

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name:	Master of Computer Science (M.Sc. CS)
Course Code: MCS 101N	Course Name: Discrete Mathematical Structure

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	Find using Karnaugh maps a minimal form for the boolean function. a. $f(x, y, z) = xyz + xyz' + x'yz' + x'y'z'$.	2
2.	Define tautologies and contradictions with examples.	2
3.	Construct the truth table for $p \vee (q \wedge r) \Leftrightarrow q \wedge (p \vee r)$.	2
4.	What is planar graph? Also explain Euler's formula.	2
5.	Let R and S be two relations on a set A. Then if R and S are reflexive then prove that $R \cap S$ is reflexive.	2
6.	Find using Karnaugh maps a minimal form for the boolean function. $f(x, y, z) = xyz + xyz' + x'yz' + x'y'z'$.	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	Rewrite the following arguments using qualifiers, variables and predicate symbols: a. All birds can fly b. Some men are genius. c. Some numbers are not rational d. There is a student who likes mathematics but not geography.	6
8.	a) Explain what it means for two sets to be equal. b) Describe as many of the ways as you can to show that two sets are equal. c) Show in at least two different ways that the sets $A - (B \cap C)$ and $(A - B) \cup (A - C)$ are equal.	6
9.	Determine whether the relation R on the set of all Web pages is reflexive, symmetric, antisymmetric, and/or transitive, where $(a, b) \in R$ if and only if a) everyone who has visited Web page a has also visited Web page b. b) There are no common links found on both Web page a and Web page b. c) There is at least one common link on Web page a and Web page b. d) There is a Web page that includes links to both Web page a and Web page b.	6

**UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021**

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name: Master of Computer Science (M.Sc. CS)	
Course Code: MCS 102N	Course Name: C++ and Object-oriented programming

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	What do you mean by “this” function? What are the applications of “this” pointer?	2
2.	List the features of Object oriented programming.	2
3.	What is reusability? Which things can be reused?	2
4.	What is friend function? How it is implemented in C++ ?	2
5.	A library function, is lower(), takes a single character (a letter) as an argument and returns a nonzero integer if the letter is lowercase, or zero if it is uppercase. This function requires the header file CTYPE.H. Write a program that allows the user to enter a letter, and then displays either zero or nonzero, depending on whether a lowercase or uppercase letter was entered.	2
6.	Write a function called reversit() that reverses a C-string (an array of char). Use a for loop that swaps the first and last characters, then the second and next-to-last characters, and so on. The string should be passed to reversit() as an argument.	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	Write a temperature-conversion program that gives the user the option of converting Fahrenheit to Celsius or Celsius to Fahrenheit. Then carry out the conversion. Use floating-point numbers. Interaction with the program might look like this: Type 1 to convert Fahrenheit to Celsius, 2 to convert Celsius to Fahrenheit: 1 Enter temperature in Fahrenheit: 70 In Celsius that's 21.111111	6
8.	Explain why do we need to use constructors? Explain a copy constructor with an example.	6
9.	Write a C++ Program to implement a class Account. An account has member data balance, functions deposit() to deposit money, withdraw() to withdraw money, and inquiry() to view the current balance.	6

**UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021**

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name:	Master of Computer Science (M.Sc. CS)
Course Code: MCS 103N	Course Name: Data Structures

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	Explain different ways of analyzing algorithm.	2
2.	Formulate the recursive function for evaluating the least common multiplier (LCM).	2
3.	Write a 'C' function to find out the maximum and second maximum number from an array of integers.	2
4.	Write a 'C' function to compute the product of two sparse matrices, represented with two-dimensional arrays.	2
5.	Define algorithm and design an algorithm to find out the total number of even and odd numbers in a list of 100 numbers.	2
6.	What is time and space complexity for the algorithm?	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	<p>There are two linked lists A and B containing the following data: A: 2, 5, 9, 14, 15, 7, 20, 17, 30 B:14, 2, 9, 13, 37, 8, 7, 28</p> <p>Write programs to create :</p> <p>(i) A linked list C that contains only those elements those are common in linked list A and B. ii) A linked list D which contains all elements of A as well as B ensuring that there is no repetition of elements.</p>	6
8.	<p>i) What is a circular queue? Write a C program to insert an element in the circular queue. Write another C function f or printing elements of the queue in reverse order.</p> <p>ii) Given the circular queue of with F = 6 and R = 2, give the values of R and F after each operation in the sequence: insert, delete, delete, insert and delete.</p>	6
9.	<p>i)Write an algorithm which upon user's choice, either pushes or Pops an element from the stack implemented as an array (the element should not shifted after the push or pop).</p> <p>ii)Convert the expression (A + B) / (C - D) into postfix expression and then evaluate it for A = 10 B = 20 C = 15 D = 5 Display the stack status after each operation.</p>	6

**UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021**

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name: Master of Computer Science (M.Sc. CS)	
Course Code: MCS 106N	Course Name: Computer Organization

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	Explain the working of JK flip flop with its truth table.	2
2.	Convert the following binary numbers to octal and hexadecimal numbers. a. 10111011 b. 010110.10101 C. 110010.011 d. 100011.101	2
3.	Implement the following Boolean functions to circuit using logic gates. i) $ab + a * b'$ ii) $(a+b).(a + b')$	2
4.	What is the difference between a direct and an indirect address instruction? How many references to memory are required for each type of instruction to bring an operand into a processor register?	2
5.	What is instruction cycle? What are the sub-phases of an instruction cycle	2
6.	What is a difference between register mode and auto-increment/auto-decrement mode? Compare index address mode with base register addressing mode.	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	Implement the following Boolean expression with only NAND gates. i) $(AB' + CD')E + BC(A+B)$ ii) $w(x + y + z) + xy$	6
8.	Simplify the following Boolean functions with k maps. i) $F(A,B,C) = \sum (1,3,6,7)$ ii) $F(P, Q, R, S) = \sum(0, 2, 5, 7, 8, 10, 13, 15)$	6
9.	Implement the following functions with multiplexer i) $C = \sum (3,5,6,7)$ ii) $F(p,q,r) = pq + pq's + q'r's'$	6

**UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021**

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name: Master of Computer Science (M.Sc. CS)	
Course Code: MCS 108N	Course Name: Data Communication and Computer Networks

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	Explain the term multiplexing. How many types of multiplexing techniques available in computer network?	2
2.	What is token ring? Why do we need token ring? Elaborate your answer.	2
3.	Describe all three types of HDLC frames.	2
4.	Explain Stop and Wait ARQ Retransmission due to timer expiry	2
5.	Explain ARP, RARP and ICMP protocols	2
6.	What do you understand by ATM in computer networks	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	Explain the function of each layer of ISO ref. model for Data Communication. How it is different than TCP/IP model?	6
8.	What is the difference between a frame and a packet? Why framing is required? Explain the significance of padding used in some of frame format?	6
9.	Explain pure ALOHA and its throughput and characteristics. Why is slotted ALOHA needed? Differentiate between pure and slotted aloha.	6

**UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021**

ASSIGNMENT QUESTION PAPER

Session: 2023 -24	Max. Marks: 30
Program Name: Master of Computer Science (M.Sc. CS)	
Course Code: MCS 109N	Course Name: Database Management System

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1.	Differentiate between the following: a. Single valued attribute vs multivalued attribute b. Simple attribute vs composite attribute	2
2.	Briefly explain redundant schema during reduction to relational schema from ER diagram.	2
3.	Write short notes on following relational algebra operations: i. Selection ii. Projection iii. Rename	2
4.	Explain differences between left outer join, right outer join and full join with a suitable example.	2
5.	Explain with example how SQL evaluates nested query and correlated nested query	2
6.	How do you determine whether the decomposed relations satisfy lossless and dependency preserving decomposition or not?	2
SECTION -B		6*3=18 marks
Q. No.	Long answer type question (approx. 500 -800 words)	Marks
7.	i)What are various advantages of DBMS over traditional file processing systems? ii)Explain the Three-Schema Architecture. What are the purposes of physical data independence and logical data independence?	6
8.	i) Explain referential integrity constraints with a suitable example. ii)How does DBMS deal when a deletion of a tuple causes violation of referential integrity constraints?	6
9.	i)Find the minimal functional dependency set of {PQ-->R, PR-->Q, Q-->S, QR--->P, PQ--->T}. ii)Consider a relation R(ABCDE) with functional dependencies A--->BCDE, BC--->ADE and D--->E. Check whether it is in third normal form or not. If not, decompose it into third normal form.	6