

MAGADH UNIVERSITY

BODH GAYA



SYLLABUS OF PRE- Ph. D. REGISTRATION ENTRANCE TEST

2014 onwards

FACULTY OF COMMERCE

MRRDM, MBA & MCA

Price Rs. 100/-

**COMPUTER SCIENCES
INFORMATION TECHNOLOGY**

Instruction: There shall be two papers each of 100 marks. Paper-I will contain 40 questions of objective type each of 2½ marks. Paper-II will be of subjective type containing twenty questions out of which candidates will have to answer any ten questions.

IT & MCA

The syllabus for both the papers will be the same which is as follows:

- (a) Hardware: CPU, Storage Devices and Media, VDU, I/O Devices, Printers, Multimedia System, Data Communication Equipment.
- (b) Software: System Software, Applications Software.
- (c) Programming Languages: Classification: Machine Code, Assembly Language, Higher-level Languages, and Fourth Generation Languages.
- (d) Data Representation: System ASCII, BCD, EBCDIC, and ASCII, Number System: Binary, Decimal, Octal, Hexadecimal.

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INFORMATION TECHNOLOGY**

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Information Technology

Information Concepts and Processing : Evolution of Information, Processing, Data Information Language and Communication, Data Processing Systems, Elements of Computer processing System :

- (a) **Hardware :** CPU, Storage Devices and Media, VDU, I/O Devices, Printers, Multimedia Systems, Data Communication Equipment.
- (b) **Software :** System Software, Application Software:
- (c) **Programming Languages :** Classification of Machine Code, Assembly Language, Higher-level Languages, and Fourth Generation Languages
- (d) **Data Representation System** ASCII, BCD, EBCDIC, and ASCII, Number System : Binary, Decimal, Octal, Hexadecimal.

Operating Systems : Concepts as Resource Manager and Co-coordinator of Processor, Devices and Memory, Concept of Priorities, Protection and Parallelism, Command Interpreter, Typical Commands of DOS, Graphical User Interface- Windows.

Computers and Communications : Single user, Multi-user, Work station, Client-Server Systems, Computer Networks, Network Protocols, LAN, WAN, Internet Facilities through WWW Mosaic, Gopher, E-mail, File Transfer, Voice Video Conferencing.

Range of Application : Scientific, Business, Educational, Industrial, National Level Weather Forecasting, Remote Sensing, Planning and Multilingual Applications.

Programming and Data Structures with 'C'.

Introduction to Algorithms, Flow Charts, Tracking Flow Charts, Decision Tables, Decision Trees, Pseudo Codes, Problem Solving Methods, Need for Computer Languages, Reading Programs written in 'C' Language, C character set, Identifiers, Keywords, Data Types Declarations, Expressions, Statements and Symbolic Constants, Input-Output Commands, Preprocessor Commands # include, # define, # ifdef.

Preparing and Running a Complete C Program.

Operators and Expressions : Arithmetic, Unary, Logical, Bit-Wise assignment and conditional operators, Library Functions Control Statements: while-do, for statements, nested loops, if-else, switch, break, continue and goto statements, comma operator.

String : Operations on Strings

Pointers : Declarations, Passing to a function
Operations on Pointer, Pointers and Array
Arrays of Pointers.

Structures : Defining and Processing, Passing
to a function, Unions

Data Files : Open, Close, Creat; .Process,
Unformatted data files

Data structures: Stacks, Queues. Lists Tree
and their Applications.

Operating System.

Operating System Functions: Types of O.S

O.S. concepts-Processes, Files, System calls, Shell O
structure- Introduction to Processes- Interproces
Communication- classical IPC problems Scheduling.

Memory Management : Memory Managemen
without swapping or paging- Swapping- Virtual Memori
Page replacement algorithms- Modeling pagin
algorithms- Design issues for paging system
Segmentation.

File Systems : Files & Directories - Files System
implementation-physical characteristics- Disk schedulin
algorithms- deadlocks- Deadlock detection& recover
Deadlock avoidance- deadlock prevention- other issue

DATABASE MANAGEMENT SYSTEMS

Introduction to Database concepts - Definition of Schema and Subschema - DDL, DML, DCL Data abstraction - Overall system structure.

Data Models

Network Data Model Hierarchical Data Model Relational Model - Entities and Relationships - ER Diagram Mapping constraints - Key constraints - Generalization Specialization and Aggregation - Reducing ER Diagram Tables.

Relational Algebra and Calculus

Formal Query Languages - Relational Algebra and Relational Calculus - Commercial Query Languages - SQL, QBE.

Database Design

Pitfalls in Relational database Design-Normalization using Functional dependencies - Boyce Codd Normal Form - Fourth Normal Form - Normalization using Join Dependencies - Domain Key Normal Form - Query Processing - Cost of Query Processing.

Security and Integrity in Database

Database Administration - Performance issues - Concurrency Control - Security and Integrity -

Distributed databases - Object Oriented Databases - Deductive Databases.

OBJECT ORIENTED PROGRAMMING WITH C++

Introduction : Object. Oriented theme, Usefulness of Object Oriented Development Object modeling technique. Object and Classes, Link and Associations, Coupling Constructs. Advance Object Modeling. Aggregation, Abstract Class, Multiple 'Inheritance, Meta Dafa, Candidate Key Constraints, Nested State Diagram.

Advanced dynamic modeling; Concepts.

Functional Modeling : Functional Model, Data Flow Diagram, Relation of Functional to Object and dynamic model.

Dynamic Model : Events and States, Operations, Nested State Diagram, Concurrency, Advance Dynamic Modelling, Concept, Sample Dynamic Model, Relation of Object and dynamic Model.

System Design : Overview, Breaking a system into subsystem, identifying concurrency allocation, Subsystems to processors and tasks, management of data stores, handling global data \resource, choosing software control implementation handling boundary conditions, setting trade off priorities, command architectural framework, architecture of ATM systems.

Object Design : Overview, Combining of Object Models, Design Optimization, Implementation of Control, Design of Association, Object Representation, Physical Packing, Implementation using C ++.

COMPUTER NETWORKS

Introduction to Computer Networks : Uses of Computer Networks, Network Hardware and Software, OSI & TCP/IP reference models-comparison of the OS & TCP models - Physical Layer - transmission Media, Wireless Transmission, Multiplexing and Switching Methods.

Data Link Layer & Medium Access Sub layer:
Data Link Layer - Design Issues - Error Detection and Correction - Elementary Data Link Protocols, Sliding Window Protocols. Medium Access Layer - Channel Allocation, Multiple Access protocols.

Network Layer: Network Layer Design Issues - Routing, Routing Algorithms - Congestion Control Algorithms, Internetworking Network Layer in the Internet and ATM networks.

Transport : Transport layer - Transport Service - Elements of Transport Protocols - Internet Transport protocols, ATM AAL layer protocols.

Application Layer : Application Layer: Network Security - Domain Name System - Single Network Management Protocol - Electronic Mail , Multimedia.

JAVA

Introduction - Features of Java - Structure - Elements of Java - Tokens - Data Types - Expressions - Statements - Array, String, String Buffer, Vectors - Methods - Object Oriented Features- Classes, Objects - Constructors.

Inheritance - Packages - Interface - Abstract class - Special types of classes - Multi Threaded Programming - Exception Handling - Utilities and Collections - I/O Streams - Applet Programming.

AWT - Graphics - Event Handling - Swings - Networking - Examples in Servlets and RMI - Database Handling.

Discrete Mathematics

Mathematical logic : Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, Predicate Calculus, Inference theory of the Predicate Calculus. V

Set-Theory : Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and ordering, Functions, Natural Numbers, Recursion.

Algebraic Structures Algebraic Systems, Semi groups and Monoids, Grammars and Languages, Polish Expressions and Their Compilation, Groups.

Lattices and Boolean Algebra : lattices as Partially Ordered Sets, Boolean Algebra, Boolean Functions, Representation and Minimization of Boolean Functions, Finite-state machines.

Graph-Theory : Basic Concepts of graph theory, Storage representation, and Manipulation of Graphs - Trees, List and Graph. Simple precedence grammars.

Internet and Web Designing

Internet Applications : Introduction to Internet, World Wide Web, Gopher, News Groups, Electronic Mail, Messaging, Internet Telephony. USENET system and its terminology. History of the Web, Growth of the web in past decade, protocols governing the web, web applications, Downloading information from Internet using FTP, FTP protocol, FTP command on different operating system. TCP/IP Protocol, HTTP, NNTP, SMTP, IMAP, POP, Telnet. Security aspects of the web.

Working with web browser - Internet Explorer / Netscape Navigator. Setting up Internet connection using dial-up or leased line. Browsing the internet. Web based E-mail service provider, Mail reader - Outlook / Communicator. Instant Messaging using MSN Messenger! Yahoo Messenger. MIRC, Public Chat rooms participation using Ms-Chat, Web Folder. Setting up Proxy.

Web Page Designer - Front Page, Visual Interdev, HTML language, HTML Tags, designing web pages using HTML! DHTML. Scripting Languages - VBScript / Jscript. Using Cookies on web page, Designing Forms on web page. Using Free web site hosting provided by companies like yahoo, angelfire etc

on Internet for setting up a web site. Placing images, animations and sound on web page. Using hit counter on a web page.

Setting up a local web server using uS or PWS on windows machine, Using UNIX system to host a website. Designing pages using ASP or CGI/PERL. Interfacing with Database, Web pages providing Interface for storing information into database, perform query in database, showing reports using database on a web page.

Operation Research :

Project Scheduling by PERT, CPM : Diagram, representation, critical path calculation, construction of time chart and resource labeling, probability and cost consideration in project scheduling, project control.

Linear Programming : Formulation of Linear Programming method, Simplex Method, Duality in Linear programming, transportation problems, Assignment problems.

