CSE

MID SEM

5th Semester Papers

2021-22

Harcourt Butler Technical University, Kanpur

MID (Odd) SEMESTER EXAMINATION [MSE]/ CLASS TEST
3rd Year, 5th Semester B.Tech. CSE+IT

Subject: Database Management Systems **(ECS-353)**

Total Time: 1 hour 30 minutes **Max. Marks: 15**

Q1.) A bank has many branches, and a large number of customers. A customer can open many different kinds of accounts with the bank. The bank keeps track of the customer with his SSN, name, address, and phone number. Age is a factor to check whether he is a major. There are different types of loans, each identified by a loan number. Customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account. Draw an ER Diagram for the bank. Make suitable assumptions and show them with suitable cardinality ratios. [5 marks]

Q2.) Consider the following relation schema for a BANK database:-
BRANCH (BranchID, Bname, City, Phone)
ACCOUNT (AccountNo, Aname, Atype, BranchID, Balance)
TRANSACTION (TID, Tdate, Ttype, AccountNo, Amount)
On the basis of the relational schema, write the following queries in SQL.

(1.) Retrieve the ID and names of all the branches located in "Seattle" City.
(2.) Retrieve the ID, type and amount of all the transactions of withdrawal type. [2 marks]

Q3.) Define Database Management System? What are its advantages over a file system? [3 marks]

Q4.) Define the attribute inheritance property with respect to specialization. Discuss in detail the various constraints that can be placed on specialization and generalization. [5 marks]

Mid –Semester (Odd Semester) Examination 2021-22
OPERATIONS RESEARCH (BMA- 341)
III B.Tech. (CS/IT/ET/ME/CE/EE)

Time: 1.5 hr. **MM: 30**

Note: Attempt all the questions:

Q.1 Explain all integer programming problem. Describe Gomory's constraint and explain its use in the solution of the problem. **(5)**

Q.2 Determine the initial basic feasible solution to the following transportation problem by using Vogel's Approximation Method: **(5)**

		Destination				
		D_1	D_2	D_3	D_4	Supply
Origin	O_1	6	1	9	3	70
	O_2	11	5	2	8	55
	O_3	10	12	4	7	70
	Demand	85	35	50	45	

Q.3 A captain of a cricket team has to allot five middle order batting positions to five batsmen. The average runs scored by each batsman at these positions are given in the table. **(5)**

Batting position →

Batsman↓	III	IV	V	VI	VII
A	40	40	35	25	50
B	42	30	16	25	27
C	50	48	40	60	50
D	20	19	20	18	25
E	58	60	59	55	53

Make the assignment so that the expected total average runs scored by these batsmen are maximum. **(5)**

Q.4 In a metal shop two articles A and B are produced. The article A takes 2 minutes to stamp, 3 minutes to form and 2 minutes to paint. The article B takes 4 minutes to stamp, 1 minute to form and 1.6 minutes to paint. The profit margins on products A and B are Rs. 6 and Rs. 9 respectively. The time available per week on each process is 50 hrs. (3000) minutes. How many products of type A and B should be produced so as to maximize profit? Find also the maximum profit by using graphical method.

Q.5 Use Big- M method to solve the following LPP: **(5)**

Minimize $Z = 12x_1 + 20x_2$

Subject to: $6x_1 + 8x_2 \geq 100$, $7x_1 + 12x_2 \geq 120$, and $x_1, x_2 \geq 0$

Q.6 What is degeneracy? Discuss a method to resolve degeneracy in LPP. **(5)**

OR

Discuss the main characteristics of OR with suitable examples.

Harcourt Butler Technical University, Kanpur

B.Tech. CS/ IT (3rd year)
Mid Term Exam (Odd Semester), 2021-22
Data Science (ECS-359)

TIME: 1Hr 30 Min **MM: 30**

NOTE: ATTEMPT ALL QUESTIONS.

Q1. What is Data Science? Describe different types of data analytics. **[5]**

Q2. Define Machine Learning and its types with their advantages and disadvantages. **[5]**

Q3. What do you understand by Deep Learning? Explain with examples **[5]**

Q4. Describe the application areas of Data Science and Machine learning. **[5]**

Q5. Define Artificial Neural Network (ANN). How it is different from biological Neural Network? **[5]**

Q6. Explain Chi-Square test and t-Test with example. **[5]**

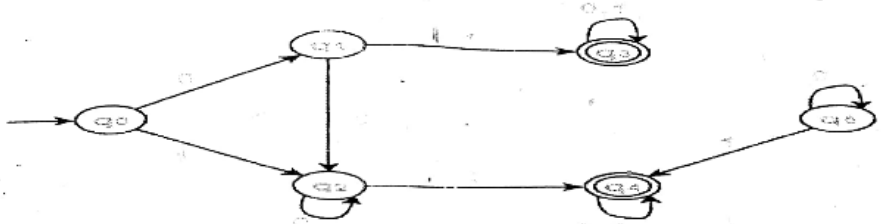
Harcourt Butler Technical University, Kanpur
Mid Semester Exam 2021-22
TAFL (ECS-357) / Third Year CSE / IT

Time: 90 minutes **Max Marks: 15**

Note: Attempt all questions.

Q1. Define the closure properties of the DFA. [3]

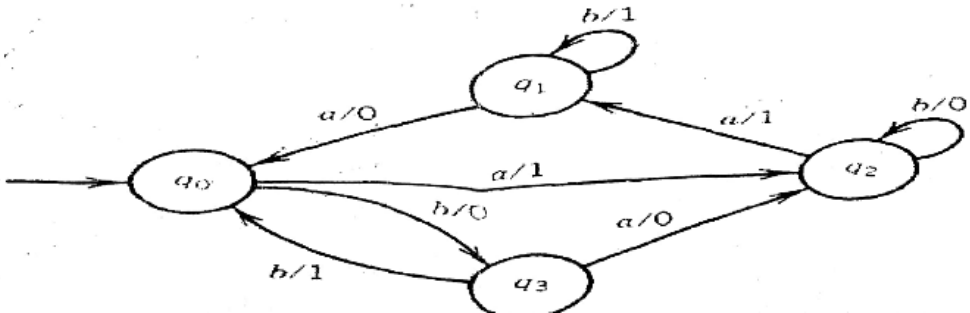
Q2. Illustrate the steps of subset construction method to minimize DFA. Show all the steps to Minimize the below given DFA [3]



Q3. Design a DFA for a set of strings over $\sum = \{0, 1\}$ such that the number of 0's is divisible by 5 and number of 1's divisible by 3. [3]

Q4. Construct NFA, DFA for the regular Expression R=ab(a+b)+abb. Obtain minimized DFA [3]

Q5. Illustrate the equivalences of Mealy machine and Moore machine. Convert the below given Mealy machine into Moore machine by showing all the steps [3]



HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

Mid-semester Examination, Session- 2021-22

3rd year, 5th semester B.Tech. (CSE & IT)

Subject Name: Design and analysis of algorithms **Subject code: ECS-355**

Note: ***Maximum marks: 15. All questions are compulsory.*** **Duration: 1.5 Hrs**

Q1. Briefly explain the divide and conquer analysis technique. [3]

Q2. Distinguish between Asymptotic notation and conditional asymptotic notation. [3]

Q3. Discuss the insert operation of Red-black tree using a suitable example. [3]

Q4. Explain the delete operation in Fibonacci heap using a suitable example. *[3]*

Q5. Arrange the following numbers in increasing order step-by-step using merge sort: *[3]*
18, 29, 68, 32, 43, 37, 87, 24, 47, 50.

Harcourt Butler Technical University, Kanpur
Mid Semester Exam 2021-22
COMPUTER NETWORKS (ECS-351)
Third Year CSE + IT

Time: 90 minutes **Max Marks [15]**

Q1. What is OSI Model? Explain the functions of each layer of OSI Model? [2.5]

Q2. Define topology and explain the advantage and disadvantage of Bus, Star and Ring topology in detail. [2.5]

Q3. Discuss the Go- Back N ARQ protocol in detail. Station A uses 32 bytes packet to transmit message to station B using sliding window protocol. The round trip delay between station A & B is 80 ms; and bottleneck bandwidth on the path between A and B is 128 kbps. Find the optimal window size. [2.5]

Q4. Discuss all carrier sense protocols in details? [2.5]

Q5. Compare and Contract twisted pair cable, co-axial cable and optical fiber cable. [2.5]

Q6. An Aloha network user 19.2kbps channel for sending message packets of 100 bit long size. Calculate the maximum throughput for pure Aloha network. [2.5]

Mid –Semester (Odd Semester) Examination 2021-22
OPERATIONS RESEARCH (BMA- 341)
III B.Tech. (CS/IT/ET/ME/CE/EE)

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