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M.C.A DEGREE EXAMINATION, AUGUST 2023

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT202 - DATA STRUCTURES AND ALGORITHM ANALYSIS

2020 Admission Onwards

C8EFE1C5

Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1.   Distinguish between linear and non-linear data structures.

2.   List various applications of Stack.

3.   What are the different types of Queues?

4.   Differentiate the internal and leaf nodes of a tree.

5.   Explain the inorder traversal with example.

6.   Write an example of AVL tree.

7.   What is linear search?

8.   Define truncation method in hashing.

9.   Explain how merging of two sorted lists is performed.

10.   How is a minimum cost spanning tree generated from a graph using Prim's algorithm?

11.   Evaluate the time complexity of all pairs shortest paths algorithm.

12.   What are the searching techniques that are commonly used in branch and bound method?

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) Write an algorithm to evaluate Postfix expression using stack .Evaluate the following postfix expression using stack. 5 8 3 - / 6 * 2 %

    OR

    b) Explain the various operations performed on a circular queue with suitable algorithms and examples.

14. a) Define Tree and explain the Tree terminologies.

    OR

    b) Explain insertion of a node in binary search tree with algorithm and example.

15. a) Explain how binary search is different from linear search with example.

    OR

    b) Why hash functions are needed? Explain any 3 hash functions.

16. a) Explain the Binary search algorithm and analyse its performance.

    OR

    b) Explain how the divide and conquer strtegy is applied in Quicksort algorithm.

17. a) Explain the general method of dynamic programming.

    OR

    b) Explain the general method of backtracking with control abstraction.

(5×9=45 marks)

M.C.A DEGREE EXAMINATION, AUGUST 2023

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT201 - OPTIMIZATION TECHNIQUES FOR COMPUTER APPLICATIONS

2020 Admission Onwards

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Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1.   What are the basic assumptions in LPP ?

2.   Discuss Canonical Form of LPP.

3.   What you mean by Artificial variable in LPP ? Explain it with an example.

4.   What you mean by Duality in LPP?

5.   Write a note on transportation problem.

6.   Explain Vogel's method for finding intial basic feasible solution.

7.   Write a note on Assignment problem.

8.   What is mean by saddle point?

9.   What are customer's behaviour in a queue?

10.   What are the two basic planning and control techniques in a network anlysis ?

11.   Define critical activity and critical path.

12.   Explain briefly how 'n' jobs on 2 machines problem can be solved?

(10×3=30 marks)

13. a) An animal feed company must produce 200 kgs of a mixture consisting of ingredients X_1 and X_2 daily. X_1 costs Rs.30 per kg and X_2 Rs. 80 per kg. No more than 80kgs of X_1 can be used and at least 60 kgs of X_2 must be used .Formulate a mathematical model to the problem.

OR

b) Solve the following LPP using graphical method:- Minimize Z $=X_1 + X_2$

Subject to 2 $X_1 + X_2 \geq 4$, $X_1 + 7 X_2 \geq 7$,

$X_1, X_2 \geq 0$

14. a) Solve the LPP

Max Z$=2x-3y+4z$

Subject to the constraints $4x-3y+z \leq 3$, $x+y+z \leq 10$, $2x+y-z \leq 10$, $x \geq 0$, $y \geq 0$, $z \geq 0$

OR

b) Use Big M method to minimize Z$=4 X_1 + 3 X_2$

Subject to

$2X_1+X_2 \geq 10$, $-3X_1+2X_2 \leq 6$, $X_1+X_2 \geq 6$, $X_1 , X_2 \geq 0$

15. a) Solve the following transportation problem

	A	B	C	D	Supply
I	1	5	3	3	34
II	3	3	1	2	15
III	0	2	2	3	12
IV	2	7	2	4	19
Demand	21	25	17	17	

OR

b) Find the Assignments of salesman to various districts which will result minimum cost.

Salesman	District			
	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

16. a) Solve the game

Player A	Player B		
	6	-3	7
	-3	0	4

<center>OR</center>

b) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Service time on an average is 36 minutes. Calculate the following. (i) Average length of non-empty queue. (ii) The probability that the queue size exceeds 10. (iii) Average waiting time?

17. a) Consider the following data for activities in a given project.

Activity	A	B	C	D	E	F
Predecessor	_	A	_	B,C	C	D,C
Time(days)	5	4	7	3	4	2

Draw an arrow diagram for the project.Compute the earliest and latest event time.What is the minimum project completion time?List the activities in the critical path.

<center>OR</center>

b) Ten jobs are required to be processed on two machines M1 and M2 in the order, M1 M2. Processing times are given below. Determine an optimal sequence and evaluate the total elapsed time.

Job :	J1	J2	J3	J4	J5	J6	J7	J8
J9	J10							
M1 :	7	8	10	3	7	4	5	8
5	6							
M2 :	4	2	6	6	5	7	2	6
7	6							

<center>(5×9=45 marks)</center>

M.C.A DEGREE EXAMINATION, AUGUST 2023

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT203 - COMPUTER NETWORKING WITH TCP/IP

2020 Admission Onwards

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Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1.   Which are the different types of addresses in TCP/IP Protocol Suite?

2.   What is Selective Repeat ARQ?

3.   What is hidden terminal and Exposed terminal problem?

4.   Explain ATM Protocol Architecture.

5.   What is a mask in IPV4 addressing

6.   Summarize about proxy ARP

7.   Demonstrate the general format of ICMP messages .

8.   What is process to process communication?

9.   Explain half close connection termination.

10.   List the timers used by TCP.

11.   Explain HTTP

12.   What is SMTP

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) 13a) Explain Physical Layer functionalities in OSI model?

    OR

    b) 13b) Explain about User support layers in OSI?

14. a) 14a) Explain in detail about BSS and ESS in IEEE 802.11?

    OR

    b) 14b)Explain about Various LAN Connecting devices.

15. a) 15a) Discuss about Inter Domain and Intra Domain Routing with example?.

    OR

    b) 15b)Describe about packet format of IPV6.

16. a) 16a) Explain about Silly Window Syndrome in TCP?

    OR

    b) 16b) Explain TCP Segment Header Format with Diagram?

17. a) 17a) Discuss about WWW and its architecture

    OR

    b) 17b) Discuss about 1) DNS Messages and 2) Types of records

(5×9=45 marks)

M.C.A DEGREE EXAMINATION, AUGUST 2023

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT204 - DATA SCIENCE & BIG DATA ANALYSIS

2020 Admission Onwards

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Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1.   Explain the steps of knowledge discovery from data

2.   Write down any three Datamining Task primitives

3.   How do we handle mising values in data preprocessing?

4.   What is apriori property?

5.   Compare supervised learning and unsupervised learning process.

6.   What is cluster?

7.   Which are the facets of data science?

8.   How is Big Data useful in advertisement?

9.   Explain Regions in HBase.

10.   What are the features of MapReduce ?

11.   Define RDBMS

12.   Discuss about the data types in Hive

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) Explain KDD(Knowledge Discovercy from Data) process with suitable diagram

    OR

    b) Diffrence Between OLAP and OLTP

14. a) Discuss FP Growth Algorithm with an example.

    OR

    b) Explain the general approach for building a Classification model in detail.

15. a) Which are the facets of data science?

    OR

    b) Describe the steps involved in data preparation in Data Science process.

16. a) Write a short note on different technologies for handling big data

    OR

    b) Describe elaborately on Hadoop architecture with HDFS and MapRdeuce

17. a) Explain the features of non-relational database.

    OR

    b) Explain a) architecture of Hive b) Any 5 built-in functions in Hive

                                                                    (5×9=45 marks)