

Time: 2 Hours

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt ALL questions selecting any TWO parts. All questions carry equal marks.

1. (a) Fill the following column by converting numbers from the given base to the indicated base in the table

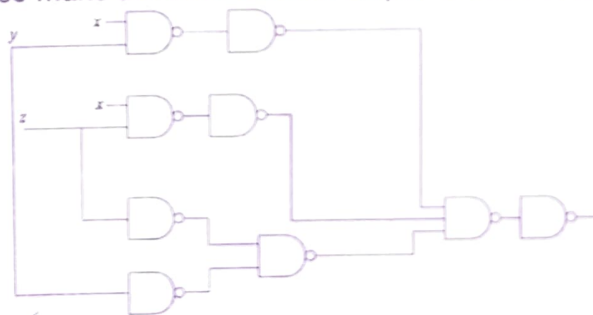
Decimal	Binary	Octal	Hexadecimal
?	?	?	B2D.C4
16		?	?
?	?	132.12	?
?	1101.11	?	

- (b) A binary computer uses 32 bit registers to store numbers. Eight bits are used for the exponent and remaining bits are used as mantissa. Find the approximate range of decimal numbers handled by this computer. Represent -2.5 in 32 bits floating point representation.

- (c) Perform the following subtraction using 1's complement and 2's complement and check by direct subtraction. (i) 32-15 (ii) 24-32

2. (a) Draw the circuit diagram for the Boolean function $f(x, y, z) = \sum(1, 2, 4, 5, 6)$ using following gates:
(i) AND, OR and NOT (ii) OR and NOT (iii) AND and NOT

- (b) Convert the following circuit using AND, OR and NOT gates without effecting the output of this circuit. Also make the truth table of output function of this circuit.



- (c) (i) Find canonical form of the Boolean function $F(x, y, z) = (y' + z)(x' + z)$
(ii) Simplify the Boolean function $F(x, y, z) = (x' + y + z)(x + y + z)(x + y' + z)(x + y + z')$

3. (a) Minimize following Boolean function using K-map: $F(A, B, C, D) = \sum(1, 5, 7, 8, 12, 14) + \sum^d(0, 6, 11)$

- (b) Minimize following Boolean function using K-map: $F(x, y, z, w) = \prod(0, 2, 5, 7, 8, 10) + \prod^d(1, 4, 6)$

- (c) Simplify the following Boolean function using K-Map

(i) $F(a, b, c) = x'yz + xyz + x'y'z + y'z$

(ii) $F(x, y, z) = (y + z')(x' + y + z)(x + z')$

4. (a) What is 8x1 multiplexer? Implement the following Boolean function with 8x1 multiplexer.
 $F(a, b, c, d) = \sum(0, 1, 4, 5, 6, 9, 11, 13)$

- (b) What is Demultiplexer? Design BCD decoder.

- (c) Design a combinational circuit which accepts three-bit input and produces square of its input number.

5. (a) What is sequential circuit? Design a sequential circuit using JK flip flop from the following state equations: (i) $A(t+1) = A'BC + ABC' + BC$ (ii) $B(t+1) = AC + B'C + ABC$ (iii) $C(t+1) = AC + AB' + BC$

- (b) List various types of shift register. Design ring counter.

- (c) What is Threshold Gate? Implement the following Boolean function with T-gate.

$$f(x, y) = \sum(1, 2)$$

M.C.A.(SEM-I) Mid Term -I, 2019
CSC111: Digital Computer Design(DCD)
Test-1
Time: 60 minutes
Maximum Marks:20

Attempt any two questions. Each question carries equal marks.

1. (a) (i) What is parity method?
(ii) Find the number of parity bits required to detect and correct the message 11011.
(iii) The four parity bit is used to correct the message, then find out the number of bits in message

(b) Write algorithm to perform subtraction using 1's complement. Perform the subtraction with the following binary numbers using 1's complement. Check the answer by straight subtraction.

(i) $25-18$ (ii) $(22)_8-(17)_8$
2. (a) ~~(i)~~ If $(85)_{10} = (221)_x$, find the value of x .
~~(ii)~~ Write first 30 numbers in binary, octal, hexadecimal.
~~(iii)~~ Find the missing terms in the following series: 11, 12, 13, 14, 15, 16, 17, __, __.
Convert the Gray code 1011 to binary

~~(b)~~ Add the following numbers in the given base without converting to decimal.
(i) $(220)_4$ and $(113)_4$ (ii) $(172.2)_9$ and $(72.4)_9$
3. (a) ~~(a)~~ Perform the multiplication of the following numbers in the given base without converting to decimal.
(i) $(223)_8$ and $(212)_8$ (ii) $(342)_7$ and $(242)_7$

(b) Perform the following binary division
~~(i)~~ $1101 \div 11$ ~~(ii)~~ $(246)_8 \div (12)_8$

M.C.A.(SEM-I) Mid Term -I, 2019
CSC111: Digital Computer Design(DCD)
Test-II

Time: 60 minutes
Maximum Marks:20

Attempt any two questions. Each question carries equal marks.

1. (a) Simplify the following Boolean function using K-map

$$f(x, y, z, w, v) = \sum (1, 2, 3, 4, 6, 7, 10, 11, 17, 18)$$

- (b) Simplify the following Boolean function using K-map

$$f(x, y, z, w) = \prod (1, 2, 3, 5, 6, 7) + \prod d(8, 9)$$

2. (a) What is full Subtractor? Implement the following Boolean function with 8×1

multiplexer $f(x, y, z, w) = \sum(0, 2, 3, 5, 6, 7, 8, 10, 11)$.

- (b) What is decoder? Design BCD decoder.

3. Design a combination circuit that convert BCD code to Excess-3 code.

CBCS for PG Students (Semester-I) Examinations, 2019-20

e-Business Systems

Time: 2 Hours

Max Marks: 75

Write your Roll No. on the top immediately on receipt of the question paper.

Attempt ALL questions selecting any TWO parts. All questions carry equal marks.

Answer precisely, including the relevant details only.

1. (a) Describe e-business along with its two distinguishing features. Compare it with traditional *business* and *e-commerce* systems on relevant criteria.
- (b) Identify an e-business situation, and four conventional *obstacles*. Elaborate further 'how do you feel to counter these while applying IT'.
- (c) What are WCA *framework* and associated *principles*? Identify its elements categorically with respect to 'registering for a skill-enhancement course'.
2. (a) List the different characteristics of business processes and describe each of the five levels of integration, with an example each.
- (b) What are the process performance variables? Describe any five of them and explain 'how an information system can improve performance relative to them'.
- (c) Consider a business process of '*borrowing books from a library*'. Elaborate it briefly as a process and in terms any of the five characteristics.
3. (a) Describe briefly the five different types of information systems used in e-business today, citing a specific example for each.
- (b) Why is the difference between tacit and explicit knowledge important for understanding knowledge management? Illustrate the relevance appropriately in e-business context.
- (c) Compare the information systems MIS, DSS, and EIS on relevant attributes, and cite one best-case example each for improving e-business systems.
4. (a) What product *performance variables*, other than cost, are customers often concerned with? Identify and illustrate precisely with examples.
- (b) What are the characteristics of *Information Products*? Identify and explain each with appropriate examples.
- (c) Consider a work system of your own choice, with internal and external customers. Identify a product performance variable each that seem the *most and the least important* and explain 'how you might measure those variables'.
5. (a) Differentiate application and system software, with examples; and explain the significance of viewing programming as a business process.
- (b) Compare the terms *error*, *fault* and *defect* about software. Describe the different types of errors that can be found during debugging a program, with appropriate specific examples.
- (c) Think of e-business suit based on the two prominent trends and the developing IT modalities, speculate about the user interfaces for VCRs, microwave ovens, and other home equipment five years from now.

Name:			Roll No:		
Course: eBusiness Systems	Instructor: Prof. K. Mustafa	Date (Time): Nov 19, 2019 (11.00-11.50)	Max. Marks: 15	Marks Obtained:	
Mid Semester Test-II (Odd Semester, 2019)-MCA(I)-DCS-JMI					

1. Write T/F against the following valid/invalid statements:					(3)
(a)	Process modeling is to identify business processes and subdividing them into their basic elements so that they can be understood and improved.				
(b)	An information system can improve the activity rate by keeping a steady workflow, of an e-Business system.				
(c)	EDI and SCM are part of the general trend toward integration between suppliers and their customers.				
(d)	Transaction processing systems primarily control decisions made as part of the e-business systems.				
(e)	Neural networks are vulnerable to training errors, as they establish stereotypes based on just a few examples.				
(f)	Expert systems are useful for problems that are totally understood, they can exercise common sense because it cannot be encapsulated by a computer program				

2. List ONE specific difference each between the following pair of terms.					(4)
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(a) Rationality vs Satisficing

(b) 'Tacit vs Explicit' Knowledge

3. Cite one specific (new) example, with a statement description to defend, of each of the following:					(4)
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(b) Intranet

(b) Enterprise Resource Planning

4. Consider an eBusiness system, best known to you. Identify two typical forms of waste with corresponding IT based mitigation solution, referring to common forms of waste in Business Systems.					(4)
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Note: Answer the last question overleaf

MCA (SEM-I) EXAMINATIONS - 2019
Discrete Mathematical Structures

Max Marks: 75

Time: 2 Hours

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt ALL questions by selecting any TWO parts. All questions carry equal marks.

1. (a) Attempt any three of the following:

- i) Is collection of good hockey players a set? Justify.
- ii) Is collection of animal species in the world a set? Justify.
- iii) Define countably finite and infinite sets with example of each.
- iv) Define set difference and symmetric difference with example of each.

(b) Define the groups and rings? Identify the following structures with proper justification:

- i) $\langle \dots, -2, -1, 0, 1, 2, \dots \rangle, \times \rangle$
- ii) $\langle \dots -3, -2, -1, 0, 1, 2, 3, \dots \rangle, \times, + \rangle$

(c) Describe relations and functions. Illustrate the inverse and complementation operations using some example.

2. (a) Define and explain the equivalence classes and partitions of a set. Give at least one example of each.

(b) Define various kinds of lattices. Let $A = \{2, 7, 14, 28, 56, 84\}$ and $a \leq b$ if and only if a divides b , then find the Hasse diagram, maximal element, and minimal element.

(c) What do you mean by closure of a relation? With the help of example, illustrate the Warshall's algorithm for finding the transitive closure of a relation.

3. (a) Write the following statements in symbolic form:

- i) Mark is poor but happy
- ii) Mark is rich or unhappy
- iii) Mark is neither poor nor happy
- iv) Mark is poor or he is rich and unhappy

(b) Define the normal forms and duals and obtain the:

- i) Duals of $\neg P(P \vee Q) \wedge (P \vee \neg(Q \wedge S))$ and $(R \wedge P) \wedge (R \vee Q)$.
- ii) Principal disjunctive and conjunctive normal forms of $(Q \rightarrow P) \wedge (\neg P \wedge Q)$

(c) Consider the following statements:

- All men are selfish
- All kings are men

Prove by the inference theory of logic that all kings are selfish.

4. (a) Find the minimum number of students needed to guarantee that five of them belong to the same class (Freshman, Sophomore, Junior, Senior, Martin).

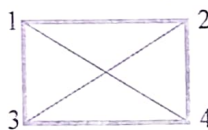
(b) Define the next largest permutation and next largest combination in lexicographic order. In set $S = \{1, 2, 3, 4, 5, 6\}$ determine the next larger permutation of 541342 and next larger combination of 1356 in lexicographic order.

(c) Attempt any two the following:

- i) In how many ways 4 people can take ice creams of 3 flavors (Chocolate, Vanilla Butter Scotch).
- ii) In a class there are 40 students. In how many ways can these students be seated in 4 groups of equal size?

5. (a) Define the various kinds of trees along with their properties. In a binary tree of 32 vertices determine the minimum and maximum heights.

(b) What do you mean by graphs and graph traversals? Explain the applications of graphs in real life and obtain the number of spanning trees of the following graph:



(c) Write short notes on any two of the following:

- i) Euler and Hamiltonian paths and their applications
- ii) Isomorphism of graphs.
- iii) Shortest paths algorithm(s).

Department of Computer Science
Jamia Millia Islamia, New Delhi-110025
1st Mid Semester Examination (Odd-Semester), 2019-20

Course: MCA
M.M. 20

Subject: Algorithmic Problem Solving
Semester:- First

Subject Code: CSC113
Time: 1 hour

Section – A

Note:- Attempt all the questions from the following:-

(4x1=4)

- 1) Define the term "Algorithm"? How it is different from Programs?
- 2) List out the benefits and limitations of flowchart?
- 3) Write a pseudo code to compute the area of a rectangle?
- 4) What are the different aspects of algorithmic performance? Explain in brief.

Section – B

Note:- Attempt ^{two} any three questions from the following:-

(3x2=6)

- 1) Explain the properties of Algorithm in brief?
- 2) Define the term "Flowchart"? Describe the different symbols which are used in flowchart?
- 3) Draw a flowchart to calculate the area of a circle?
- 4) Draw a flowchart to generate Fibonacci series?

Section – C

Note:- Attempt any two questions from the following:-

(2x6=12)

- 1) a) Explain the different methods to test the algorithm?
b) Explain the growth rate function with the help of suitable example? What should be analyzed in the algorithms? Explain.
- 2) a) Draw a flowchart to find whether the number is odd or Even?
b) Calculate the execution time of the following algorithm:-

```
i = 1;
sum = 0;
while (i <= n) {
    j = 1;
    while (j <= n) {
        sum = sum + i;
        j = j + 1;
    }
    i = i + 1;
}
```

- 3) a) Write an algorithm to add two numbers entered by user?
b) Calculate the execution time of the following algorithm:-

```
i = 1;
sum = 0;
while (i <= n) {
    i = i + 2;
    sum = sum + i;
}
```

Department of Computer Science
Jamia Millia Islamia, New Delhi-110025
End Mid Semester Examination (Odd Semester), 2019-20

Course: MCA
Subject: Algorithmic Problem Solving

Subject Code: Code: CSC113
M.M. 20

Time: 1 hour
Semester: -First

Note:- Attempt any five questions from the following:-

(5x4=20)

- 1) What are monotonic subsequences? Explain with a suitable example? Discuss the algorithm for finding the length of longest increasing subsequence.
- 2) Discuss the algorithm for the re-arrangement of the following elements in an array,
1 2 3 4 5 6 7
So that they appear in reverse order as under :-
7 6 5 4 3 2 1
- 3) Merge the following two arrays of integers, both with their elements in ascending order into a single ordered array. Discuss its algorithm.
A:- 15 18 42 51
B:- 8 11 16 17 44 58 71 74
- 4) What is the role of Hash function in Hash Search? Apply hash search technique on the following elements by considering modulo method for hash function and hash table size as 10.
17 14 13 12 0 5 5
Give solution for the collision if exist.
- 5) Explain the algorithm description for finding the maximum number in a set of 'n' numbers.
- 6) Explain the algorithm development procedure for the removal of duplicate elements from an ordered array.
- 7) Discuss binary search algorithm with suitable example. Compare its time complexity with linear search.
- 8) Explain the algorithm development procedure for selection sort. Compare it with bubble sort.