

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME**  
**BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023**  
**COMPUTER APPLICATIONS**  
**Programming in C**

Duration:2 Hours

Max Marks:60

**PART A**

Answer any FIVE questions:

(5×2= 10)

- 1) What are escape sequences?
- 2) What are bitwise operators? Write any two.
- 3) What is the purpose of strcpy() function? Give an example.
- 4) How do you create a structure variable? Give an example.
- 5) Differentiate break and continue statements in C.
- 6) How do you read string variable in C? Give an example.

**PART B**

Answer any FIVE questions :

(5×6= 30)

- 7) Explain a) Documentation section    b) Link Section
- 8) Explain with syntax and example a) if statement    b) if-else statement
- 9) Explain linear search with example.
- 10) How do you create a structure within a structure? Explain with an example.
11. Write a C program to count occurrences of a character in a string.
12. Write a note on a) Integer datatype    b) Floating point datatype    c) Character datatype

**PART C**

Answer any TWO questions :

(2×10= 20)

13. a) What are constants? Explain any two with its meaning.  
b) Write a note on C Tokens.
14. a) Explain with examples type casting  
b) Write a note on conditional operator with example.
15. Write a note on a) pointer increment and scale factor    b) pointer arrays

## CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.C.A FIRST SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023

## MATHEMATICS

## Mathematical Foundation

Duration:2 Hours

Max Marks:60

## PART - A

I. Answer any 6 questions. Each question carries 2 marks: (2×6= 12 Marks)

a. If  $A = \begin{bmatrix} 1 & 2 & 0 & 4 \\ 2 & 4 & -1 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 1 & 0 & 3 \\ 1 & -1 & 2 & 3 \end{bmatrix}$ . Find a  $2 \times 4$  matrix  $X$  such that  $A - X = 3B$ .

b. Find  $\begin{vmatrix} 3 & 4 & 8 \\ 2 & 1 & 3 \\ 7 & -2 & 0 \end{vmatrix}$

c. Find the rank of the matrix;  $A = \begin{bmatrix} 1 & 2 & 3 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

d. Find the co-ordinates of the point which divides the line joining the points  $(-7, 1)$  and  $(3, 6)$  internally in the ratio  $3 : 2$ .

e. Find the value of  $k$  if the lines  $6x + 3y - 7 = 0$  and  $kx + y - 1 = 0$  are parallel.

f. Find the equation of the circle, if the centre is  $(0, 2)$  and radius 3 units.

g. Express  $60^\circ$  in radians.

h. Evaluate  $\int(4x^3 + 3x^2 - 2x + 5)dx$ .

## PART - B

2. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. Find the adjoint of the matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$ .

b. Solve the system of equations by using Cramer's Rule :

$$x + y + z = 6$$

$$x - y + z = 2$$

$$2x + y - z = 1$$

c. Solve the system of equations by using Matrix method :

$$x + y + z = 9$$

$$2x + 5y + 7z = 52$$

$$2x + y - z = 0$$

d. If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ , then show that  $A^3 - 3A^2 - A + 9I = 0$ .

### PART - C

3. Answer any 2 questions. Each question carries 6 marks:

(6×2= 12 Marks)

a. Show that the matrix  $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$  satisfies its characteristic equations.

b. Reduce the matrix  $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$  to its normal form and find the rank.

c. Compute the inverse of the matrix  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 2 \\ 2 & 0 & 1 \end{bmatrix}$ .

d. Find the characteristic equation of the matrix  $A = \begin{bmatrix} 1 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ .

### PART - D

4. Answer any 2 questions. Each question carries 6 marks:

(6×2= 12 Marks)

a. Show that  $A(-1, 2)$ ,  $B(3, -1)$ ,  $C(2, 6)$  are the vertices of isosceles right angled triangle.

b. Find the area of the triangle formed by  $A(1, -3)$ ,  $B(5, 2)$  and  $C(3, 4)$ . Hence find the length of the altitude from  $A$ .

- c. (i) Find the equation of a line with slope  $\frac{-2}{3}$  and passing through the point  $(5, -2)$ .  
(ii) Find the equation of a line with slope 4 and y intercept 5.
- d. (i) Find the length of the perpendicular drawn from the point  $(2, 3)$  to the line  $5x - y + 6 = 0$ .  
(ii) Find the angle between the lines  $4x + 5y - 7 = 0$  and  $5x - 4y + 7 = 0$ .

**PART - E**

**5. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)**

- a. If  $\sin \theta = \frac{15}{17}$ ,  $\theta$  is acute, then find the values of  $\tan \theta$  and  $\cos \theta$ .
- b. (i) Verify  $\cos^2 30^\circ - \cos^2 60^\circ = \sin 30^\circ$ .  
(ii) Verify  $2 \cos^2 \frac{\pi}{4} - 1 = \cos \frac{\pi}{4}$ .
- c. Differentiate  $\frac{(x+1)(2x-1)}{x-3}$  with respect to  $x$ .
- d. Find the maximum and minimum values of the function  $\frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$ .

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**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME**  
**BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023**  
**COMPUTER APPLICATIONS**  
**Fundamentals of Computers**

Duration:2 Hours

Max Marks:60

**PART A**

Answer any FIVE questions:

(5×2= 10)

- 1) What is a touch screen?
- 2) What is a low level programming language?
- 3) Convert the octal 200 to Decimal.
- 4) Differentiate between NOR and XOR gates.
- 5) What is a dotmatrix printer?
- 6) Find 1's and 2's complement of the number 100111.

**PART B**

Answer any FIVE questions :

(5×6= 30)

- 7) Explain the classification of computers based on memory.
- 8) Draw a flow chart to find the largest of three numbers.
- 9) Convert the following binary numbers a) 10101 b)11100 c)101011 to octal
- 10) Write a note on i) Singlet ii) Quad iii) Pair with example.
11. Write a note on a) minterm b) maxterm. Give suitable example.
12. Write an algorithm to check whether the given number is prime or not.

**PART C**

Answer any TWO questions :

(2×10= 20)

13. What are the different classification of computers? Explain.
14. List out the difference between hardware and software. Give examples.
15. Explain a) Idempotent law b) Complement law c) Identity law  
d) Associative law e) Distributive law in Boolean algebra.

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