

OPTIMIZATION TECHNIQUES

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) What are the phases of Operations research.?

Or

(b) A company produces both interior and exterior house paints. Two basic raw materials R_1 and R_2 are used to manufacture the paints. The maximum availability of R_1 is 6 tons a day, that of R_2 is 8 tons a day. The daily requirements of the raw materials per ton of interior and exterior paints are tabulated below :

Tons of raw material per Ton of paint

	Exterior	Interior	Maximum availability
R_1	1	3	12
R_2	4	2	10
Price per ton	Rs. 3,000	Rs. 4,000	

Formulate the above as an LPP.

2. (a) Explain north west corner rule.

Or

- (b) Explain any two procedures used to solve assignment problem.

3. (a) Find the dual of maximize

$$z = 5x_1 + 4x_2 - 3x_3$$

$$\text{Subject to } 2x_1 + x_2 - x_3 \leq 10$$

$$-x_1 + 2x_2 + 3x_3 \leq 8$$

$$x_1, x_2, x_3 \geq 0.$$

Or

- (b) Explain branch and bound method.

4. (a) Write the mathematical model for an assignment problem.

Or

- (b) Explain stochastic processes with suitable example.

5. (a) Explain arrival characteristics.

Or

- (b) In (M/M/1) : (∞ /FIFO) queuing model derive the formula for the average waiting time of a customer in the queue.

6. (a) In $(M/M/1:GD/\infty/\infty)$, prove that the probability distribution that there are n customers in the system is geometric.

Or

(b) Explain Kendall's notation for representing queuing models.

7. (a) State and prove any two properties of Z-transforms.

Or

(b) With usual notation, prove that

$$Z(pn+1) = \frac{1}{z} \{p(z) - p_0\}$$

PART B — $(4 \times 10 = 40 \text{ marks})$

8. (a) Solve the following LPP using graphical procedure :

$$\text{Maximize } z = 3x_1 + 2x_2$$

$$\text{Subject to } 2x_1 + 3x_2 \leq 100$$

$$4x_1 + 2x_2 \leq 120$$

$$x_1, x_2 \geq 0.$$

Or

(b) Solve the following LPP using simplex method :

$$\text{Maximise } z = 3x_1 + 5x_2$$

$$\text{Subject to } 3x_1 + 2x_2 \leq 18$$

$$x_1 \leq 4$$

$$x_2 \leq 6,$$

$$x_1, x_2 \geq 0.$$

9. (a) Solve the following integer Linear programming problem :

$$\text{Maximize } z = 4x_1 + x_2$$

$$\text{Subject to } 4x_1 + 2x_2 \leq 7$$

$$3x_1 + 5x_2 \leq 15.$$

x_1, x_2 are non-negative integers.

Or

(b) Obtain an optimal solution of the assignment problem :

	A	B	C	D
1	6	5	5	2
2	3	4	5	7
3	4	3	5	1
4	5	4	2	6

10. (a) An income department has 4 counters to receive people who have problem and complaints about their income taxes. Arrival average 80 persons in an 8-hour service day. The time taken by the tax adviser on a customer is distributed as exponential with average service time 20 minutes. Determine

(i) Average number of customers in the system

(ii) Average queue length

(iii) Average time a customer spends in the system

(iv) Average time a customer waits before being served.

Or

(b) The tools room of a plant is managed by 2 persons. Workers arrive to the tools room at the rate of 4 per hour. Each person can serve the customers at the rate of 5 per hour.

Calculate :

(i) The probability that an arriving customer has to wait

(ii) The chance of finding exactly one customer in the system

(iii) Average waiting time in the system

(iv) Average waiting time in the queue.

11. (a) In $(M/M/2) : (GD/\infty/\infty)$, mean service time is 5 minutes and mean inter arrival time is 8 minutes Find

(i) The probability of a delay

(ii) The probability of at least one of the servers being busy.

(iii) The probability that both servers are idle

Or

(b) The arrivals to an one-man barber shop is found to be a Poisson process with an average rate of 4 per hour. The customers spend an average of 10 minutes in the barber shop. If the shop has 6 chairs to seat the waiting customers, calculate

(i) The probability that a customer can get directly into the barber chair

(ii) The expected waiting time of a customer in the shop

(iii) The fraction of customers who did not enter the shop.

COMPUTER GRAPHICS

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

Answer ALL questions.

PART A — ($7 \times 5 = 35$ marks)

1. (a) Explain graphic application of CAD.

Or

- (b) Explain computer animation.

2. (a) Explain graphic software standards.

Or

- (b) Explain three dimensional monitor.

3. (a) Write DDA line drawing algorithm.

Or

- (b) Write the transformation matrix to perform 45 degree rotation of the triangle A(0,0), B(1,1) C(5,2) about the origin.

4. (a) List character attributes.

Or

(b) Explain concatenation properties of transformation matrices.

5. (a) Explain blanking with suitable example.

Or

(b) Explain perspective projects.

6. (a) Explain an five transformation commands.

Or

(b) Explain view transformation in 3-D.

7. (a) Explain three dimensional rotation about arbitrary axis.

Or

(b) Explain three dimensional graphic packages.

PART B — (4 × 10 = 40 marks)

8. (a) Explain various interactive input devices.

Or

(b) Explain the features of PHIGS.

9. (a) Explain the transformations reflection and shear with suitable examples.

Or

(b) Obtain the transformation matrices for 3-D rotation with respect to the three axes.

10. (a) Explain an three interactive input methods.

Or

(b) Explain on-line character recognizer.

11. (a) Explain the implementation of any two viewing operations.

Or

(b) Explain segment concepts, segment files and segment attributes.

SYSTEM ANALYSIS AND DESIGN

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) Explain the system development life cycle and its components.

Or

- (b) Explain the different kind of managers with whom systems analyst come into contact.

2. (a) Explain the development of Project and Resource plan.

Or

- (b) Write note on the cost assessment.

3. (a) Explain data flow diagram in system analysis.

Or

- (b) Explain any two general approaches for eliciting information.

4. (a) What are the strategies determining information requirements?

Or

(b) Explain the data model and its components.

5. (a) Explain System Diagram based on Computer.

Or

(b) Explain the grouping criteria of organizing the system's component.

6. (a) Explain the overview of design specification.

Or

(b) Explain the concept of system design.

7. (a) Explain the features of the computer system that may be purchased for system design.

Or

(b) Explain the concept of structure design.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Explain the steps in designing the databases.

Or

(b) Write an essay on the phases of a system design.

9. (a) Write an essay on planning steps of project.

Or

(b) Explain various types of cost involved in a project.

10. (a) Write an essay on the tools supporting system analysis.

Or

(b) Write an essay on the system requirements and specification.

11. (a) Discuss the common problems of database design.

Or

(b) Explain various report used in the system analysis and design.

COMPUTER NETWORKS

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) Explain Local area networks.

Or

- (b) Explain connection oriented and connectionless services.

2. (a) Explain tasks of the data link layer.

Or

- (b) Write note on Microwave transmission.

3. (a) Explain unstructured data link simplex protocol.

Or

- (b) Write note on IEEE standard 802.3

4. (a) Explain various reasons for the use multiple LANs connected by bridges.

Or

(b) Explain briefly FDDI.

5. (a) Explain shortest path routing algorithm.

Or

(b) Explain congestion control in virtual circuit subnets.

6. (a) Discuss the TCP protocol.

Or

(b) Explain performance problems aspect of network performance.

7. (a) Explain transposition ciphers category of encryption method.

Or

(b) Explain the implementation of USENET.

Answer ALL questions.

8. (a) Explain three example networks in detail.

Or

(b) Discuss any two types of communication satellites.

9. (a) Discuss any two types of bridges in detail.

Or

(b) Write an essay on network layer design issues.

10. (a) Discuss five parts of link state routing.

Or

(b) Discuss congestion control for multicasting.

11. (a) Discuss the TCP timer management in detail.

Or

(b) Write note on (i) MIME and (ii) SMTP.

11. (a) Discuss the four types uniform hash functions.

Or

- (b) Write and explain insertion algorithm for B-Trees. Give an analysis of this algorithm.
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MAY 2009

DATA STRUCTURE USING C++

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) Explain analysis phase of software product.

Or

- (b) Explain the first four generation Languages.

2. (a) Explain parameter passing by value with example.

Or

- (b) Explain inline function with syntax and example.

3. (a) Explain singly linked list with example

Or

- (b) Explain the nested class in C++.

4. (a) Explain Public inheritance with simple example.

Or

(b) Write a note on templates in C++.

5. (a) Define the following with respect to a tree

(i) Degree of a node

(ii) Terminal node

(iii) Siblings

(iv) Degree of a tree and

(v) Ancestors.

Or

(b) Define binary search trees.

6. (a) Explain various operations that can be performed on symbol table.

Or

(b) Explain an two was of handling overflow in hash tables.

7. (a) Explain the defining properties of 2-3-4 trees.

Or

(b) What are the defining properties of m-way search tree?

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Write an essay on the five phases of software product.

Or

(b) Explain binary search and selection sort with suitable C++ code.

9. (a) Explain various types of virtual functions.

Or

(b) Write note on

(i) Implementing Linked Lists with Templates.

(ii) Linked list iterators.

10. (a) Discuss various types of representations of Trees.

Or

(b) Discuss various operations on max heap with suitable functions.

Using

- (i) trapezoidal rule and
- (ii) Simpson's Rule with $h = 0.25$.

11. (a) Apply euler's method to tabulate the solution of

$$\frac{dy}{dx} = 1 + y^2, y(0) = 0, h = 0.2$$

by obtaining $y(0.2)$ and $y(0.4)$ and $y(0.6)$ and $y(0.8)$ and $y(1.0)$.

Or

- (b) Given

$$\frac{dy}{dx} = x^2 + y^2, y(0) = 1,$$

obtain $y(0.2)$ $y(0.4)$ and $y(0.6)$ using Runge-Kutta 4th order formula and obtain $y(0.8)$ using predictor method.

3655/R25

MAY 2009

COMPUTER BASED NUMERICAL METHODS

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

Answer ALL questions.

PART A — ($7 \times 5 = 35$ marks)

1. (a) Design an algorithm to find real root of a quadratic equation.

Or

- (b) Explain Secant method of finding roots of transcendental equation.

2. (a) Write note on Muller's method.

Or

- (b) Explain Bairstow method.

3. (a) Explain Gauss-Jordan Elimination method.

Or

- (b) Explain Gauss-Seidal iteration Method.

4. (a) Explain Gauss Elimination method.

Or

(b) Explain SOR method.

5. (a) Explain interpolation with suitable example.

Or

(b) Explain the principle of least squares.

6. (a) Explain a method of numerical differentiation based on finite differences.

Or

(b) Explain trapezoidal rule.

7. (a) Explain Back Ward Euler's Method.

Or

(b) Write note on predictor-corrector methods.

PART B — (4 × 10 = 40 marks)

8. (a) Use Chebychev's method to find the roots of the equation $2x - \sin x - 5 = 0$ correct to six decimal places.

Or

(b) Using Giraeffe's root squaring method to find a root of $x^3 + 3x^2 - 4 = 0$ correct to two decimals.

9. (a) Obtain the solution of the system of equations.

$$\begin{aligned}10x^1 - x^2 - x^3 - x^4 &= 7 \\ -x^1 + 10x^2 - 2x^3 - x^4 &= 6 \\ -2x^1 - x^2 + 10x^3 - 3x^4 &= 4 \\ -3x^1 - x^2 - x^3 + 10x^4 &= 5\end{aligned}$$

Using Gauss-Jacobi iteration method.

Or

(b) Determine the largest eigen value and the corresponding eigen vector of the matrix.

$$\begin{vmatrix} 2 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 2 \end{vmatrix}$$

to 3 decimal places using power method.

10. (a) Find the unique polynomial $P(x)$ of degree 2 or less such that $P(2) = 4$, $P(3) = 8$ and $P(5) = 25$ using

(i) The Lagrange's interpolation formula.

(ii) The Newton's Divided difference formula.

Or

(b) Find the approximate values of the integral

$$\int_0^1 \frac{1}{1+x} dx$$

JAVA PROGRAMMING

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

Answer ALL questions.

PART A — ($7 \times 5 = 35$ marks)

1. (a) Explain Domain Name System with example.

Or

- (b) Write a note on GOPHER.

2. (a) Explain Two components of TCP/IP.

Or

- (b) Explain the connectionless services offered by layers to the layers above.

3. (a) Explain various data types in Java.

Or

- (b) Explain any two control statements in Java.

4. (a) Explain any two operators in Java with examples.

Or

(b) Explain any five methods of Input stream class with suitable example.

5. (a) Write a simple Java program to illustrate the creation of a thread using runnable interface.

Or

(b) Explain properties of Java Beans.

6. (a) Explain the name sin Java Script with suitable examples.

Or

(b) Explain any two operators in Java Script with suitable examples.

7. (a) Write note on data types in PERL.

Or

(b) Explain scope and life time of a variable in VB script.

PART B — (4 × 10 = 40 marks)

8. (a) Explain URL and HTTP in detail.

Or

(b) Explain any two Internet browsers.

9. (a) Explain exception handling mechanism in Java.

Or

(b) Discuss different types of constructors in Java.

10. (a) Explain the properties of Java Beans Methods in detail.

Or

(b) Explain the use of Java applets in web creation with suitable example.

11. (a) Explain PERL (i) data types (ii) built-in functions and (iii) Regular expression with suitable examples.

Or

(b) Write a note on

(i) OLE and

(ii) ACTIVEX in VB script.

OPERATING SYSTEM

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) Explain the functions and main objectives of operating systems.

Or

- (b) Explain the process creation with suitable diagram.

2. (a) Explain the indirect communication of process.

Or

- (b) What are the concepts of process scheduling?

3. (a) Explain an one component involved in the CPU scheduling function.

Or

- (b) What are the necessary conditions for dead lock situation.

4. (a) Explain three steps of binding of instruction and data to memory addresses.

Or

(b) Compare logical and physical address space.

5. (a) Explain fragmentation and cause for it.

Or

(b) What are the categories of fragmentation?

6. (a) Explain the need for page replacement.

Or

(b) Explain additional-reference-bits algorithm.

7. (a) Write note on Hash tables.

Or

(b) Explain the process state of Unix.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Explain Binary semaphore and Process Synchronization with semaphore.

Or

(b) Explain the dead lock prevention by examining the four necessary conditions.

9. (a) Discuss the shortest-Job-first scheduling algorithm with a suitable example.

Or

(b) Explain the importance of dead lock and its function.

10. (a) Explain second chance page replacement algorithm

Or

(b) Explain various file operations in detail.

11. (a) Explain FCFS and SCAN Disk scheduling algorithms with suitable example.

Or

(b) Compare the process structure of traditional Unix system and Solaris.

ARTIFICIAL NEURAL NETWORKS

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — ($7 \times 5 = 35$ marks)

Answer ALL questions.

1. (a) Explain the advantages of Neural networks.

Or

- (b) Explain the application of neural networks to Vector quantization and Pattern association.

2. (a) Explain performance of neural networks based on Generalizability.

Or

- (b) Explain linearly separable classes of networks with example.

3. (a) Explain two layered back propagation network.

Or

- (b) Explain quick prop algorithm.

4. (a) Explain any one supervised learning technique.

Or

(b) Explain prediction networks.

5. (a) Write note on Growing cell Structures.

Or

(b) Explain maximum entropy unsupervised neural network learning algorithm.

6. (a) Explain briefly multilayer network.

Or

(b) Explain counter propagation network.

7. (a) Explain any one evolutionary operator.

Or

(b) Define length and order of a schema.

PART B — ($4 \times 10 = 40$ marks)

Answer ALL questions.

8. (a) Explain the network architectures

(i) Single-layer artificial neural networks

(ii) Multi-layer neural networks

Or

(b) Discuss Neural leaning with the underlying theory.

9. (a) Explain the neural networks

(i) Recurrent networks and

(ii) feed forward networks that are used for prediction tasks.

Or

(b) Explain in detail about the Adaptive Multilayer networks.

10. (a) Discuss in detail an one associative model.

Or

(b) Explain brain state in a box network.

11. (a) Discuss Evolutionary algorithms in detail.

Or

(b) Explain Simulated Annealing optimization method.

11. (a) Explain briefly the layers of OSI systems interconnection model.

Or

(b) Write about any three issues relating to LAN administration.

3659/R29

MAY 2009

CLIENT-SERVER COMPUTING

(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — (7 × 5 = 35 marks)

Answer ALL questions.

1. (a) Explain database replication and data warehousing in the client/server environment.

Or

(b) Explain features of main frame computers.

2. (a) Explain any two client/server configuration with suitable diagrams.

Or

(b) Explain encapsulation and objects.

3. (a) Explain database services provided by NOS.

Or

(b) Explain Novell's Netware operating system.

4. (a) Explain any five features of NOS.

Or

(b) Explain any one server operating system.

5. (a) Explain database services provided by the server.

Or

(b) Discuss Banyan Vines network operating system.

6. (a) Explain Network Layer and data link layer of OSI Model.

Or

(b) Explain Fibre Distributed data interface.

7. (a) Explain the training systems administrator training.

Or

(b) Explain database administrator training.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Explain the object oriented technology ideas

(i) Classes

(ii) Inheritance

(iii) Message

(iv) Methods and

(v) Objects.

Or

(b) Explain any five advantages of client/server computing.

9. (a) Explain the following services provided by network operating systems

(i) Fax/print services

(ii) Network management services and

(iii) Remote boot services.

Or

(b) Discuss CORBA in detail.

10. (a) Explain the following services provided by the server

(i) File services

(ii) Print Services and

(iii) Database services.

Or

(b) Write an essay on distributed computing environment.