Reg No.:_____ 0520MCA188072101 Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Year) Degree Examination July 2021

Course Code: 20MCA188

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1 Define an agent and rational agent in AI. (3)

2 Solve the following crypt arithmetic problem.

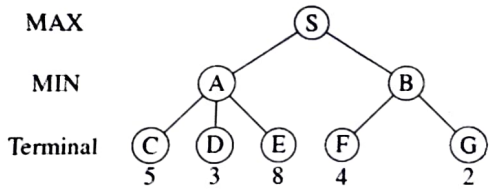
```
   EAT     819
+ THAT    9219
-------  10038
 APPLE
```

(3)

3 Compare and contrast BFS and DFS methods. (3)

4 Define a heuristic function and an admissible heuristic function with examples. (3)

5 Compute MINIMAX(S) in the following game tree.



(3)

6 List the requirements for knowledge representation systems in AI. (3)

7 Explain the inference rules in FOPL. (3)

8 Describe supervised, unsupervised and reinforcement learning. (3)

9 Give a short note on role of an expert system (3)

10 List some membership functions that define a certain special fuzzy sets. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11 Solve missionaries and cannibals problem. (6)

OR

12 Describe a production system in AI. What are the merits and demerits of production systems? (6)

Module II

13 Explain various uninformed search strategies. (6)

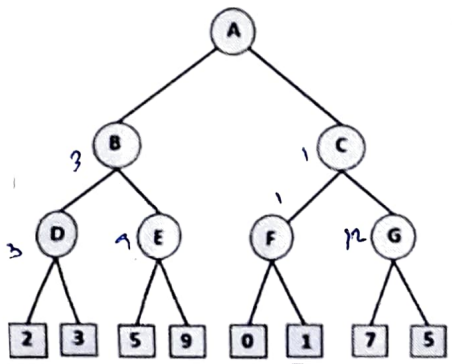
OR

14 Explain the following types of hill climbing: (6)

a. Simple hill climbing.
b. Steepest-ascent hill climbing

Module III

15 Explain alpha-beta pruning and determine which of the branches in the game tree below will be pruned if we apply alpha-beta pruning to solve the game (Assume that the maximising player plays first). (6)



OR

16 a) Describe the different types of semantic networks with examples. (3)

b) List advantages and disadvantages of semantic networks. (3)

Module IV

17 Explain the algorithm to convert WFF to clause with an example (6)

OR

18 Explain Neural net and Genetic learning methods in AI (6)

Module V

19 Briefly explain about typical expert systems. (6)

OR

20 Given the fuzzy sets (6)
A = {0.3/2, 0.4/3, 0.1/4, 0.8/5, 1.0/6}
B = {0.7/4, 0.5/5, 1.0/6, 0.02/7, 0.75/8} find A ∪ B and A ∩ B.

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Reg No.:_____ Name:_____

0520MCA172072103

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Year) Degree Examination July 2021

Course Code: 20MCA172

Course Name: ADVANCED OPERATING SYSTEMS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Explain Critical Section problem.	(3)
2		List out the different states of a process	(3)
3		Explain the requirements of Mutual Exclusion algorithms	(3)
4		Illustrate Access Matrix model	(3)
5		Discuss the mechanisms for building Distributed File Systems	(3)
6		Explain Distributed Shared Memory. What are the central issues during the implementation of Distributed Shared Memory	(3)
7		Explain the structure of Multiprocessor Operating Systems.	(3)
8		Differentiate between UMA, NUMA & NORMA architectures	(3)
9		Compare Wait-Die algorithm and Wound-Wait algorithm.	(3)
10		Discuss about the requirements of a database system	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11	(a)	Explain Serializer in Operating System.	(4)
	(b)	List out the advantages of Serializer over Monitor.	(2)

OR

12		Discuss two communication models that provide communication primitives in Distributed Systems	(6)

Module II

13		Discuss about mutual exckusion. Explain Lamport's Algorithm for Mutual Exclusion.	(6)

OR

14		Explain any six Design Principles for Secure Systems.	(6)

Module III

15		Discuss Sender Initiated Algorithm and Receiver Initiated Algorithm.	(6)
		OR	
16		Discuss Central Server algorithm and Migration algorithm.	(6)
		Module IV	
17		Discuss the design issues of Multiprocessor Operating Systems.	(6)
		OR	
18	(a)	Illustrate Virtualization in Operating Systems.	(2)
	(b)	Explain the advantages and disadvantages of Virtualization.	(4)
		Module V	
19		Explain:	
	(i	Logs,	(2)
	(ii)	Serial Logs,	(2)
	(iii)	Log Equivalences	(2)
		OR	
20	(a)	Discuss about 2 phase locking.	(2)
	(b)	Explain the problems with 2 phase locking	(4)

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Reg No.: TVE20MCA-2033 Name: Bobin

0520MCA102072102

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Years) Degree Examination July 2021

Course Code: 20MCA102

Course Name: ADVANCED DATABASE MANAGEMENT SYSTEMS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1 Differentiate logical data independence and physical data independence. (3)

2 With the help of an example, explain generalization and specialization in extended ER features. (3)

3 Define multivalued dependency and the related normal form with an example. (3)

4 Write down the inference rules for functional dependencies used in database normalisation. (3)

5 Discuss the ACID properties of a transaction. (3)

6 How does it implement concurrency control using timestamp method? (3)

7 Discuss any two RAID levels with diagram. (3)

8 Prepare a note on dense index and sparse index with example. (3)

9 Compare homogenous and heterogenous distributed databases. (3)

10 Explain array and multiset types in in SQL. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11 Construct an Entity-Relationship Diagram for a database of research projects. (6)

The database should contain the information about the following

Projects : name, manager, budget, duration (in years), funding agency

Employees : SSN, name, projects, salary¡

Each project is funded by a single agency. Project names are unique within an agency. An employee can be associated with several projects. Managers are

employees. You can make other additional assumptions that make sense in the real world.

OR

12 Identify the additional operations of relational algebra with suitable example. (6)

Module II

13 Discuss the anomalies at different levels of normalization with example. (6)

OR

14 Describe the informal design guidelines for relational databases. (6)

Module III

15 Explain why concurrency control mechanism needed in transaction management. (6)

OR

16 Define lock granularity and explain different levels of locking methods for concurrency control. (6)

Module IV

17 Elaborate on different file organization methods in data storage. (6)

OR

18 Explain the structure and search operation of a B+ Tree with an example. (6)

Module V

19 Explain about non-relational distributed databases. (6)

OR

20 Discuss about MongoDB sharding and replication. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

0520MCA104072102

Second Semester MCA (2 Year) Degree Examination July 2021

Course Code: 20MCA104

Course Name: ADVANCED COMPUTER NETWORKS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1	What is protocol layering? What are the reasons for using Layered Architecture in Computer Networks?	(3)
2	What is the role of SMTP in E-Mail message transfer?	(3)
3	Demonstrate the significance of sequence numbers in stop and wait ARQ.	(3)
4	Explain the TCP segment header format.	(3)
5	Compare datagram network with virtual circuit network.	(3)
6	Explain multicast routing.	(3)
7	Explain how parity is used to achieve error detection in data communication.	(3)
8	Explain the working of CSMA/CD?	(3)
9	Explain Network Address Translation.	(3)
10	What is VPN? List different types of VPN.	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11	Explain the working of File Transfer Protocol (FTP) and its features.	(6)

OR

12	Explain the two predominant network architecture used in modern network applications with diagrams.	(6)

Module II

13	Outline in detail the two well-known data transport protocols provided by the Internet transport layer.	(6)

OR

14	Explain why TCP congestion control is referred as Additive increase Multiplicative decrease form of congestion control.	(6)

Module III

15 Describe the format of IPv6 datagram with the help of a diagram, highlighting the significance of each field. (6)

OR

16 Explain the significance of routing in networking. Illustrate distant vector routing algorithm used in network routing. (6)

Module IV

17 a) What are channel partitioning protocols? Indicate the difference between each category of channel partitioning protocol. (3) (6)

b) Draw the Ethernet frame structure and mention the purpose of fields in it. (3)

OR

18 What are the different error detection techniques used at the data link layer? (6)

Module V

19 Explain Bluetooth with its architecture and layers. (6)

OR

20 Explain Network management and highlight the role of network administrator. (6)

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