2006E0167

Candidate's Seat No :_____

M.C.A. (Sem.-4) Examination
Software Construction
June 2019

Time : 3-00 Hours] **[Max. Marks : 50**

NOTE : (1) Write both the sections in the separate answer books
(2) Figures to the right indicate full marks.
(3) Make necessary assumptions wherever necessary.

SECTION-I

Q.1 **Define the following (Any three)** [9]
[a] Problem definition with example
[b] Accidental and essential difficulties
[c] Object-parameter coupling
[d] Assertions
[e] Macro routines

Q.2 [a] State levels of software design. [4]
[b] List error-handling techniques in defensive programming. [4]

OR

Q.2 [a] Explain any two design building blocks. [4]
[b] Give any four guidelines for creating good class interfaces. [4]

Q.3 **Attempt the following.** [8]
[a] Explain the guidelines for initializing variables.

OR

[a] Explain general tips on using pointers

SECTION-II

Q.4 **Define the following (Any three)** [9]
[a] Strength Reduction in expression formation
[b] Tips for using recursion
[c] Handling null statements
[d] Explain why "don't redefine a predefined type".

Q.5 [a] Explain care to be taken while entering and exiting the loop. [4]
[b] Explain the use of Boolean variables to simplify complicates tests. [4]

OR

Q.5 [a] Explain how changes in data types can be a powerful aid in reducing program size and improving execution speed. [4]
[b] Explain Pseudo programming process. [4]

Q.6 **Explain the following.** [8]
[a] Explain various table driven methods with suitable examples.

OR

[a] Explain reasons to refactor. [8]

2106E0174

Candidate's Seat No :_____

M.C.A. (Sem.-4) Examination
Computer Based Optimization Models
June 2019

Time : 3-00 Hours] **[Max. Marks : 50**

Note : (1) Write both the sections in the separate answer books
(2) Figures to the right indicate full marks.
(3) Make necessary assumptions wherever necessary.

SECTION-I

Q.1 Attempt the following. [9]

(a) What is the role of Operations Research in decision-making?

(b) Define an Operations Research model and give examples. State their properties, advantages and limitations

(c) What is Linear Programming? What are its major assumptions and limitations?

Q.2 Solve the following (ANY TWO) [8]

(a) Use the Simplex method to solve the following LP Problem

Max Z = 16X1 + 17X2 + 10X3
S.T.C
a) x1 + x2 + 4x3 ≤ 2,000 b) 2x1 + x2 + x3 ≤ 3600 c) x1 + 2x2 + x3 ≤ 2400 d) x1 ≤ 30
and x1,x2,x3 ≥ 0

(b) An advertising agency wishes to reach two types of audiences: Customers with annual income greater than Rs 15,000(target audience A) and customers with annual income less than Rs 15,000(target audience B). The total advertising budget is Rs 2,00,000. One programme of TV advertising costs Rs 50,000; one programme on radio advertising costs Rs 20,000. For contract reasons, at least three programmes ought to be on TV, and the number of radio programmes must be limited to five. Surveys indicate that a single TV programme reaches 4,50,000 customers in target audience A and 50,000 in target audiences B. One radio programme reaches 20,000 in target audience A and 80,000 in target audience B. Determine the media mix to maximize the total reach.

(c) Use the penalty method to solve the following LP Problem

Max Z= 5x1 + 3x2
S.T.C
a) 2x1 + 4x2 ≤ 12 b) 2x1 + 2x2 = 10 c) 5x1 + 2x2 ≥ 10
and x1,x2 ≥0

P.T.O.

E174-2

Q3 Solve the following [8]

(a) A small project is composed of 7 activities, whose time estimates are listed in the table below. Activities are identified by their beginning (i) and ending (j) node numbers.

Activity	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

a) Draw the network diagram of the activities in the project
b) Find the expected duration and variance for each activity. What is the expected project length?
c) What is probability that the project will be completed:
   i) At least 4 weeks earlier than expected time.
   ii) No more than 4 weeks later than expected time

(b) Explain the mathematical model of the Simplex Method.

(c) Obtain the Dual Problem of the following primal LP problem.

Minimize $Z = X1 - 3X2 - 2X3$

Subject to the constraints

$3X1 - X2 + 2X3 \leq 7$

$2X1 - 4X2 \geq 12$

$-4X1 + 3X2 + 8X3 = 10$

$X1$ and $X2 \geq 0$, $X3$ unrestricted in sign

SECTION-II

Q4 Solve the following [9]

(a) Explain mathematical model of the transportation in details.

(b) A marketing manager has 5 salesmen and 5 disticts. Consider the capabilities of the salesmen and the nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district would be follows:

Job	Machines				
	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

Find the assignment of salesmen to district that will result in

maximum sales.

(c) For the following transportation problem it is not possible to transport any quantity from factory B to Godown 5.

Factory	Godowns						Stock Available
	1	2	3	4	5	6	
A	7	5	7	7	5	3	60
B	9	11	6	11	-	5	20
C	11	10	6	2	2	8	90
D	9	10	9	6	9	12	50
Demand	60	20	40	20	40	40	

Determine the optimal solution to minimize the total cost of the transportation.

Q.5 Solve the following(ANY TWO) [8]

(a) In a super market the average arrival rate of customers is 5 every 30 minutes. The average time it takes to list and calculate the customer's purchases at the cash desk is 4.5 minutes, and this time is exponentially distributed. Answer the following

i. How long will the customer expect to wait for service at the cash desk?
ii. What is the chance that the queue length will exceed 5?
iii. What is the probability that the cashier is working?

(b) Dr. Strong is a dentist who schedules all her patients for 30 minutes appointments. Some of the patients take more or less 30 minutes depending on the type of dental work done. The following summary shows the various categories of work, their probabilities and the time actually to complete the work:

Category	Time Required (minutes)	Probability of Category
Filling	45	0.40
Crown	60	0.15
Cleaning	15	0.15
Extraction	45	0.10
Checkup	15	0.20

Simulate the dentist's clinic for four hours and determine the average waiting time for the patients as well as idle time for the doctor. Assume that all the patients show up at the clinic at exactly their scheduled arrival time starting at 8:00 a.m. Use the following random number handling the above problem: 40, 82, 11, 34, 25, 66, 17, 79.

(c) Explain the different costs involved in the inventory models.

Q.6 Answer the following (ANY TWO) [8]

P.T.O.

(a) An item is produced at the rate of 50 items per day. The demand occurs at the rate of 25 items per day. If the set up cost is Rs. 100 and holding cost is Re. 0.01 per unit of item per day, find the economic lot size for one run, assuming that the shortages are not allowed. Also find the time of cycle and minimum total cost of one run.

(b) Describe the procedure to deal with unbalance Transportation and Assignment problems.

(c) Briefly Describe a) Feasible Solution b) Slack Variable c) Artificial Variable d) Surplus Variable.

2406E0181

Candidate's Seat No : _____

M.C.A. (Sem.-4) Examination
Fundamentals of Networking
June 2019

Time : 3-00 Hours] [Max. Marks : 50

Instructions: (1) Make suitable assumption wherever necessary.
(2) Figure to right indicate marks.
(3) Write both the sections in separate answer books.

SECTION – I

Q – 1 Answer the following in brief. (Any Nine) [9]

1. Define: Piconet & Scatternet
2. List two names of guided media.
3. List bands in satellite communication.
4. Difference between Hub and Switch.
5. List 10Mbps Ethernet standards.
6. Difference between congestion control and flow control.
7. Which error detection techniques is best & why?
8. Full form of GSM and CDMA.
9. Which OSI layer is used to decide the router of the packet?
10. Major difference between Pure Aloha and Slotted Aloha

Q – 2 1. Uses of computer networks [8]
2. Public switched telephone network.

OR

Q – 2 1. List layers in TCP/IP model and explain in detail. [8]
2. List satellites orbits. Explain each orbit functionality in detail

Q – 3 1. Explain GoBackN and Selective Repeat Protocol in detail. [8]
2. Short note on Gigabit Ethernet

OR

Q – 3 1. Explain CRC method with an example. [8]
2. Write a short note on Wireless LANs

SECTION – II

Q – 4 Answers in Brief. (Any Nine) [9]

1. Which standard port number used by SMTP and IMAP.
2. In context of domain name system define, Domain & Zone
3. List symmetric key algorithms.
4. Full form of TCP and UDP
5. What is the importance of TTL field in packet?
6. Define: Cryptography and Cryptanalysis
7. List transport layer protocols.
8. Discuss any one network layer design issue in brief.
9. Difference between digital signature and digital certificate.
10. Define: Authentication and Confidentiality.

Q – 5 1. Explain Closed Loop and Open Loop congestion control in detail. [8]
2. Write a short not on DNS resource record

OR

Q – 5 1. Distance Vector routing algorithm in detail [8]
2. Explain Elements of transport protocols

Q – 6 1. List public key algorithm and explain RSA with an example. [8]
2. MIME protocol in detail.

OR

Q – 6 1. Short note on Domain Name System. [8]
2. Explain AES algorithm in detail.

2506E0188

Candidate's Seat No :_____

M.C.A. (Sem.-4) Examination

Structured & Object Oriented Analysis & Design

June 2019

Time : 3-00 Hours] **[Max. Marks : 50**

NOTE : (1) Write both the sections in the separate answer books
(2) Figures to the right indicate full marks.
(3) Make necessary assumptions wherever necessary.

SECTION-I

Q.1 **Define the following (Any three)** [9]

1 Image maps
2 Metadata
3 Wireframing
4 CRUD matrix
5 Insert anamoly

Q.2 (a) Explain different forms of measurement scale and their problems. [4]
(b) Describe algebraic notations used in Data Dictionary with an example. [4]

OR

Q.2 (a) Explain decision tables in detail with example with various situations. [4]
(b) Compare any 2 output methods and factors used to choose them. [4]

Q.3 **Attempt the following.**

(a) Draw data flow diagrams for online examination system. State the detailed definition first. [8]

OR

(a) Explain all fact finding methods in detail with example.

SECTION-II

Q.4 **Answer the following (Any three)** [9]

1 Aggregation vs generalization
2 Include vs extend in usecase digarams
3 Change vs time event in state transition diagram
4 Class vs interface

Q.5 (a) Explain swimlane activity diagram with example. [4]
(b) Explain the types of modeling done by each UML diagram [4]

OR

Q.5 (a) Explain multiple inheritance and its workarounds [4]
(b) Explain control operators in sequence diagrams [4]

Q.6 **Explain the following.**

(a) Draw use-case diagram for online matrimonial website. State the problem definition explicitly. [8]

OR

(a) Draw example diagram for the following (Any two). [8]
1. Do/entry/exit activities
2. Association class
3. Qualifier in class diagram

2/37

2606E0193

Candidate's Seat No :_____

M.C.A. (Sem.-4) Examination
Distributed Application Development
June 2019

Time : 3-00 Hours] **[Max. Marks : 50**

Note : (1) Write both the sections in the separate answer books.
(2) Figures to the right indicate full marks.
(3) Write answers in point form.

SECTION-I

Q.1 Answer the following (Any three) [12]

(a) What is RMI? Explain its architecture.
(b) What is XML? Write a note on available XML parsers.
(c) Explain Scrollable and Updatable ResultSet in database programming.
(d) Explain property types of Java Beans.

Q.2 Explain the following (Any four) [08]

(a) Socket
(b) JDBC
(c) Transaction Management
(d) Internationalization
(e) Resource Bundle

Q.3 Do as directed [05]

(a) Fill in the blanks:
   i. _____ class is used to convert between host names and internet addresses.
   ii. In Java Beans, _____ property is one that takes a single value such as a string or a number, while _____ property specifies an array.

(b) Identify whether the statement is true or false:
   i. In JDBC, Result sets are scrollable and updatable by default.
   ii. Internationalization is a mechanism to create such an application that can be adapted to different languages and regions.

P.T.O.

E193-2

SECTION-II

Q.4 Answer the following (Any three) [12]

(a) Explain Servlet Life Cycle.

(b) Explain Session Management of a Servlet along with its techniques.

(c) Explain Servlet Filter along with its advantages.

(d) Explain features of Apache Ant Tool.

Q.5 Explain the following (Any four) [08]

(a) Servlet

(b) Servlet Context

(c) Request Dispatcher

(d) forward() vs sendRedirect()

(e) Deployment Descriptors

Q.6 Identify five incorrect syntaxes in the following Java code and correct it [05]

```
//A java program to fetch records from the database
try {
   String driver = "com.mysql.cj.jdbc.Driver";
   String connectionUrl = "odbc:mysql://localhost:3306/shopping_database";
   Class.forName(driver);
   Connection connection = DriverManager.getConnection(connectionUrl,
   "root", "");

   Statement statement = connection.createStatement( );
   String query = "SELECT name, price, category_id FROM shopping_list";
   int resultSet = statement.executeUpdate(query);
   while (resultSet.nextLine( )) {
      System.out.println(resultSet.getString(1) + " | " +
      resultSet.getDouble(2) + " | " + resultSet.getInt(3));
   }
   connection.close( );
} catch (IOException e) {
      System.err.println("Exception : " + e.getMessage( ));
}
```

2706E0197

Candidate's Seat No :_____

M.C.A. (Sem.-4) Examination
Elective-I : Artificial Intelligence
June 2019

Time : 3-00 Hours] **[Max. Marks : 50**

Instructions:

1. Figures to the right indicate full marks
2. Each section should be written in a separate answer book
3. Be precise and to the point in your answer

SECTION-I

1. Answer the following briefly: (Any Nine) **[09]**

i. What is Artificial Intelligence? Mention any 1 application of AI around you.
ii. Define: State Space Search. Draw an example State Space for tic-tac-toe.
iii. What does a production rule consist of?
iv. Draw Search Graph/Search Tree for 3-water jug problem.
v. Give examples to show the limitations of Prepositional logic.
vi. Which search method out of BFS and DFS takes less memory? Why?
vii. What is a Heuristic Function? Give an example.
viii. Distinguish between: Declarative and Procedural Knowledge.
ix. What is Local Minima? Suggest a possible solution to overcome the problem.
x. Present an example of your choice to show usage of Frames in knowledge representation.
xi. Write any 2 advantages of Semantic Nets over other knowledge representation techniques.

2. Answer the following: (Any Two) **[08]**

A. Analyze the seven problem characteristics for Travelling Salesman Problem.
B. Explain Steepest Ascent Hill Climbing algorithm with the help of proper example.
C. Consider the following sentence and do as directed:

"Fred finds a furry white kitten in the garden"

a) Draw a Semantic Network.
b) Represent the knowledge using Conceptual Dependency.

3. Consider the following sentences: **[08]**

1. Lucy is an employee and he works for a company.
2. All employees are people.
3. Fred is the boss.
4. Bosses give instructions to employees.
5. All employees do consider the boss a friend or dislike him.
6. Everyone is a friend of someone.
7. People only criticize people that are not their friends.
8. Lucy criticized Fred.

a) Translate these sentences into formulas in predicate logic.
b) Find "Does Lucy like Fred?" using Backward Chaining.

P. T. O.

SECTION-II E\97-2

4. **Do as Directed: (Any Three)** [09]

A. What is Intelligent Agent? Describe how an Internet Shopping Agent is affected by various environment types.

B. Explain the stages for designing knowledge base in Expert System.

C. Which common problems are encountered while processing Natural Language? List any 2 applications of Natural Language Processing.

D. Distinguish between: Supervised and Unsupervised Learning.

5. **Answer the following w.r.t. PROLOG:** [08]

A. a) Discuss ways in which Prolog fails and backtracks. [04]

b) Explain the process of Winding and Unwinding giving an example.

B. Write Prolog rules to perform the following operations on List of integers: [03]

a) Count number of elements

b) Delete the k^{th} element

C. What is the difference between the outputs of following two rules? [01]

find(X):- a(X), b(X).	find(X):- a(_), b(_).

6. **Answer the following with the help of appropriate examples: (Any Two)** [08]

A. The performance of MiniMax search procedure can be improved using Alpha-Beta Pruning. Using appropriate examples explain the operation of Alpha-Beta Pruning.

B. Present the architecture of Multilayer Perceptron and explain the Backpropagation Learning algorithm.

C. Discuss the steps of Natural Language Processing.

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