

MCA-221: COMPUTER NETWORKS

Maximum Marks: 50
Maximum Pass Marks: 40%

Maximum Time: 3 hrs.
Lectures to be delivered: 45-55

(A) INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

(B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt one question each from sections A, B, C, D of the question paper and the entire section E.
2. Use of non programmable scientific calculator is allowed.

SECTION-A

Computer Networks: Uses Of Computer Networks, Network Software, References Models, Network Standardization, The Medium Access Sublayer: The Channel Allocation Problem, Multiple Access Protocols, (The Ethernet MAC Sublayer Protocol, The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2 : Logical Link Control, Retrospective on Ethernet)

SECTION-B

Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, Data Link Layer Switching, Network Layer Design Issues, Routing Algorithm, Congestion Control Algorithms, Quality Of Service (Requirements, Techniques for Achieving Good Quality of Service), Internetworking, The Network Layer in The Internet (The IP Protocol, IP Addresses, Internet Control Protocols).

SECTION-C

The Transport Service (Services Provided To The Upper Layers And Transport Service Primitives), Elements Of Transport Protocols, The Internet Transport Protocols : UDP (Introduction to UDP, Remote Procedure Call), TCP (Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy and TCP Congestion Control).

SECTION-D

The Application Layer : DNS—The DNS Name Space, Electronic Mail, The World Wide Web (Architectural Overview, The Hyper Text Transfer Protocol and The Wireless Web), Multimedia (Introduction to Audio, Video Over IP, Introduction to Voice, Video on Demand), Introduction to Cryptography, Substitution Ciphers, Transposition Ciphers, One- Time Pads, Two Fundamental Cryptographic Principles, Public-Key Algorithms (RSA, Other Public- Key Algorithms), Digital Signatures, Message Digests and The Birthday Attack), Management Of Public Keys (Certificates), Communication Security, Authentication Using Public-Key Cryptography.

TEXT BOOKS

1. Computer Networks, Tanenbaum, PHI.
2. Data Communications & Networking by Forouzan, Tata McGraw Hills.

MCA-222: OPERATING SYSTEM

Maximum Marks: 50
Maximum Pass Marks: 40%

Maximum Time: 3 hrs.
Lectures to be delivered: 45-55

(A) INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

(B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt one question each from sections A, B, C, D of the question paper and the entire section E.
2. Use of non programmable scientific calculator is allowed.

SECTION-A

Operating System as Resource Manager, Types Of Operating System-Batch Processing, Multiprogramming, Multitasking, Time Sharing, Parallel, Distributed and PC Operating System. Operating System Structure, System Services, System Calls, System Design and Implementation Process Management, Process Scheduling, Operation on Process, Co-operating Process, Inter Process Communication. CPU Scheduling Algorithms, Multiple Processor Scheduling, and Algorithm Evaluation.

SECTION-B

Process Synchronization, Critical Section Problem, Semaphores, Critical Regions, Monitors. Deadlock, Necessary Conditions, Prevention, Avoidance, Detection Methods, and Recovery. Disk Scheduling, Disk Management, Swap Storage Management, Stable Storage Management. Directory Structure, Allocation Methods, Free Space Management, Directory Implementation.

SECTION-C

Memory Management, Local vs. Physical Addresses Space, Swapping, Contiguous Allocation, Paging, Segmentation, and Segmentation with Paging. Virtual Memory, Demand Paging, Page Replacement Algorithms, Thrashing. Introduction to Distributed Systems, Topology, Network Types, Communication, Design Strategies. Distributed File System, Naming and Transparency, Remote File Access.

SECTION-D

Distributed Co-ordination, Event Ordering, Mutual Exclusion, Atomicity, Concurrency Control, Deadlock Handling. Security, User Authentication, Program Threats, Securing Systems and Facilities, Intrusion Detection, Cryptography, Security-Classifications, Example Of Window NT. Case Study of LINUX, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, I/O System, Interprocess Communication.

TEXT BOOK

1. Silberschatz and Galvin, Operating System Concepts, Sixth Edition, Addison-Wesley publishing, Co., 1999.

REFERENCES

1. Hanson, Per Brinch, Operating System Principles, Prentice-Hall. 1984.
2. N. Haberman, Introduction to Operating System Design, Galgotia Publication. 1986.
3. Hansen, Per Brich, The Architecture of Concurrent Programs, PHI, 1978.
4. Shaw, “Logical Design of Operating System”, PHI, 1978.

MCA-223: COMPUTER BASED OPTIMIZATION TECHNIQUES

Maximum Marks: 50
Maximum Pass Marks: 40%

Maximum Time: 3 hrs.
Lectures to be delivered: 45-55

(A) INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

(B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt one question each from sections A, B, C, D of the question paper and the entire section E.
2. Use of non programmable scientific calculator is allowed.

SECTION-A

OR Models, Solving the OR Model, Introduction to Linear Programming, Two Variable LP Model, Graphical LP Solution, Graphical Sensitivity Analysis, Simplex Method, Big M Method, Two Phase Method, Special Cases In Simplex Method Application.

SECTION-B

Duality and Sensitivity Analysis: Definition of The Dual Problem, Primal Dual Relationship, Additional Simplex Algorithm for LP, Post Optimal or Sensitivity Analysis. Transportation Model, Transportation Algorithm, Assignment Model.

SECTION-C

Network Models: Definition, Minimum Spanning Trees Algorithms, Shortest Route Problem, Maximum Flow Model, Minimum Cost Capacitors Flow Problem, PERT & CPM.

SECTION D

Non-Linear Programming: Unconstrained Algorithms, Direct Search Method, Gradient Method, Constrained Algorithm, Separable Programming, Quadratic Programming, Geometric Programming.

TEXT BOOK

1. H.A. Taha, Operations Research, Seventh Edition, PHI, New Delhi.

REFERENCES

1. Kanti Swarup, Operations Research.
2. N.G.Nari, Operations Research.
3. Hears and Gupta, Operations Research.
4. S.D.Sharma, Operations Research.
5. Goel and Mittal, Operations Research.
6. V.K. Kapoor, Problems and Solutions in Operations Research.

MCA-224: OBJECT ORIENTED MODELING AND DESIGN USING UML

Maximum Marks: 50
Maximum Pass Marks: 40%

Maximum Time: 3 hrs.
Lectures to be delivered: 45-55

(A) INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

(B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt one question each from sections A, B, C, D of the question paper and the entire section E.
2. Use of non programmable scientific calculator is allowed.

SECTION-A

Introduction to Object: Object Orientation, Development, Modeling, Object Modeling Technique. Object Modeling: Object and Classes, Links and Association, Generalization and Inheritance, Grouping Constructs, Aggregation, Abstract Classes, Generalization as Extension and Restriction, Multiple Inheritance, Meta Data, Candidate Keys, Constraints. Dynamic Modeling: Events and States, Nesting, Concurrency, Advanced Dynamic Modeling Concepts. Functional Modeling: Functional Models, Data Flow Diagrams, Specifying Operations, Constraints, Relation of Functional Model to Object and Dynamic Models.

SECTION-B

Design Methodology Analysis: Object Modeling, Dynamic Modeling, Functional Modeling, Adding Operations, Iterating Analysis. System Design: Subsystems Concurrency, Allocation to Processor and Tasks, Management of Data Stores, Handling Global Resources, Handling Boundary Conditions, Setting Trade-off Priorities. Object Design: Overview, Combining the Three Models, Designing Algorithms, Design Algorithms, Design Optimization, Implementation of Control, Adjustment of Inheritance, Design of Associations, Object Representation, Physical Packaging, Document Design Decision.

SECTION-C

Comparison of Methodologies: Structured Analysis/Structured Design, Jackson structured Development. Implementation: Using Programming Language, Database System, Outside Computer. Programming Style: Object Oriented Style, Reusability,

Extensibility, Robustness, Programming-in-the-large. UML: Basics, Emergence of UML, Types of Diagrams. Use Case: Actors, Use Case Diagram, Relationship Between Use Cases. Classes: Class Diagram, Classes, Objects, Attributes, Operations, Methods, Interfaces, Constraints, Generalization, Specialization, Associations, Aggregation.

SECTION-D

Behavioral Diagrams: Activity Diagram, Collaboration Diagram, Sequence Diagram, Statechart Diagram. Implementation Diagrams: Component Diagram, Deployment Diagram.

TEXT BOOKS

1. Rambough, Object Oriented Modeling and Design, Pearson Education, 2002
2. Bernd Oestereich, Developing Software with UML, Pearson Education.

REFERENCES

1. BOOCH, Object Oriented Analysis and Design, Addison Wesley.
2. Pierre-Alain Muller, Instant UML, Shroff Publisher, 2000.
3. Booch, Rambough, Jacobson, The Unified Modeling Language User Guide, Addison Wesley, 1999.
4. Booch, Rambough, Jacobson, The Unified Modeling Language Reference Manual, Addison Wesley, 1999.
5. Rebecca Wirfs-Brock, Design Object Oriented Software, PHI

MCA-225: PROGRAMMING IN JAVA

Maximum Marks: 50
Maximum Pass Marks: 40%

Maximum Time: 3 hrs.
Lectures to be delivered: 45-55

(A) INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

(B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt one question each from sections A, B, C, D of the question paper and the entire section E.
2. Use of non programmable scientific calculator is allowed.

SECTION-A

Introduction to Java: Features of JAVA, Data Types, Wrapper Types, Variables, Arrays, Operators-Arithmetic, Bit-Wise, Relational, Boolean, Various Control Statements.

SECTION-B

Introduction to Classes: Class Fundamentals, Declaring Objects, Methods, Constructor, Garbage Collection, Passing Parameters to Methods, Recursion, Access Control, Static, Final and Finally Method. An introduction to AWT: AWT Classes, Window Fundamentals working With Frame Windows, Creating a Frame Window in An Applet, Displaying Information within a Window.

SECTION-C

Inheritance, Super, Multilevel Hierarchy, Abstract Methods and Classes, Packages and Interfaces, Importing Packages, Exception Handling. Exception Types, Try, Catch, Finally, Throw and Throws, Creating Exception Subclasses, Multithread Programming, Thread Priorities, Synchronization, Messaging, Creating Multiple threads, Interthread Communication.

SECTION-D

Input/output Streams, Reading and Writing Console Input/output, Reading and Writing Files, Difference between JAVA and C++, Wrapper Classes. Applets: Basics, Architecture, Skeleton, Simple Applet Display Methods, Repainting, HTML, APPLET Tag, Passing Parameters to Applets.

REFERENCES

1. Patrick Naughton and Herbert Schildt, The Complete Reference JAVA 2, Tata McGraw Hill, 1999
2. JAVA Programming Language, Third Edition by Ken Arnold, James Gosling, David Holmes. Pearson Publications.

MCA-226: PROGRAMMING IN JAVA

Maximum Marks: 40

Maximum Pass Marks: 40%

Maximum Time: 3 hrs.

Practical Units to be conducted: 45-55

Lab Assignments Based on MCA-225.

Maximum Marks for Continuous Assessment: 60

Minimum Marks for University Examination: 40