Registration No : | | | | | | | | | | |

Total Number of Pages:02 **MCA 2 Yrs**
MCA02001

2nd Semester Regular / Back Examination: 2021-22
COMPUTER NETWORKS
BRANCH(S): MCA (2 Yrs)
Time: 3 Hour
Max Marks :100
Q.Code:J402

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 × 10)**

a) What is mean by data communication?
b) What are the responsibilities of data link layer?
c) What is ARQ?
d) Write short notes on Ethernet?
e) What is a Hub?
f) Define LAN?
g) Difference between IPv4 and IPv6?
h) What is the purpose of Domain Name System?
i) What is TELNET?
j) What is FTP?

Part-II

Q2 **Only Focused-Short Answer Type Questions-(Answer Any Eight out of Twelve)** **(6 × 8)**

a) What is the key idea of Stop & Wait Protocol? Explain in detail.
b) What is CSMA/CD? Why we use it? Explain in detail.
c) What is the role of layers, protocols, interfaces and services? Explain.
d) Explain ICMP and IGMP protocol used in network layer?
e) Connection less and connection-oriented protocol
f) What is framing? What are various methods used for framing? Explain them with examples.
g) What do you understand by Selective Repeat Sliding window protocol? Also discuss the size of sliding window at both the sender site and receiver site.
h) Why we need media access control protocol? Explain ALOHA in detail.
i) Why routing protocol is required? Explain flooding and multicast?
j) Explain the effect of noise of on coaxial cable and twisted pair cable?
k) Draw and explain the header format of a Real Time Transport Protocol.
l) List the steps in TCP connection establishment.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is meant by framing and error control? Discuss the different framing techniques used by data link layer. **(16)**

Q4 What do you mean by Carrier Sense? What are various Carrier Sense Multiple Access (CSMA) Protocols? Describe in detail with diagram? **(16)**

Q5 How transport layer is used for connection management? What is the need of UDP protocol? Explain. **(16)**

Q6 How does information get passed from one layer to the next in OSI reference model? Explain. **(16)**

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Total Number of Pages : 02 **MCA (2 Yrs)**
MCA02002

2nd Semester Regular / Back Examination: 2021-22
ANALYSIS AND DESIGN OF ALGORITHMS
BRANCH(S): MCA (2 Yrs)
Time : 3 Hour
Max Marks : 100
Q.Code : J473

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions :** **(2 × 10)**

a) Explain the situations when insertion sort performs the worst and the best.
b) What are the characteristics of a Red-Black tree.
c) Write the advantages and disadvantages of Depth First Search over Breadth First Search.
d) Explain the principle of optimality with example.
e) Write the recursion of binary search and solve it by Master's method.
f) Given three matrices A(10x50), B(50x100) and C(100x5). What is the minimum number of scalar multiplications required to multiply these three matrices.
g) What is the limitation of Rabin-Karp algorithm?
h) Explain the greedy technique to solve the Travelling Salesman Problem.
i) Differentiate between deterministic and non deterministic algorithm.
j) Write two real-life applications of Travelling Salesman Problem.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Explain the physical significance of asymptotic notations O, Ω and Θ with example.
b) Solve the following recurrence using Master's method.

$$T(n) = 1 \text{ for } n=1$$
$$= 7T(n/2) + cn^2 \text{ for other values of } n$$

c) Construct the AVL tree for the given set of elements
12, 67, 34, 78, 23, 45, 69, 17, 28, 10, 27, 59
d) Write the Prim's algorithm to construct the minimum spanning tree and find the time complexity.
e) Is greedy technique suitable to find the optimal solution of 0/1 knapsack problem? Justify your answer.
f) Construct the state space tree for solving sum of subset problem and explain how backtracking can be used to solve the problem with reduced time complexity.
g) What is the limitation of finite automata method for string matching problem? How KMP algorithm overcomes it?

h) Define optimal binary search tree problem. Explain how dynamic programming technique finds the optimal solution of it.

i) Explain the mathematical analysis of recursive and nonrecursive algorithms.

j) What is reducibility? Explain with example.

k) Compare the advantages and disadvantages of linked list representation and tree representation of a disjoint set.

l) Explain the following problems.
Vertex cover decision problem and Vertex cover optimization problem,
Clique Decision problem and Max Clique problem,
Chromatic number Decision problem and Chromatic number optimization problem

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 **a)** Write the algorithm to create a heap by using heapify procedure and find the time complexity. **(8)**

b) Compute the worst case and average case time complexity of quick sort. Explain the situation where quick sort performs the worst. **(8)**

Q4 **a)** Construct the decode tree for the given letters and their frequencies of occurrence in the message. **(8)**
(a, b, c, d, e, f, g) = (2, 3, 5, 7, 9, 13, 20)

b) Find the longest common subsequence in the following given two sequences **(8)**
X=”RAMAYAN” Y=”ATMAN”

Q5 **a)** Explain how the backtracking algorithm works to solve the 4-queen problem. Explain by constructing the state space tree. **(8)**

b) Explain with example how Rabin Karp algorithm works to find a exact and spurious match of substring in a string. **(8)**

Q6 **a)** What is approximation algorithm? Can we say greedy algorithm is an approximation algorithm? Justify your answer. **(8)**

b) Explain P, NP, NP-hard and NP-complete class of problems. **(8)**

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Total Number of Pages: 02 **MCA (2 Yrs)**
MCA02003

2nd Semester Regular / Back Examination: 2021-22
OBJECT ORIENTED PROGRAMMING USING JAVA
BRANCH(S): MCA (2 Yrs)
Time: 3 Hour
Max Marks: 100
Q. Code: J547

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 × 10)**

a) State the advantages of Object-oriented programming Paradigm.
b) Distinguish between Data abstraction and Data encapsulation with examples.
c) Is Java a Platform neural Language? Justify your answer.
d) State the rules for naming Java Identifiers.
e) The following is a segment of a program:
X=1:
Y=2;
if(n>0)
X = X+1:
Y = Y-1:
What will be the values of X and Y if 'n' assumes the values: (a) 0 and (b) 1?
f) State the difference between instance variables and class variables.
g) Write down the significance of super keyword with suitable example.
h) What are wrapper classes? Give an example.
i) What is the difference between overriding and overloading a method?
j) What is unchecked and checked exception?

Part-II

Q2 **Only Focused-Short Answer Type Questions-(Answer Any Eight out of Twelve)** **(6 × 8)**

a) Describe the different level of access protection available in Java.
b) Create a base class called Shape, it contain two methods getxyvalue() and show xy value() for accepting co-ordinates and to displaying the same. Create a subclass called Rectangle. It also contains a method to display the length and breadth of the rectangle called show xy value(). Use the method overriding concept.
c) What is an abstract class? Can an abstract class have constructors? Explain.
d) If you create two threads in your program, how many threads actually run? Explain the complete flow of execution of threads inside a program.
e) What is thread priority? How can it be set for a thread?
f) Write a Java program to count the number of words and characters in a string.
g) Explain class path. What is the procedure to set user defined class path?
h) Explain how exception handling mechanism can be used in a Java program.
i) Write a Java program to implement Runnaable class to create a Thread.
j) Write a Java program to display the different car names using list object.

k) Write an applet to display an user defined image and play an user defined song.

l) Write a Java program to display the month names by JList and display the Days by JComboBox.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain the different types of inheritance with schematic diagrams and examples? Write down a Java program that uses interface to obtain multiple inheritance. **(16)**

Q4 How do you define try and catch block? Can a try block have two finally block? Prove it? Define an exception called "NoMatchException" that is thrown when a string is not equal to "BPUT". Write a Java program that uses this exception. Differentiate between Checked and Unchecked exceptions. **(16)**

Q5 What is Event handling? Explain the Event Class hierarchy in Java. Write a Java program to demonstrate the use of mouse handling events. **(16)**

Q6 Explain the life cycle of an Applet. Write an applet to illustrate the life cycle of an Applet. What is the default layout of an Applet? Write an applet to draw National flag with tricolors. **(16)**

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Total Number of Pages: 02 **MCA (2Yrs)**
MCA02004

2nd Semester Regular / Back Examination: 2021-22
OBJECT ORIENTED ANALYSIS & DESIGN
Branch(S): MCA (2 Yrs)
Max Marks: 100
Time: 3 Hours
Q Code J627

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(02×10)**

a) What are the main advantages of object-oriented development?
b) Distinguish between method and message in object.
c) Define patterns.
d) What is meant by low coupling?
e) What is meant by Abstract Class?
f) Differentiate between coupling and cohesion.
g) List the phases of unified process.
h) What is UML?
i) Define law of demeter.
j) What is meant by interface segregation principle?

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(06×08)**

a) Define and differentiate between a class and an object. Explain the different relationships possible among classes.
b) Define and differentiate between aggregation and composition.
c) Compare between Activity and State chart Diagram with examples.
d) Define and differentiate between static and dynamic modelling in UML. List out the different types of diagrams that we deal with under each category.
e) Explain in detail about the interaction diagrams and its notations.
f) Explain about association and attributes.
g) Explain logical architecture and UML package diagram.
h) Explain in detail about the Class Diagram.
i) Differentiate between Include and Extend use case relationships.
j) Briefly explain about UML sequence diagrams.
k) Define and describe Martin's package metrics.
l) Briefly explain about flyweight design patter with an appropriate example.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Write a problem statement for Library management system. Draw the UML Use Case, Activity diagram, Class diagram, Sequence diagram, State Chart diagram, package diagram, Component and Deployment diagrams. **(16)**

Q4 What do you mean by Unified Process in OOAD? Explain the phases withsuitable diagrams. **(16)**

Q5 List out the key design principles. Explain about the following design patterns: Singleton, observer, adapter, Façade, proxy with examples. **(16)**

Q6 State and elaborate the SOLID principles of object-oriented programming. Give proper example as required. **(16)**

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Total Number of Pages : 03 **MCA (2 Yrs)**
MCA02005

2nd Semester Regular / Back Examination: 2021-22
Internet and Web Programming
BRANCH(S): MCA (2 Yrs)
Time : 3 Hour
Max Marks : 100
Q.Code : J694

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is the difference between a switch and router?
b) With a neat diagram, show the various layers of OSI model.
c) Which tags are present in the head tag of an HTML document?
d) What is the difference between GET and POST method in html form?
e) Write code in JavaScript to convert temperature in Fahrenheit to Celsius.
f) Create a list of 5 presidents of Independent India displaying their names and photos.
g) What is the difference between padding and margin property of CSS? Show the difference through an example figure.
h) Given a string “Good Morning”. Write a program in Javascript to find the length of the string.
i) Write the syntax of an anchor tag with an example.
j) Differentiate between symmetric key and asymmetric key cryptography?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) What is HTTP? Briefly describe the HTTP Request Message format.
b) Provide the syntax of following HTML tags: image, paragraph, division, span, bold, headings with examples.
c) Write a program using HTML and CSS to display a time table as shown in figure.

TIME TABLE

Day/Period	I 9:30-10:20	II 10:20-11:10	III 11:10-12:00	12:00-12:40	IV 12:40-1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
Monday	Eng	Mat	Che	LUNCH	LAB			Phy
Tuesday	LAB				Eng	Che	Mat	SPORTS
Wednesday	Mat	phy	Eng		Che	LIBRARY		
Thursday	Phy	Eng	Che		LAB			Mat
Friday	LAB				Mat	Che	Eng	Phy
Saturday	Eng	Che	Mat		SEMINAR			SPORTS

d) Differentiate between a web browser and web server. Give examples of two of each.

e) What is a regular expression in javascript? Explain the use of following RegEx methods: test(), execute().
What is the meaning of following patterns in a Regular expression pattern search: [abc],[0-9],(x|y)
What is the value of n in the following code snippet
var str = "Visit BPUT"
n = str.search(/bput/i);

f) Describe the use of following attributes in an html table with an example.

1. align
2. border
3. bgcolor
4. cellspacing
5. cellpadding
6. background

g) Explain with examples about the various operators available in Javascript.

h) Differentiate between external CSS and internal CSS with examples.

i) Discuss how a digital signature ensures the integrity of a digital document?

j) Write a short note on firewall.

k) What is an event in Javascript? Write a program using java script and HTML to display the full name of a student when he/she clicks on a submit button after entering his/her first name and last name in corresponding text fields.

l) Design a form using HTML and CSS to register students for a workshop on "Internet of Things".

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Design a webpage for your resume which shall have your bio data with a photo. **(16)**

Q4 Design a website for your college. The website should have details about the institute, The faculty directory, About the Academics of the institute, a notice board displaying important notices etc. **(16)**

Q5 Write a form that will collect information from a visitor and send it to be processed by JavaScript in the page summary.html. The form should collect the following information: petName (the name of a pet), petType (which can be either Dog, or Cat, or Bird) and pedigreed (which is either true or false, and should start out checked). Your form should include a Submit button, and should demonstrate proper use of the tag. In the summary page display the details entered by the visitor. **(16)**

Q6

a) Describe the document structure in HTML. (3)
b) What is the advantages of using CSS in HTML document? (3)
c) Describe the use of following background properties in CSS through examples. (5)

- background-color
- background-image
- background-repeat
- background-attachment
- background-position

d) Write a program using javascript, html and CSS which will change the color of a link(anchor) depending on visited, hover or active state. (5)

(16)