rules.

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Computer Fundamentals	Sinha P.K.	BPB Publication
2.	Introductory Methods of Numerical Analysis	Sastry S.S.	Prentice Hall
3.	Computer Based Numerical Algorithms	Krishnamurthy E.V. & Sen S.K.	Affiliated East West Press
4.	Computer Oriented Numerical Methods	Rajaraman V.	Prentice Hall

B.A/B. Sc-III Semester- VI

Paper-I (ST-601)

Time: 3 Hours

M.M.:B.Sc: 40+10*

B.A: 28+7*

* Internal Assessment

Statistical Quality Control

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Statistical Quality Control : Meaning and uses of SQC, causes of variations in quality, product and process control, control charts, 3- σ control limits, control chart for variables- \bar{X} and R chart, criteria for detection of lack of control in \bar{X} & R Charts, Interpretation of \bar{X} & R charts.

UNIT-II

Control chart for standard deviation (σ chart), control charts for attributes: 'p' chart and 'c' chart, Concept of 6- σ limits.

UNIT-III

Acceptance sampling : Problem of lot acceptance, stipulation of good and bad lots, producer's and consumers risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN function.

UNIT-IV

Demand Analysis : Laws of demand and supply, price elasticity of demand, demand function with constant price elasticity, partial and cross elasticities of demand, types of data required for estimating elasticities: family budget data, time series data- Leontief's and Pigous's methods to estimate demand functions. Engel's law of income and expenditure, Pareto's Law of income distribution, curves of concentration, Lorenz curve and Gini's coefficient.

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Statistical Quality Control	Grant E.L.	McGraw Hill
2.	Statistical Methods in Quality Control	Cowden D.J.	Asia Pub. Society
3.	Statistical Theory and Methodology in Science & Engineering	Brownlee K.A.	John Wiley & Sons
4.	Engineering Statistics	Bowker H.A. & Liberman G.T.	Prentice Hall
5.	Fundamentals of Applied Statistics	Gupta S.C. & Kapoor V.K.	Sultan Chand & Sons
6.	Fundamentals of Statistics, Vol. II	Goon A.M., Gupta & M.K. Dasgupta B.	World Press Calcutta