

DEPARTMENT OF MATHEMATICS, RANCHI UNIVERSITY, RANCHI,

SYLLABUS FOR M.C.A. 1ST SEMESTER (2010-13)

Paper: IT 11. INFORMATION TECHNOLOGY

Full Marks: 75

Pass Marks: 30

Time: 3Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Syllabus: -

Information concept and processing Evolution of information processing, data information language and communication. **[No. of question =2]**

Elements of a computer processing system: Hardware-CPU, storage device and media. VDU. Input – output device. Data communication equipment Software – system Software. Application software. **[No. of question =2]**

Programming Languages: Classification, machine code, assembly language, higher-level languages. Fourth generation languages.

[No. of question =1]

Operating Systems: Concept as resource manager and coordinator of processor, devices and memory. Concept of priorities, protection and parallelism. Command interpreter, typical commands of DOS/UNIX/NETWORK, Gul – Windows.

[No. of questions =3]

Computer and Communication: single user, multi – user, work – station, client server system, Computer networks, network protocols, LAN, WAN, Internant facilities through WWW, Mosaic, Gopher, HTML, elements of JAVA.

[No. of questions =3]

Information integrity definition ensuring integrity Computer security: Perverse software, concept and components of security, Preventive measures and treatment. Range of application: Scientific, business, educational, industrial, national level weather forecasting, and remote sensing, planning, multilingual applications.

[No. of question =1]

Reference: - “Fundamental of Computer”; V. Rajaraman
“Information Technology”; A.Jaiswal.

Paper: IT 12. COMPUTER ORGANIZATION AND ARCHITECTURE

Full Marks: 75

Pass Marks: 30

Time: 3Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Syllabus: -

Principles of Computer design – Software, Hardware interaction layers in computer architecture, Central processing unit, Machine language instructions, Addressing modes, Instruction selection, Instruction cycle and execution cycle.

[No. of questions =3]

Control unit, data path and control path design, and Micro programming Vs hardwired control, RISC Vs CISC, Pipelining in CPU design, Superscalar processors.

[No. of questions =3]

Memory system, storage technologies. Memory array organization, Memory hierarchy, interleaving, cache and virtual memories and architectural aids to implement these Input – output devices and characteristics.

[No. of questions =3]

Input – output processing, Bus interface, data interface, data transfer techniques, I/O interrupts, channels, performance evaluation – SPEC marks, Transaction Processing benchmarks.

[No. of questions =3]

Reference: - “Computer System and Architecture”, Morris Mano, PHI.
“Computer Organization”, V.C. Hamchar, TMH

Paper: IT 13. PROGRAMMING AND DATA STRUCTURES

Full Marks: 75

Pass Marks: 30

Time: 3Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Syllabus: -

Introduction to algorithm, Flow charts, Tracing Flow Charts, Problem-solving methods, need for computer languages, Reading programs written in C languages. C character set, Identifiers and keywords, Data types, Declarations, Expressions, Statements and symbolic constants. Input-output: get char, put char scanf, printf, gets, puts functions Preprocessor command, # include, define, ifdef, Preparing and running a complete C Program. **[No. Of question =1]**

Operators and expressions: Arithmetic unary, logical, bit-wise, assignment and conditional operators. Library functions. Control statements: while, do –while, for, statements, nested loops, if else, switch, break, continue and goto statements, comma operator. **[No. Of questions =2]**

Functions: Defining and accessing: passing arguments, Function prototypes, Recursion. Use of library functions, Storage classes: automatic, external and static variables, Arrays: Defining and processing, Passing to a function, Multi dimensional arrays. **[No. Of questions =2]**

Strings operations on strings. **[No. Of question =1]**

Pointers: declarations. Passing to a function. Operators on pointers. Pointers and arrays. Arrays of pointers. Structures: Defining and processing. Passing to a function. Unions. Data files: Open, close, creates, process. Unformatted data files. **[No. Of questions =3]**

Data structures: Stacks, queues, lists, tree and their application. **[No. Of questions =3]**

Reference: -“Programming in ‘C’; E. Balagurusamy; TMH
“Data Structure Using ‘C’”; G. S. Baluga

Paper: **BM 11. INTRODUCTION TO MANAGEMENT FUNCTIONS.**

Full Marks: 75

Pass Marks: 30

Time: 3Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Syllabus: -

HRD: Selection, appraisal, training and information systems

[No. of question=1]

Marketing: Understand the concept of marketing mix. These marketing mix elements consist of production policy and design, pricing, choice of marketing intermediaters, methods of physical distribution, use of personal selling, advertising and sales promotion, Marketing research, and marketing organization.

[No. of questions =3]

Finance: Finance function (concept, scope, and its relationship with other functions); tools of financial analysis (funds and cash flow analysis, ration analysis risk-return trade - of): financial forecasting (Performa income statement and balance sheet, management of capital (operating cycle concept, inventory, accounts receivables, cash and accounts payables, working capital requirements).

[No. of questions =3]

Manufacturing: Operations Planning and Control (aggregate planning, product batch, production cycles, short term scheduling of job shop, setting production rate in continuous production systems, activity scheduling in project, introduction to project time calculations (through PERT / CPM): Management of supply chain, material management (introduction to material management systems, and procedures for inventory management planning, and procurement of materials): quality management (quality concept and planning, standardization, quality circles).

[No. of questions =3]

Strategy: Firm and its Environments: strategies and resources: industry structure and analysis evaluation of corporate strategy: strategies for growth and diversification: process of strategic of strategic planning.

[No. of questions =2]

Reference: - “Organization and Management”; R. D. Agarwal, TMH
“Essential of Management”; Massie, PHI

Paper: MT 11. MATHEMATICAL FOUNDATIONS

Full Marks: 75

Pass Marks: 30

Time: 3Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Syllabus: -

Mathematical logic: Notation, Connectives, Normal forms. Theory of inference for statement calculus. Predicate calculus, Inference theory of the predicate calculus.

[No. of questions =3]

Relations and ordering, Functions, Recursion, and Algebraic Structures: Groups. Application of residue arithmetic to computers, Group codes.

[No. of questions =3]

Graph theory: Definition, Path, reachability, connectedness, Matrix representation of graphs, Trees.

[No. of questions =3]

Storage representation and manipulation of graphs: Trees, List structures and graphs, Pert and related techniques.

[No. of questions =3]

Reference: - “Discrete Mathematical Structures with Application to Computer Science”, J. P. Trembly & R. Manohar
“Mathematical Structures”; Kolman & Busy.

DEPARTMENT OF MATHEMATICS, RANCHI UNIVERSITY, RANCHI

SYLLABUS FOR M.C.A 3rd SEMESTER (2009-12)

PAPER : IT31: DATA BASE MANAGEMENT SYSTEM

FULL MARKS: 75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Basic Concepts: database & database users, Characteristics of the Data base, Database System, Concepts & Architecture, Data Models, Schemas & Instances DBMS architecture & data Independence, Data base language & interfaces data modeling using the Entity – Relationship Approach, Relational model language & systems, Relational Data Model & relational algebra, Relational Model concept, Relational algebra. **[No. of questions = 3].**

SQL – A Relational Database language Data Definition in SQL, View & Queries in SQL, specifying Constraints & Indexes in SQL, A Relational Database management System.

[No. of questions = 2].

ORACLE / INGENERS

Conventional data Modal & System, Network data model & IDMS System, Membership types & options in a set, DML for the network model, Navigation within a network database, hierarchical Data Model & IMS system, Hierarchical Database DML for Hierarchical Modal, Overview of IMS. **[No. of question = 1].**

Relational Database Design: Function Dependencies & Normalization for relational Databases, Functional Dependencies, Normal forms based on Primary keys (1NF, 2NF,3NF & BCNF), Losses join & dependency preserving decomposition. **[No. of questions= 3].**

Concurrency Control Technique, Locking Techniques, Times stamp ordering, Granularity of database, Recovery Techniques, Recovery concepts Data base backup and recovery for catastrophic failures. **[No. of questions = 2].**

Concepts of Object oriented database management system. **[No. of question = 1].**

References:

- 1) “An Introduction to Database Systems”, C.J. Date
- 2) “An Introduction to Database Concepts”, B.Desai.

PAPER: IT32 Computer Communication Network

FULL MARKS: 75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Advantage of network, structure of the communications network point – to – point and multidrop circuits, data flow and physical circuits, network topologies and design goals, hierarchical topology, horizontal topology (BUS), star topology, ring topology, mesh topology. The telephone network switched and non-switched options. Fundamentals of communication theory, channel speed and bit the frequency spectrum connecting the analog and digital worlds, digital signals, the modem, asynchronous and synchronous transmission. **[No. of questions = 3].**

Wide area and local networks, connection oriented and connectionless network, classification of communication protocols, time division multiple access (TDMA), time division multiplexing (TDM). **[No. of question = 1].**

Carrier sense (collision 0 system token passing, peer – to – peer priority systems, priority slot carrier sense (collision free) system, token passing (priority) system. **[No. of question = 1].**

Aired Protocols and the OSI model Goal of Layered Protocols, network design problems, communication between layers introduction to standards organization and the OSI model, standards organization, Layers of OSI SI status. **[No. of question = 1].**

Polling / Selection Networks Way LANs? Primary attributes of the LAN. Broadband and base LANS, IEELAN tankards relationship of the 802 standards of the ISO / CCITT model, connection options with LANs LC and MAC topology and protocols, CSMA / CD and IEEE802.3 token ring (priority), token bus and IEEE802.4, metropolitan area network (MANs). ANSI fiber distributed data interface. **[No. of question = 1].**

Witching and Routing in Networks. Message switching, Packet switching when and not to use packet switching, Packet routing, Packet switching support to circuit switching network. **[No. of question = 1].**

The X 25 Network and Supporting Protocols. Features of X.25, Layers of X.25 and the Physical Layer, X.25 and the data link layer, companion standards to x.25, features of x.25 channel options, flow control principles, other packet types .25

Logical channel states, packet formats, internetworking, connectionless mode networks the frame lay and X.25 stacks. **[No. of questions = 2].**

TCP /IP

TCP / IP and internetworking example of TCP / IP operation, related protocols ports and sockets the IP address structure, major features of IP data gram, Major IP source routing value the transport layer. TCP. Major features of TCP, passive operation, the transmission control block (TCB), rout discovery protocols, examples of the rout discovery protocols, application protocols. **[No. of question = 1].**

Personal Computer Network Personal compute communication characteristics, error handling, using the personal computer a server linking the personal computer to mainframe computers, file transfer on personal computers, personal computer and local area network, network operating system (NOSs) common IBM PC LAN Protocol stacks. **[No. of question = 1].**

References:-

- 1). “Data Communication and Networking”, B.A Foroutam. Tata Megrwa Hill.
- 2). “ Computer Networks – Protocols, Standards and Interfaces”, U.Black. Prentice Hall of India.
- 3). “Computer Communication Networks”, W. Stallings.

PAPER: IT33 Object Oriented Analysis and Design

FULL MARKS: 75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Objective modeling: Objects and classes; Links and associations, Generalization and inheritance Grouping constructs Aggregation, Generalization as extension and restriction. Multiple inheritance Meta data, candidate keys, Dynamic modeling. Events and status Nesting Concurrency, Functional Modeling, Data flow diagrams specifying operations.

[No. of questions = 4].

Analysis: Object modeling, Dynamic modeling; functional modeling, adding operations, Iteration

[No. of question = 1].

System design: - Subsystem, Occurrence, Allocation to Processors and tasks. Management of data stores, Control implementation. Boundary condition. Architectural frameworks. Object design. Optimization, Implementation of control Adjustment of Inheritance. Design of association. Documentation. Comparison of methodologies.

[No. of questions = 2].

Implementation: using a Programming Language(C++). A data base system. Programming styles reusability, extensibility, robustness programming.

[No. of questions = 5].

References:

- 1). " Object Oriented Analysis and Design", G.Booch
- 2). " Object Oriented Modelling and Design", J. Rumbaugh

PAPER: BM31 MANAGEMENT SUPPORT SYSTEMS

FULL MARKS: 75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Introduction to the concept of Decision Support System: Components of DSS; Dialogue Management; Data Management and Model Management of DSS. **[No. of questions = 3].**

Examples of different types of DSS; System Analysis and Design for DSS; Models in the context of DSS; Algorithms and heuristics DSS Application in different function. **[No. of questions = 3].**

Design of interface in DSS; An overview of DSS Application in different function; Design of interface in DSS; An overview of DSS generations Group Design in Support system (GDSS) and Decision Conferencing. **[No. of questions = 3].**

Introduction of Expert System, Expert System in Management; Case Study on Expert System, Introduction to GIS; Executive Information system (EIS). **[No. of questions = 3].**

References:

- 1). "Computers and Information Management", S.C. Bhatanagar, K.V. Ramani
- 2). "Information System concepts for Management in Practice", H.C.lucas.

PAPER: MT31 STATISTICAL COMPUTING

FULL MARKS: 75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Basic Statistics: Measures of central tendencies; Measures of dispersion, frequency distributions moments. Correlation coefficient, Regression. **[No. of questions = 3].**

Sampling; Theory of sampling. Population and sample survey methods and estimation statistical inference. Testing of hypothesis and inference. **[No. of questions = 3].**

Computing frequency charts. Regression analysis. **[No. of questions = 3].**

Statistical Quality control methods; Factor analysis; Tests of significance X test and F test Application. **[No. of questions = 3].**

Reference:

- 1). Affi, A.A., “ Statistical Analysis: A Computer Oriented Approach”, Academic Prss, New York.
- 2). Hogg, R.V. Et. At., “ Introduction to Mathematical Statistics”, American Publishing. New York.

DEPARTMENT OF MATHEMATICS, RANCHI UNIVERSITY, RANCHI

SYLLABUS FOR M.C.A 5TH SEMESTER (2008-11)

VTH SEMESTER

Paper IT 51 Artificial Intelligence and Applications

FULL MARKS: 75
PASS MARKS: 30
TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Scope of AI, Games, theorem proving, natural language processing, vision and speech processing robotics expert system, AI technique-search knowledge abstraction. Problem solving.

[No. of questions = 2]

State space search – Production system. Search space control; Depth first, breadth first search, heuristic search; Hill climbing, best first search, branch and bound, Minimal search: Alpha Beta cut off. Knowledge Representation.

[No. of questions = 4]

Predicate logic: Solemnizing queries, Unification, Modus ponens, Resolution dependency. Directed backtracking.

[No. of question = 1]

Ruled based system: Forward reasoning: Conflict resolution; backward reasoning: use of no backtrack.

[No. of question = 1]

Structured Knowledge, Representations: Semantic Net: Slots exceptions and defaults frames, Handling uncertainty, Probabilistic reasoning, Use of certainty factors, Fuzzy logic. Learning.

[No. of question = 1]

Concept of learning, learning automation, genetic algorithm, learning by induction, neural nets back propagation.

[No. of question = 1]

Expert System Need and justification for expert system, knowledge acquisition, Case studies MYCIN, RI.

[No. of questions = 2]

References: -

- 1). Sasi Kumar, M., Ramani, S., “Rule Based Expert System “ Narosa Publishing House.
- 2). Retch, E., and Knight, K.,”Artificial Intelligence “ Tata McGraw Hill.
- 3). Patterson, D.W.”Introduction to AI and Expert System”, Prentice Hall India, New Delhi.
- 4). Schalkoff, R.J. “Artificial Intelligence – An Engineering Approach “. McGraw hill International Edition. Singapore, 1992.

12 Questions will be set and students will be required to answer any six (6) of them.

Coding: Style of programming. Efficiency. Peer review of code. Structured Programming. Code review.
[No. of questions = 2].

Software Quality Assurance: Quality Plan. Quality Metric, V&V. **[No. of questions = 2].**

Testing Software Testing. Purpose of testing. Two essential of testing Test case and the expected output. How do we know we have tested enough. Test coverage. Levels of Testing. Unit testing Domain and Path testing. Equivalence class based portion testing 100% testing of simple program (6 variables and 100 paths). Component Testing. Integrated aggregate of few units. Integration Testing. Aggregation components. Mismatch in assumption between components.
[No. of questions = 4].

System Testing. Black Box Testing. Requirements based testing. Acceptance based testing.
[No. of question = 1].

Test Planning. Test Strategy. Test Coverage Planned. Test case generation. Test and output expected. Test reporting. Bug fixing. Regression and stress are testing. Testing for performance, Security. Installation recovery, configuration sensitivity. Testing Software tools: Capture/replay. Test coverage. Test generation. Test case and report data base. Test automation. Regression testing. Object orientation and testing SW tools, Change Management. Software Maintenance: Maintainability, Documentation to facilitate maintenance, Regression Testing, Reverse Engineering, Legacy systems, Y2K Problem.

[No. of questions = 3].

References:

- 1). Whitten, Bentley and Barlow. "System Analysis and Design Methods". Second Edition.
- 2). Galgotia Publication. Pressman R.s. "Software engineering – a Practitioner's Approach". Narosa.
- 3). Jalote P., "An Integrated Approach to Software Engineering". Narosa. 1991.

14 Questions will be set and students will be required to answer any six (6) of them.

Linear Programming: Graphical method for two-dimensional problems – central problem of linear programming various definitions – statements of basic theorems and properties – Phase I and Phase II of the simplex method. [No. of question = 1].

Revised simplex method. [No. of question = 1].

Primal and dual simplex method. [No. of question = 1].

Sensitivity analysis. [No. of question = 1].

Transportation problem and its solution. [No. of question = 1].

Assignment problem and its solution by Hungarian method. [No. of question = 1].

Integer Programming:- Gomory cutting plane methods – Branch and Bound method.

[No. of questions = 2].

Queuing Theory

Characteristics of queueing systems – steady state M/M/1, M/M/1/K and M/M/C queueing models. [No. of question = 1].

Replacement Theory:- Replacement of items that deteriorate – Replacement of items that fail group replacement and individual replacement. [No. of question = 1].

Inventory Theory:- Cost involved in inventory problems – single item deterministic model – economic lot size models without shortage and with shortage having production rate infinite and finite. [No. of questions = 2].

PERT and CPM:- Arrow network – time estimates – earliest expected time, latest allowable occurrence time and slack – critical path – probability of meeting scheduled date of completion of project – calculations on CPM network – various floats for activities – critical path – updating project – operation time cost trade off curve – project time cost trade off curve – selection of schedule based on cost analysis. [No. of questions = 2].

References :

- 1). Gillet, B.E. “Introduction to Operation Research: A Computer Oriented Algorithm Approach”. Tata Mcgraw Hill. Kambo,
- 2). N.S., “Mathematical Programming Techniques”, Mcgraw Hill. New York. Taha H.A., Operation research – An introduction”. McMillan publication co. New York. 1986.
- 3). Kanti Swarup. Gupta, P.K., and Man Mohan, “Operation Research”. Sultan Chand and Sons, New Delhi, 1990.

Paper BM 51: Managerial Economics

FULL MARKS:75

PASS MARKS: 30

TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Nature and scope of managerial economics. Objectives of the firm. Managerial and behavioral theories of the firm.

[No. of questions = 2]

Concepts of opportunity cost, incremental, time perspective. Principles of discounting and equimargins. Demand analysis – purposes and concepts. Elasticity of demand. Methods of demand forecasting.

[No. of questions = 3]

Product and cost analysis: short run and long run average cost curves.

[No. of questions = 2]

Law of supply. Economics and diseconomics of scale. Law of variable proportions.

[No. of question = 1]

Production function – single output isoquants.

[No. of question = 1]

Pricing prescriptive approach. Price determination under perfect competition monopoly, oligopoly and monopolistic competition. Full cost pricing, product line, pricing strategies.

[No. of questions = 2]

Profits : nature and measurement policy. Break-even analysis. Case study.

[No. of question = 1]

References :-

1)Dean, J., “Management Economics”. Prentice Hall India, New Delhi.

Paper IT 53E: Distributed Database Management

FULL MARKS:75
PASS MARKS: 30
TIME: 3 Hrs.

12 Questions will be set and students will be required to answer any six (6) of them.

Distributed DBMS features and needs. Reference architecture. Levels of distribution transparency, replication. Distributed database design – fragmentation, allocation criteria. Storage mechanisms. Translation of global queries / global queries optimization. Query execution and access plan. **[No. of questions = 3].**

Concurrency control:- 2 phase locks. Distributed deadlocks. Time based and quorum based protocols. Comparison. Reliability – non-blocking commitment protocols. Partitioned network. Check points and cold starts. **[No. of questions = 3].**

Managerial of distributed transactions-2 phase unit protocols. Architecture aspects. Node and link failure recoveries. Distributed data dictionary management. Distributed database administration. **[No. of questions = 3].**

Heterogeneous database- federated database, reference architecture, loosely and tightly coupled. Development task. Operation- global task management. Client server database – SQL server, open database connectivity. Constructing an application. **[No. of questions = 3].**

Reference: Ceri, S., Pelagant, G. “ Distributed Database: Principles and Systems”, Mcgraw Hill.

IT 51 L. AI and applications laboratory

The laboratory should use language such as PROLOG and LISP to solve the ... it is also suggested that an expert system shell such as IITM rule be used to ... system for, say, trouble shooting moped, VCR etc. some suggested experiments..... stable marriage problem, game playing (such as bridge), coin change problem etc.

MT 52L. Optimization Techniques laboratory

To develop computer programs for the following and to test with suitable.....

1. General method to solve two dimensional linear programming problem.
2. Revised simplex method to solve n-dimensional linear programming problem.
3. Dual simplex method to solve n-dimensional linear programming problem.
4. Solution of transportation problem
5. Gomory cutting planer methods for integer programming problems
6. Branch and bound method to solve integer programming problems.
7. M/M/I/N and M/M/C queing problems.
8. Single item deterministic inventory model problems with/without shortage.... Production rate.
9. To draw the PERT? CPM networks.
10. Calculations of PERT analysis.
11. Calculation of CPM analysis.