B.C.A. (Semester-II) Examination, 2020

(2019-22)

COMPUTER ARCHITECTURE

| Paper Code : BC-202 |

Time : Three Hours]   [Maximum Marks : 80

Note : Candidates are required to give their answers in their own words as far as practicable. The questions are of the equal value. Answer **any five** questions.

1.   Convert the following in Binary Number and perform the arithmetic operation using 1's/2's complement. Indicate overflow /underflow (if any) :

   (a) $(6)_{10} + (-13)_{10}$

   (b) $(45)_{10} + (-15)_{10}$

2. Using 10's complement, find :

    (a)   72532 - 3250

    (b)   3250 - 72532

3. What do you mean by Logic Gates ? Briefly explain each of them with respective diagram and Truth Table.

4. State Demorgan's Theorem and provide basic properties of Boolean Algebra.

5. What do you mean by Digital Counters ? Design a 3 bit binary counter using Flip-Flop

6. What is Flip-Flop ? Name them. Explain R-S Flip-Flop with diagram and Truth Table.

7. What do you mean by Data Transfer ? Differentiate Synchronous and Asynchronous mode of data transfer.

8. Explain I/O Interface. Briefly explain DMA and I/O Processor.

9. What do you mean by Memory ? Classify it and introduce them. Differentiate RAM and ROM with examples.

10. Write short notes on **any two** of the following :

   (a)   Sequential and Combinational Circuit

   (b)   Flip-Flop and Latches

   (c)   Register and Counter

   (d)   Memory Organization

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DESCRETE MATHEMATICS

[Paper Code : BC-201]

Time : Three Hours]   [Maximum Marks : 80

Note : Candidates are required to give their answers in their own words as far as practicable. The questions are of equal value. Answer **any five** questions.

1.   Define the following with an example :

   (a)   Null set

   (b)   Universal set

   (c)   Super set

   (d)   Difference of two set

2.   List all partition of sets :

   (a)   A = { 1, 2, 3}

   (b)   B = {a, b, c, d}

3. Given U(Universal) = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9},

A = {2, 4, 6}, B = {1, 3, 5, 7}, C = {6, 7}. Find :

(a) $A' \cap B$

(b) $(A \cup B) - C$

(c) $(A \cup C)'$

(d) $(A \cap U) \cap (B \cup C)$

4. If $f(x) = ax^2 + bx + 2$, $f(1) = 3$ and $f(4) = 42$, find 'b'.

5. Find $f(4)$, if $f(x) = x^4 - 3x^3 + bx^2 - 10x + 16$.

6. If A = {1, 3, 5}. Let R be a relation such that XRY : if Y = X + 2 and S be the relation such that XRY : if X < Y. Then find the following :

(a) Find RoS

(b) Find SoR

(c) RoS and SoR via a diagram

7. If $f(z) = 2^{z-2}$, then find the value of $f(-1.5)$.

8. A tree has 2n vertices of degree 1, 3n vertices of degree 2 and n vertices of degree 3. Determine the number of vertices and edge in the tree.

9. (a) Use K-map to simplify the following expression :

$$X = A'BC'D' + ABC'D' + A'BCD' + ABCD'$$

(b) Simplify $F(A, B, C, D) = \sum m(0, 2, 7, 8, 10, 15)$

using K-map.

10. Define the following terms :

(a) Power set

(b) Operations on sets

(c) Groups

(d) Rings

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SYSTEM ANALYSIS AND DESIGN

[Paper Code : BC-204]

Time : Three Hours] |Maximum Marks : 80

Note : Candidates are required to give their answers in their own words as far as practicable. The questions are of equal value. Answer **any five** questions

1. What is a System ? Explain its elements, types and characteristics in detail.

2. Explain Waterfall Model. What are the frequently encountered issues when Waterfall model is applied?

3. Define Cohesion and Coupling in the context of design. Also explain its types used in modular design.

4   What is Software Requirement Specification (SRS) ? What are the characteristics of good SRS document ? Explain them.

5. What is Herbert Simon's model ? Discuss various phases of Herbert Simon's model in decision making.

6. Explain basic relevant rules to constructing a Data Flow Design (DFD). Distinguish between DFD and Flow Chart with example's.

7. What are the diffrences between MIS and DSS ? Discuss the components of MIS and failure and seccess of MIS.

8. What are the role, attributes and responsibilities of System Analyst ? Explain

9. What are the purposes of Information Gathering Tools? Discuss various methods of Information Gathering.

10. Write short notes on **any two** of the following :

    (a)   Black Box and White Box Testing

(b)   HIPO Chart

(c)   Types of Files

(d)   Decision Table

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C. PROGRAMMING AND DATA STRUCTURE

| Paper Code : BC-203 |

Time : Three Hours] |Maximum Marks : 80

Note : Candidates are required to give their answers in their own words as far as practicable. The questions are of equal value. Answer **any five** questions

1. What is Data Structure? Discuss the types of data structure in details.

2. What is Recursive Function? Distinguish between Looping and Recursion with suitable examples.

3. What is Structure. Distinguish between structure and union. Write a program to demonstrate the concept of structure.

4. What is Linked List? Discuss the types of Linked List over Array.

5. What is Graph ? Explain the properties of Graphs in details.

6. Write a 'C' program using function to sort the list of n integer elements into ascending order using bubble sort.

7. What is Stack? Write down the Algorithm for implementing push and pop operation in a stack.

8. What is Tree ? Discuss Binary Tree Traversal Recursive Algorithm in details.

9. What is Sorting? Discuss the types of sorting. Write an algorithm for selection sort for the list of n given number.

10. Write short notes on **any two** of the following :

(a) Application of Data Structure

(b) AVL Tree

(c) Dynamic Memory Allocation

(d) Tree Traversal