

2022-26

Full Marks : 70

Time : 3 hours

Answer from **both** the Groups as directed.

*The figures in the right-hand margin indicate marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

**GROUP—A**

Answer any *four* questions. 10 × 4

1. What is the need of JVM in execution of any Java program ? Discuss the structure of any Java program.
- ② Define loop. Explain all looping statements available in Java with suitable example.
3. What is meaning of access control of a variable and function in Java ? Explain the different access control mechanism in Java with the help of a suitable program.

( Turn Over )

4. Define method overloading. Write a program to calculate the area of different shapes namely *Circle*, *Rectangle* and *Triangle* using the concept of method overloading.
5. Explain the different usage of final keyword with suitable example.
6. Explain how a string class object can be created using an existing '**StringBuffer**' class. Also explain how can you find the location of the last occurrence of '*a*' in the string "**Java Programming**".
7. What is multithreaded programming ? Explain how threads are created in Java. Explain the need of thread synchronization with an example.
8. What is an exception ? Write an exception subclass which throws an exception if the variable *age* passed as argument to a method and the value of age is less than 18.

( 3 )

GROUP-B

Answer *all* the questions.  $3 \times 10$

9. Explain any two benefits of inheritance.
10. What is a global variable ?
11. What are the advantages of java programming over C++.
12. Give one example of type casting in java.
13. What are the characteristics of static members in Java ?
14. Define constructor overloading.
15. Write a java program to display even numbers between 0 to 20.
16. Explain any two usage of super keyword.
17. Define wrapper class in java.
18. What do you mean by Abstract class ?

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### SECTION—A

Answer any *four* questions of the following:

10 × 4

1. A coin is tossed 8 times. Find by using binomial distribution the probability of getting
  - (a) At least 3 heads.
  - (b) Exactly 3 heads.
  - (c) At most 3 heads.

( Turn Over )

2. State and prove Baye's theorem.

~~3.~~ Find the mean, Median and Mode of the following data:

Marks obtained	No. of students
Less than 10	5
Less than 20	9
Less than 30	17
Less than 40	29
Less than 50	45
Less than 60	60
Less than 70	70
Less than 80	78
Less than 90	83
Less than 100	85

$$\sigma = \sqrt{\sum_{i=1}^n x_i^2}$$

( 3 )

4. Calculate the correlation co-efficient for the heights of fathers ( $X$ ) and sons ( $Y$ ):

$X$	65	66	67	68	69	70	72	67
$Y$	67	68	65	72	72	69	71	68

5. Define regression co-efficient and discuss its properties.

6. Find range, standard deviation and variance for the following data:

87 99 75 87 94 75 35 88. 87

7. Define random variable and distribution function of discrete random variables.

8. Calculate the chi-square ( $\chi^2$ ) test from the following data:

	Hb %		Total
	Above normal	Below normal	
Above normal	85	75	160
Below normal	165	175	340
Total	250	250	500

5/120/3

365  
180

( 4 )

18  
18  
4  
18  
324

## SECTION—B

Answer *all* questions:

3 × 10

9. Define Event and Sample space.
10. Define Chi-Square.
11. Define Quartile Deviations.
12. Write merit and demerit of mode.
13. What is Regression Co-efficient ?
14. Define Skewness and Kurtosis.
15. Define Karl Pearson's Co-efficient of Correlation.
16. Define Test of goodness of fit.
17. Write Hypothesis testing procedure.
18. Define Binomial distribution.

UG-C-3004-BCA

2022-26

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SECTION—A

Answer any *four* questions. 10 × 4

1. What is system analysis and design ? Explain the difference between Analysis and Design phases of software development.
  
2. What are the various activities involved in the feasibility study ? Discuss any three feasibilities need to be studied during feasibility analysis.

( Turn Over )

3. Why is it difficult to determine user requirement? Illustrate any two important fact-finding techniques for getting information about user requirement.
4. What is Data Flow diagrams? Draw context level Data flow Diagram of university admission system.
5. Explain common skills of a system analyst. Which skill do you think is most important?
6. What is need of software documentation? Explain any three documentation standards.
7. Define SDLC. Compare and contrast waterfall model and prototyping model.
8. Explain decision table and decision tree by taking suitable example.

SECTION—B

All questions are compulsory 3 × 10

UCCN

PA UG-C-3004-BCA

(Continued)

9. How can risk and threats to IT systems be identified and managed ?
10. What are the issues and constraints to be taken care of while designing a software product ?
11. What is meant by "User Interface" ? What are the basic guidelines to design a user interface ?
12. What is meta data ?
13. What do you mean by risk analysis ?
14. What is software quality control ?
15. List any three important elements of system.
16. What are software threats ?
17. Why software testing is important, comment your views ?
18. Give example of physical and abstract system.

UG-C-3003-BCA

2022-26

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**SECTION—A**

Answer any *four* questions. 10 × 4

1. List and explain Registers for the Basic Computer.
2. Draw the neat diagram of decimal adder and explain its functioning by taking suitable example.
3. How do we evaluate the arithmetic statement  $X = (A * B) / (C - D)$  using zero, one, two or three address instructions.

( Turn Over )

( 2 )

4. Write the difference between CISC and RISC. Also, specify the characteristics of both.
5. What is array processor ? Discuss the types and working of array processor.
6. Illustrate how CPU-IOP communication takes place in I/O processor.
7. Define addressing modes. Explain the following addressing modes with examples.
  - (a) Immediate addressing mode
  - (b) Indirect addressing mode
  - (c) Register indirect addressing mode
8. Write an assembly program to print the alphabet A to Z.

### SECTION—B

All questions are compulsory 3 × 10

( 3 )

101  
110

9. Define the following terms: *a.* Instruction code *b.* Operation code.

10. How Data transfer takes place from I/O device to CPU in programmed I/O.

11. Write IEEE standard for floating point format.

12. What are the functions of assembler ?

13. What are different types of interrupts available in a computer system ?

14. Define MACRO in assembly program.

15. List any three important features of 8085 processor.

16. Write short notes on Strobe Control method of asynchronous data transfer.

17. What is pipelining ?

18. Add  $(356)_8$  and  $(173)_8$ .

UG-C-3001-BCA

2022-26

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GROUP—A

Answer any *four* questions. 10 × 4

- ✓ 1. Define data structure. Explain different types of data structure.
- ✓ 2. Define linked list. Write a C program for array implementation of a singly linked list.
3. Define Stack. Explain how to evaluate arithmetic expression using stack.

( Turn Over )

4. What is Queue ? Write a C function to perform insertion and deletion on Queue.
5. Define Binary Search Tree (BST). Write an algorithm to construct a BST.
6. What is a traversal of a Binary tree ? Construct the Binary tree with the following tree traversal:

Inorder: 4, 8, 2, 5, 1, 6, 3, 7

Postorder: 8, 4, 5, 2, 6, 7, 3, 1

7. Define AVL tree. Construct an AVL tree with the following data.

21, 26, 30, 9, 4, 14, 28, 18

8. What is Merge sort ? Explain the procedure of merge sort with the following data

6, 2, 11, 7, 4, 3, 19, 8

( 3 )

**GROUP—B**

Answer *all* the questions.

3 × 10

9. What are the limitations of arrays ?
10. Define polish notation.
11. What is Big-oh notation ?
12. Compare between linear search and binary search.
13. What is complete binary tree ?
14. Differentiate between Graph and Tree.
15. Write about the sparse array.
16. What is a spanning tree ?
17. What is Hashing ?
18. Define Circular Queue.