

FOURTH SEMESTER

MCA-410

OPERATING SYSTEMS

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will

cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and 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, Operating system structure, (Monolithic, Layered), System services, system calls, process states, process control block (PCB), Fork, EXEC, Cooperating process, Inter process communication.

CPU scheduling algorithms, (FCFS,RR,SJF, Priority, Multilevel queue, Multilevel queue with feedback) Multiple processor scheduling & their comparison.

SECTION B

Process synchronization, Critical section problem, Semaphore, Binary semaphores, critical regions, Monitors, Dekker's algorithm, Bakery algorithm, Semaphore solution of Bounded buffer, Reader writer, Dining philosopher, Banker's algorithm.

Deadlock, Necessary conditions, Prevention, Avoidance and detection methods & recovery.

Disk scheduling (FCFS, SCAN,C-Scan, Look, C-Look)

Access methods, directory structure, allocation methods, free space management, directory implementation.

SECTION C

Memory Management: Physical V/s Logical address, Dynamic linking, Dynamic loading, Swapping, contiguous allocation, paging, segmentation, and segmentation with paging.

Virtual Memory, Demand paging, page replacement algorithms, thrashing, Distributed systems, topology network types, design strategies.

Network operating structure, distributed operating system, remote services & design issues.

SECTION D

Distributed file system, naming and transparency, remote file access, remote file accesses, example systems – UNIX, Sun Network File System.

Distributed co-ordinations, event ordering, mutual exclusion, atomicity, concurrency control, deadlock handling, election algorithms.

Protection and security, goals of protection, domain of protection, access matrix, security problem authentication, password, programs threats, system threats, encryption, computer security classification, Model of Windows-NT.

References:

1. Silberschatz and Galvin "Operating system concepts"(5th edition), Addison-Welsey publishing, Co 1999
2. Hansen, Per Brinch, "Operating system Principles" Prentice-Hall, 1984.
3. N. Habermanb, "Introduction of Operating system design" Galgotia Publication 1986.

MCA-420

COMPUTER ORGANISATION AND ARCHITECTURE

Maximum Time : 3 Hrs.

University Examination : 70

Marks

Total Marks : 100

Continuous Internal Assessment : 30

Marks

Minimum Pass Marks : 40%

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 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus

uniformly and will carry 40% marks in all.

B) Instructions for candidates

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

SECTION A

Number system, Binary arithmetic, Gray code, BCD, Logical Gates, Boolean Algebra, K-Map simplification, SOP forms, POS forms, Half adder, Full adder, Flip-Flops (SR, JK, D & T), Counters, Registers.

SECTION B

Basic computer architecture, Functional Organisation, Register organization, Arithmetic and logic unit, Pipeline, Central processing unit, Instruction formats, Addressing modes, Data transfer and manipulation, Interrupts, RISC/CISC architecture.

SECTION C

Register transfer and micro-operations, Register transfer language (RTL), Arithmetic, Logic and Shift micro-operations, Micro-program Control Organisation; Control memory, Address sequencing, Micro-program sequencer, Addressing Mode.

SECTION D

Memory and storage ; Processor V/s Memory speed, High-speed memories; Cache memory, Direct mapping, Set Associative Mapping, Fully Associative Mapping, Associative memory, Interleaved memory, Virtual memory and Memory management hardware. Input/Output Organisation: Peripheral devices, I/O interface, Asynchronous Data Transfer : Strobe control, Handshaking Data transfer schemes (Programmed, Interrupt Initiated, DMA transfer), I/O Processor.

References :

1. A. S. Tanenbaum, "Structured Computer Organisation", PHI, 1990.
2. M. M. Mano, "Computer System Architecture", Prentice-Hall, 1976.
3. S. Stone, "Introduction to Computer Architecture", Galgotia Publications, 2nd Ed. 1986.
4. J.P. Hayes, "Computer Architecture and Organisation", McGraw Hill, 1988.
5. C. William Gear, "Computer Organisation and Programming", McGraw-Hill, 1985.

MCA-430

SOFTWARE VERIFICATION VALIDATION AND TESTING

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

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

SECTION A

Definition of testing, goals, psychology, model for testing, effective testing, limitations of testing,

Definition of testing Definition of failure faults or bug, error incident, test case, test ware, life cycle of bug, bug effects, bug classification, test case design, testing methodology, development of test strategy, verification, validation, testing life cycle model, testing techniques, testing principles.

SECTION B

Verification activities, verification of requirements, verification of HL design, verification of data design, verification of architectural design, verification of UI design, verification of LL design, intro. To validation activities.

Boundary value analysis, equivalence class partitioning, state table based testing, decision table based, grappling, error guessing

SECTION C

Logic coverage criteria, basic path testing, graph matrices, loop testing, mutation testing.

Types of static testing, technical reviews, inspections, inspection process, structured walk through, walk through process, advantage of static testing.

SECTION D

Unit testing drivers stubs, integration testing, methods, effect of module coupling and cohesion, functional testing, system testing, recovery testing, security testing, stress testing, performance testing, usability testing.

S/W measurement and testing, testing metrics, tools debugging, design of practical test cases, reducing No. of test cases, regression testing and test case management.

Reference:-

1. P. Jalota " An Intrgrated Approach to software engineering", Narosa Publising House 1992
2. M.Shooman "Software Engineering",TMA 1983
3. Roger S. Prersman, " Software Engineering –A practioners Approach", 3rd Edition, TMH 1992.

MCA-440

COMPUTER GRAPHICS

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.

SECTION A

Input device - Keyboard, Touch Panel, Light pens, Graphic tablets, Joysticks, Touch balls, Image scanner, Mouse. Handy copy device :- Zero impact and Non impact printers, Dot matrix, Laser printer, Inkjet printer, Dectrostate, flatted and drum platters. Video display devices :- Cathode ray tube, Resistance, Resolution, aspect ration vertical and horizontal, colour CRT monitors, Direct view storage tube, Flat panel displays, LCD, virtual reality, Faster scan system, random scan system. Memory device :- Memory (RAM,ROM), CD, Floppy Disk, Magnetic tapes, Magnetic disks.

SECTION B

Scan conversion algorithm for line (DDA & Bresenham's algorithm) midpoint circle, circle & ellipse, Midpoint ellipse, Bresenham's algorithms, area filling techniques, Scan line polygon fill, Boundary fill character generation. 2-dimensional Graphics:- Cartesian & Homogeneous coordinate system, Geometric transformations (Translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, Affine transformation, Viewing pipeline, Two dimensional viewing transformation and clipping (Line, Polygon and Text).

SECTION C

Three dimensional Graphics :- Geometric transformation (translation, scaling, rotation, reflection, shearing) Composite transformations, Mathematics of projections (parallel & perspective), view pipeline, 3-D viewing transformations and clipping(normalized view volumes, view port, clipping)

SECTION D

Hidden line and surface elimination algorithms, Z-buffer, Scan-line, Sub-division, Painter's algorithm. Illumination Models : Diffuse reflection, Specular reflection, refracted light, texture surface patterns, Half toning, Dithering. Surface rendering methods : Constant intensity method, Gouraud shading, Phong shading. Colour Model : Introduction to RGB, CMY & HSV colour models.

Reference:-

1. D. Hearn and M.P. Baker "Computer Graphics" PHI New Delhi 2nd edition 1995.
2. J.D. Foley, A.V. Dam, S.K. Feiner, J.F.Hughes, R.L. Phillips, "Introduction to computer Graphics" Addison-Wesley Publishing company, N.Y. 2nd edition 1994
3. R.K. Plastock and G. Kalley " Computer Graphics " McGraw Hill, 1986.

MCA-450P

PROGRAMMING LAB- (DBMS)

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

This laboratory course will mainly comprise of exercises on what is learnt under paper : MCA-140 Data Base Management system.

MCA-460- EI

OBJECT ORINETED ANALYSIS AND DESIGN

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will

cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.

SECTION A

Introduction to Object : Object orientation, Development, Modeling, Object modeling technique, Object modeling : Object and classes, Links and Association, Generalisation and inheritance, Grouping constructs, Aggregation, Generalisation as extension and restriction, Multiple inheritance, Meta data, candidate keys.

SECTION B

Dynamic modeling : Events and states, Nesting, concurrency, Functional modeling : Data flow diagrams, specifying operations. Design Methodology, Analysis : object modeling , Dynamic modeling, Functional modeling, Adding operations, Iteration.

SECTION C

System design : Subsystems concurrency, Allocation to processor and tasks, Management of data stores, Control implementation, Boundary condition, Architectural frameworks, Object design : Optimisation, Implementation of control, Adjustment of inheritance, Design of association, Documentation, Comparison of methodologies.

SECTION D

Object oriented styles, Implementation: Using a programming language, A database system, Programming styles reusability, extensibility, Robustness, Programming-in-the-large, Case study.

Reference:-

1. Rambough, "Object Oriented Modelling and Design", Pearson Education.
2. BOOCH, "Object Oriented Analysis and Design", Addison Wesley.
3. Rebecca Wirfs-Brock, "Design Object Oriented Software", PHI.

MCA-460- EII

E-COMMERCE

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks : 40%

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will

cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.

SECTION A

Electronic commerce framework, Electronic commerce and media convergence, The anatomy of e-commerce applications.

Market forces influencing the I-way, Components of the I-Way, Network access equipment, Global information distribution networks, Public policy issues shaping the I-way.

SECTION B

Client-Server Network Security, Emerging client-server security threats, Firewalls and Network security, Data and message security, challenge response system, Encrypted documents and electronic mail, U. S. Government regulations and encryption, Summary.

Architectural framework for electronic commerce , WWW as the architecture, Web background : Hypertext publishing, Technology Behind the web, security and the Web, summary.

SECTION C

Consumer-oriented applications, Mercantile process models, mercantile models from the consumer's perspective, mercantile models from the merchant's perspective, summary.

SECTION D

Types of electronic payment systems, digital token-based electronic payment systems, smart cards and electronic payment systems, credit card-based electronic payment systems, risk and electronic payment systems, designing electronic payment systems, summary.

Reference:-

1. Ravi Kalkota : Frontiers of Electronic commerce, Addison Wesley.
2. Kamlesh K. Bajaj & Debjani Nag, E-commerce, The cutting edge of business, Tata McGraw Hill.
3. Pete Losuin and A. Murphy, Electronic commerce, A Jaico book.
4. Green Stein "Understanding electronic commerce" PHI.
5. Kosiur, "Understanding electronic commerce" PHI.
6. Kienan, "Managing your E-commerce Business, PHI.

MCA-460- EIII COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHOD

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks : 40%

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

(A) Instructions for the 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 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.

SECTION A

Solution of transcendental equation : Bi-section method, Regula Falsi method, Newton Raphson method, and secant method.

System of simultaneously non-linear and algebraic equation :- Gauss elimination method, Gauss seidel alternative method, Gauss Jordan's method, Jacobi's iteration.

SECTION B

Operation, E, Algebraic properties of E and , Relation between operators, differences table, Forward Difference, Backward Difference, Central difference factorial Notation, Divided Differences, Language's Interpolation formula for unequal intervals.

SECTION C

Numerical Integration :- The trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 weddle's rule.

Numerical Realtion of solution differential equation : Euler's method, Taylor's series, Runge-kutta method.

SECTION D

Introduction to Statistics :- Meaning, scope of statistics, Mean, Mode, Median, Standard Deviation, Variance.

Bivariate data: Correlation, Karl's pearson coefficient, Rank correlation, Numerical based on regression lines (using least square method)

Reference:-

1. A. R. Vasishtha, "Numerical Analysis", John wiley & sons.
2. B.S. Grewal, "Engineering Mathematic", Khanna.
3. S.S. Sastry, "Numerical Methods".