R20

MBA II SEM

REGULAR & SUPPLEMENTARY EXAMINATIONS

JULY 2023

Subject Code: R20MCA201

MCA - II Semester Regular & Supple Examinations, July-2023
COMPUTER NETWORKS

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

**1.** (a) What are the limitations of aloha

(b) Match the following to one or more layers of the OSI model:
   a. Reliable process to process message delivery–
   b. Route selection
   c. Defines frames
   d. Provides user services such as email and file transfer
   e. Transmission of a bit stream across a physical medium
   f. Providing services for the end user
   g. Flow control
   h. Interface to transmission media

(c) What is the purpose of a subnet mask?

(d) What are the functions of MAC?

(e) What are the two categories of QoS attributes?

[2+2+2+2+2+2]

PART-B

4X 12 = 48

2. (a) Explain the ISO-OSI reference model with neat sketch

   (b) Find the CRC cyclic redundancy check for the following message M = 1010001101, using the divisor polynomial $x5 + x4 + x2 + 1$.

3. (a) CSMA/CD (CSMA with Collision Detection) is widely used on LANs (Ethernet) in the MAC sub layer. Explain how it functions?

   (b) Explain the token passing mechanism of Token Ring network.

4. (a) Explain the Distance vector routing algorithm for the following graph
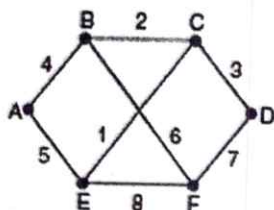
   (b) Explain Congestion Control and Congestion Avoidance in detail.

5. (a) Explain the IP header with neat sketch

(b) Consider an IP Packet with a length of 4,500 bytes that includes a 20byte IPv4 header. The packet is forwarded to an IPV4 router that supports a MTU of 600 bytes. How many fragments are generated? What are their characteristics (i.e. what are the flags and offset values for each?

6. (a)Explain the three way handshake protocol to establish the transport level connection.

(b) Explain the flow control mechanisms in TCP

7. (a) How does MIME enhance SMTP?

(b) Explain the RSA algorithm with example

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NEC

Subject Code: R20MCA202

MCA - II Semester Regular & Supple Examinations, July-2023
OBJECT ORIENTED PROGRAMMING USING JAVA

Time: 3 hours
Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) List the types of variables in Java
    (b) What is garbage collection?
    (c) State the advantages of inheritance
    (d)Why do we use daemon threads?
    (e) Differentiate AWT and Swings
    (f) Distinguish between radio buttons and check boxes

    [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) What are the shortcomings of procedure oriented programming? Explain how does object oriented programming overcome these shortcomings
    (b) What is instance? How it is different from class?

3. (a) Explain the concept of scope and life time of a variable
    (b) Explain different control statements which are used in Java.

4. (a) Demonstrate the use of package and interface with an example program to calculate student marks statement
    (b) What is an abstract class? What is its importance? How is it designed in java?

5. (a) What is a "finally" block? When and how is it used? Give a suitable example
    (b) Write a java program to create three threads one for printing 1to 10 numbers, one for performing arithmetic operations and one for printing a multiplication table

6. (a) How to handle events? Discuss the relationship between event sources and listeners
    (b) Discuss about lists & scrollbars with an example

7. (a) Write an applet to find whether the given no is strong number or not
    (b) Explain the steps to passing parameters to an applet with an example

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NEC

Subject Code: R20MCA203

MCA - II Semester Regular & Supple Examinations, July-2023
SOFTWARE ENGINEERING

Max Marks: 60

Time: 3 hours

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is Software? List its characteristics.
   (b) What do you mean by functional and non – functional requirements?
   (c) Define C & C (Component and Connector)?
   (d) What do you understand the evolution of architecture?
   (e) Define Quality. How can you assess the quality of the software?
   (f) Define Risk. List out the various risks available?

   [2+2+2+2+2+2]

PART-B

4X 12 = 48

2. Explain the various levels of Capability Maturity Model Integration.

3. Assume that you are the technical manager of a software development organization. A client approached you for a software solution. The problem stated by the client have uncertainties which lead to loss if it is not planned and solved. Which software development model will you suggest for this project – justify. Explain the model with pros and cons and neat sketch.

4. (a) What is meant by Effort Estimation and Explain its factors.
   (b) What are Architecture styles. Explain its importance.

5. (a) What are the types of behavioural models? Explain with an example?
   (b) Explain design process?

6. What is black box testing? Explain different black box testing strategies. Explain by considering suitable examples?

7. Which software process model is good for risk management? Explain the model. Describe how the model is used to layout the objectives, risk and plans for quality improvement.

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Subject Code: R20MCA204
MCA - II Semester Regular & Supple Examinations, July-2023
DESIGN AND ANALYSIS OF ALGORITHMS
Time: 3 hours   Max Marks: 60
Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Prove that $f(n)=3n^2+2n+2$ is $O(n^2)$.

(b) Define disjoint sets and explain its operations

(c) Differentiate between Greedy method and Dynamic programming.

 (d) Define Graph coloring problem.

(e) Define Binary search and write best, worst and average case time complexities of Binary search.

(f) Define Non-Deterministric Polynomial Time Problems.

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PART-B

4X 12 = 48

2. (a) Explain asymptotic notations with examples.

(b) Explain how Union operation can be done on two different sets using Weighted Rule with an algorithm.

3. (a) Explain Merge sort with Recursive Algorithm and derive its time complexity.

(b) Derive the time complexity of Strassen's Matrix multiplication using recurrence relation.

4. (a) Define Spanning tree? Explain Prim's minimum cost Spanning tree with an algorithm and suitable example.

(b) Find the Optimal solution for given Knapsack instances using greedy method
    N=4, M=20, (P1,P2,P3,P4)=(25,24,15,18), (W1,W2,W3,W4)=(18,16,10,15).

5. (a) Find the Minimum number of operations required for the following Chain Matrix Multiplication using Dynamic programming. A(5x3) * B(3x4) * C(4x2) * D(2x6)
(b) Construct an optimal travelling sales person tour using Dynamic Programming.

$$\begin{pmatrix} 0 & 10 & 9 & 3 \\ 5 & 0 & 6 & 2 \\ 9 & 6 & 0 & 7 \\ 7 & 3 & 5 & 0 \end{pmatrix}$$

6. (a) Explain 4-Queen's problem using backtracking and Draw the state space tree by taking implicit constraint, explicit constraint and bounding functions.
(b) Describe the Backtracking technique for Hamiltonian Cycle. Explain with an example.
7. (a) Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance:
n = 5, (p1,p2,...,p5) = (10,15,6,8,4), (w1,w2,..,w5) = (4,6,3,4,2) and m=12.
Find an optimal solution using fixed – tuple sized approach.

(b) How P and NP problems are related? Give the relation between NP-hard and NP-Complete problems.

Subject Code: R20MCA207

MCA - II Semester Regular & Supple Examinations, July-2023
DATA WAREHOUSING AND DATA MINING

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Discuss various tasks of data mining.
   (b) Explain discretization.
   (c) Explain features of OLAP & OLTP.
   (d) Discuss Measures for Selecting the Best Split.
   (e) What is Pruning? Discuss.
   (f) What is clustering analysis?

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PART-B

4X 12 = 48

2. (a) What do you mean by data mining? What kind of data and patterns can be mined? What are the major challenges of data mining?
   (b) Explain Measurement and Data Collection Issues.

3. (a) Why is data preprocessing became an inevitable phase in the knowledge discovery process? Explain about the major tasks in data preprocessing.
   (b) Explain Discretization & Binarization with Example.

4. (a) Explain the three-tier Data Warehousing architecture. Write about Data Warehouse characteristics.
   (b) Illustrate various schemas for multidimensional data models, from tables to data cubes.

5. (a) Explain about the Decision tree construction with example
   (b) State Bayes' theorem. Explain various classification models based on this theorem.

6. (a) Demonstrate Apriori algorithm with example.
   (b) Discuss different methods to handle Continuous Attributes

7. (a) Demonstrate k-means clustering technique and also discuss its strengths and weaknesses.
   (b) Explain the DBSCAN clustering technique and also derive its time and space complexities.

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