Hall Ticket Number :										

R-20

Code: 20DF2GT

M.C.A. II Semester Regular Examinations November 2021

Design & Analysis of Algorithms

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	Blooms Level

UNIT–I

1. a) Determine the number of times " There is no ornament like virtue" and "AITS Rajampet" is printed in the Display() algorithm given below when 'n' is provided as input.

```
Algorithm Display(n)
{
    for i:= 1 to n do
        for j:=i+1 to n do
            print "There is no ornament like virtue"
                for k:=1 to n do
                    print "AITS Rajampet";
}
```

6M CO1 L2

b) With pseudo code explain an algorithm for solving towers of Hanoi problem. Give a recurrence for the running time of your algorithm and represent it using θ-notation. 6M CO1 L2

OR

2. a) Define the asymptotic notations big-oh (O), big-omega (Ω) and theta (Θ). Give an example for each of the notations. 6M CO1 L1

b) Explain with an example general frame work for analyzing non-recursive algorithms. 6M CO1 L2

UNIT–II

3. a) Give a recurrence for the running time of merge sort algorithm. Solve the recurrence and represent its running time using θ-notation.

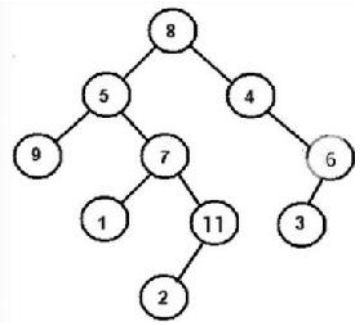
Consider the following pairs of sorted lists:

A: (30; 50; 70; 90) and (20; 40; 60; 80)

B: (10; 20; 30; 40) and (50; 60; 70; 80)

Which pair is more efficiently *merged*. Justify. 6M CO2 L5

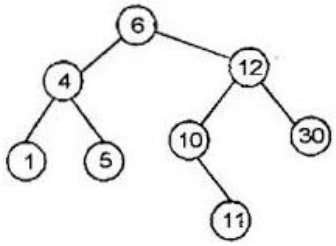
b) With pseudo code explain a recursive inorder traversal algorithm. Determine the inorder traversal of the following binary tree.



6M CO2 L3

OR

4. a) Perform the inorder, preorder and postorder traversal on the following binary tree.



6M CO2 L3

b) Give a recurrence for the worst-case running time of the following algorithms and represent it using θ-notation.
i). Binary search ii). Quick sort — 6M CO2 L2

UNIT–III

5. a) Define the following terms and give an example for each.
i). Principle of optimality i.e., optimal substructure
ii). Overlapping subproblems — 6M CO3 L1

b) Define a Minimum Spanning Tree (MST). With pseudo code explain Prim's algorithm for finding a MST of an undirected, weighted graph. Analyze the running time of the Prim's algorithm if the priority queue is implemented as a binary heap data structure? — 6M CO4 L2

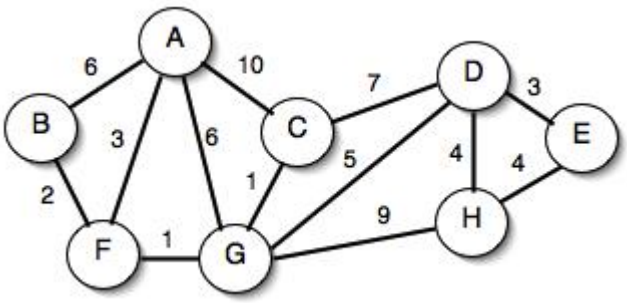
OR

6. a) Define 0/1 knapsack problem. Solve the following instance of 0/1 knapsack problem by applying dynamic programming algorithm.

Item No	Weight (Kg)	Profit (Rs)
1	2	1
2	3	2
3	4	5

Knapsack capacity = 6 Kg. — 6M CO3 L3

b) What is minimum spanning tree (MST)? Determine an MST of the following graph by applying Kruskal's algorithm.



6M CO4 L3

UNIT–IV

7. a) Explain the general method of backtracking. — 6M CO5 L2

b) Give a backtracking solution to graph coloring problem. — 6M CO5 L2

OR

8. a) Explain the general method of branch and bound with a suitable example. — 6M CO5 L2

b) Explain briefly the main steps in a backtracking solution to Hamiltonian cycle problem. — 6M CO5 L3

UNIT–V

9. a) How to show that a problem is NP-hard. Explain with an example. — 6M CO6 L2

b) Define the decision version of the clique problem. Show that the clique decision problem is in NP. — 6M CO6 L3

OR

10. a) Define the complexity classes NP, NP-hard and NP-complete. Also give an example for each of the classes. — 6M CO6 L1

b) Explain the COOKs theorem with an example. — 6M CO6 L2

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Hall Ticket Number :										

R-20

Code: 20DF2ET

M.C.A. II Semester Regular Examinations November 2021

Management Information Systems

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What do understand by MIS? Distinguish between data and information.	6M	CO1	L1
	b)	Explain Expert System and Knowledge Management System.	6M	CO1	L2
		OR			
2.	a)	Describe emerging issues and concepts in information system.	6M	CO1	L1
	b)	What are the characteristics of MIS? Explain its significance in the organization.	6M	CO2	L1
		UNIT–II			
3.	a)	What are the different types of information required by the different levels of management? Explain with examples.	6M	CO2	L2
	b)	List at least five inherent technologies which are affecting businesses and management. Explain how in short.	6M	CO3	L2
		OR			
4.		How information system impact organizational and business firms.	12M	CO3	L3
		UNIT–III			
5.	a)	Define system design. What should be included in design documentation?	6M	CO4	L4
	b)	Explain different system development life cycles with its stages. What is its use to develop MIS?	6M	CO4	L4
		OR			
6.	a)	Discuss different software development models in detail.	6M	CO4	L4
	b)	How to analyze the information needs of any project?	6M	CO3	L4
		UNIT–IV			
7.	a)	How to perform project management of MIS detailed design?	6M	CO4	L5
	b)	How to compute degree of automation of each operation?	6M	CO4	L4
		OR			
8.		The small publishing company for which you work, wants to create a new database for storing information about all of their books. What factor will influence how you design the database?	12M	CO4, CO5	L5
		UNIT–V			
9.	a)	Discuss different ethical and social dimensions of information system implementation.	6M	CO5	L5
	b)	In today's life, Individuals rely on information systems, generally Internet-based, for conducting much of their personal lives: for socializing, study, shopping, banking, and entertainment. Information technology refers to anything related to computing technology, such as networking, hardware, software, the Internet, or the people that work with these technologies. How do you differentiate between the information system and information technology? Explain using an example.	6M	CO5	L2
		OR			
10.		Write a note on: i) Organize for implementation ii) Train the operating personnel. iii) Computer related acquisitions	12M	CO1, CO4, CO5	L5

END

Hall Ticket Number :										

R-20

Code: 20DF21T

M.C.A. II Semester Regular Examinations November 2021

Operating Systems

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		Briefly explain about different kinds of Operating System Environments	12M	CO1	L3
		OR			
2.		What is operating systems and explain about different functions discharged by Operating System.	12M	CO1	L3
		UNIT–II			
3.	a)	What are the differences between primitive and non-primitive scheduling?	6M	CO2	L3
	b)	Compare the functionalities of Thread and Process.	6M	CO2	L3
		OR			
4.		Discuss about following scheduling algorithms with the help of examples			
	a)	Shortest Job First Scheduling Algorithm	6M	CO2	L3
	b)	Round Robin Scheduling Algorithm.	6M	CO2	L3
		UNIT–III			
5.		What is deadlock? Discuss about different methods to prevent the deadlock situation.	12M	CO3	L2
		OR			
6.	a)	Briefly Discuss about Algorithm for Deadlock Avoidance.	6M	CO3	L3
	b)	Explain how to recover from the Deadlock situation.	6M	CO3	L3
		UNIT–IV			
7.	a)	What is Paging? Discuss about Page Fault.	6M	CO4	L2
	b)	Explain about Virtual Memory.	6M	CO4	L2
		OR			
8.		Explain about different disk scheduling algorithms with a simple example.	12M	CO4	L2
		UNIT–V			
9.		How are the access-matrix facility and the role-based access-control facility similar? How do they differ?	12M	CO5	L3
		OR			
10.	a)	What is Computer Virus? Explain about any four types of Viruses	6M	CO5	L2
	b)	Briefly Explain about Network Threats.	6M	CO5	L2

END

Hall Ticket Number :										

R-20

Code: 20DF22T

M.C.A. II Semester Regular Examinations November 2021

Python Programming

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What is Python? Describe its features and applications.	6M	CO1	L2
	b)	What is IDE? Describe in detail about the functioning of IDLE?	6M	CO1	L2
		OR			
2.	a)	What are keywords in Python? Explain the rules for writing identifiers?	6M	CO1	L2
	b)	Write in detail about the data types in Python?	6M	CO1	L1
		UNIT–II			
3.	a)	Mention the different types of selection structures allowed in Python.	6M	CO1	L2
	b)	Write a Python program that prints multiplication table of a given number.	6M	CO1	L1
		OR			
4.	a)	What is the purpose of else clause for a loop? Explain how else works with while and for loops, with examples	6M	CO1	L2
	b)	What is a list in Python? How to create nested lists? Demonstrate how to create and print a 3-dimensional matrix with lists.	6M	CO1	L3
		UNIT–III			
5.	a)	Explain about different types of arguments in Python	6M	CO1	L2
	b)	Write a script to draw a pattern using Turtle?	6M	CO2	L1
		OR			
6.	a)	Outline about function definition and call with example.	6M	CO1	L4
	b)	Describe about default arguments with suitable program.	6M	CO1	L2
		UNIT–IV			
7.	a)	Illustrate the internal structure of a typical Python module with the suitable example?	6M	CO1	L2
	b)	Explain about the file reading and writing operations using format operator with Python code.	6M	CO3	L2
		OR			
8.	a)	Explain about how exceptions are handled with example.	6M	CO3	L2
	b)	Summarize the difference between dictionaries and sets.	6M	CO1	L2
		UNIT–V			
9.	a)	Describe the design of recursive functions.	6M	CO1	L2
	b)	Explain the advantages of using polymorphism in program design.	6M	CO5	L2
		OR			
10.	a)	Explain the appropriate use of iteration Vs. recursion.	6M	CO1	L2
	b)	Write a script illustrating multiple inheritance.	6M	CO5	L1

END

Hall Ticket Number :										

R-20

Code: 20DF23T

M.C.A. II Semester Regular Examinations November 2021

Software Engineering

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define the concept of software engineering with layered technology approach.	6M	1	L3
	b)	Discuss in detail on agile process for software development.	6M	1	L3
		OR			
2.	a)	Define software myths? Explain the various myths in detail	6M	1	L3
	b)	Explain in detail on CMMI?	6M	1	L3
		UNIT–II			
3.	a)	Describe SDLC Model with an example?	6M	2	L2
	b)	Bring out any three differences between functional& Non-functional requirements	6M	2	L2
		OR			
4.	a)	Write briefly about Requirements Elicitation and Analysis	6M	2	L2
	b)	Write short notes on data models	6M	2	L2
		UNIT–III			
5.	a)	Explain architectural design in detail?	6M	3	L3
	b)	Explain the concepts involved in organizing the system	6M	3	L3
		OR			
6.	a)	Explain any two Modular Decomposition Styles?	6M	3	L3
	b)	Explain the concept of design evolution?	6M	3	L3
		UNIT–IV			
7.	a)	List out the steps involved in planning the verification and validation.	6M	4	L2
	b)	Write a brief note on Software Inspections.	6M	4	L2
		OR			
8.	a)	Explain in detail on Component Testing	6M	4	L2
	b)	Describe the key concepts in test automation.	6M	4	L2
		UNIT–V			
9.	a)	Explain in detail on Project Management activities	6M	5	L3
	b)	Explain the concepts involved in Risk Management	6M	5	L3
		OR			
10.	a)	Define software cost estimation? Explain any one technique?	6M	5	L3
	b)	Discuss in detail on project duration and staffing?	6M	5	L3

END

Hall Ticket Number :										

R-20

Code: 20DF24T

M.C.A. II Semester Regular Examinations November 2021

Computer Networks

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What do you mean by computer network? List any two applications of computer networks.	6M	CO1	L1
	b)	Differences between Circuit Switching and Packet Switching.	6M	CO1	L4
		OR			
2.	a)	List and explain the different network topologies.	6M	CO1	L3
	b)	Compare and contrast the OSI model and TCP/IP model.	6M	CO1	L4
		UNIT–II			
3.	a)	Consider the delay of pure ALOHA versus slotted ALOHA at a low load. Which one is less? Explain your answer.	6M	CO2	L1
	b)	Datalink protocols almost always put the CRC in a trailer rather than in a header. Why? Explain.	6M	CO2	L2
		OR			
4.	a)	Mentioning the advantages and disadvantages, explain sliding window protocol using Go back n and using selective repeat.	6M	CO2	L4
	b)	What is the need for framing? Explain different farming methods in Datalink Layer.	6M	CO2	L3
		UNIT–III			
5.	a)	What is internetworking? What are the principles of internetworking?	6M	CO3	L1
	b)	How do you find the distance vector routing algorithm? Discuss.	6M	CO3	L1
		OR			
6.	a)	Difference between link state routing and distance vector routing	6M	CO3	L3
	b)	Explain the different congestion prevention policies at network layers?	6M	CO3	L2
		UNIT–IV			
7.	a)	List and explain the TCP connection management modeling	6M	CO4	L4
	b)	The following is a dump of a UDP header in hexadecimal format. CB84000D001C001C, Is the packet directed from a client to a server or vice versa?	6M	CO4	L3
		OR			
8.	a)	With the help of a neat diagram, explain the Data flow and flow control feedbacks in TCP.	6M	CO4	L3
	b)	DNS uses UDP instead of TCP. If a DNS packet is lost, there is no automatic recovery. Does this cause a problem, and if so, how is it solved.	6M	CO4	L4
		UNIT–V			
9.	a)	Explain the approach of Digital signature using Public-Key Cryptography	6M	CO5	L1
	b)	Discuss the Advanced Encryption Standard.	6M	CO5	L3
		OR			
10.	a)	Do you agree with the statement that an increase in the key size of 1 bit doubles the security of DES? Justify your answer.	6M	CO5	L2
	b)	Explain the Asymmetric-Key Cryptography algorithms.	6M	CO5	L3

END