

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.C.A. FIRST SEMESTER DEGREE EXAMINATION JANUARY 2023

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 $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$. Then find the value of $2A + 3B$.
- b. If $A = \begin{bmatrix} 6 & 5 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ then find $|A|$ and $|B|$.
- c. Find the characteristic equation of the matrix $A = \begin{bmatrix} 1 & -6 \\ -6 & 7 \end{bmatrix}$.
- d. Find the co-ordinate of the point which divides the line joining the points $(2, -4)$ and $(7, 1)$ externally in the ratio $2 : 3$.
- e. Find the slope of the line joining the points $A(\frac{1}{2}, \frac{2}{3})$ and $B(\frac{1}{3}, \frac{-1}{2})$.
- f. The equation of the circle is $x^2 + y^2 + 6x + 8y + 25 = 0$. Find the centre and the radius of the circle.
- g. Convert $\frac{2\pi^c}{3}$ into degree.
- h. Evaluate $\int (3x^{-1} + 4x^2 - 3x + 8)dx$

PART - B

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

- a. Find the adjoint of the matrix $A = \begin{bmatrix} 2 & 2 & 3 \\ 1 & -2 & 3 \\ 0 & 1 & -1 \end{bmatrix}$.
- b. Solve the system of equations by using Cramer's Rule :
- $$x + y + z = 9$$
- $$2x + 5y + 7z = 52$$
- $$2x + y - z = 0$$
- c. Solve the system of equations by using Matrix method :
- $$x + y + z = 6$$
- $$x - y + z = 2$$
- $$2x + y - z = 1$$

d. Show that
$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix} = (b-c)(c-a)(a-b).$$

PART - C

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

a. Compute the inverse of the matrix $A = \begin{bmatrix} 2 & 2 & 3 \\ 1 & -2 & 3 \\ 0 & 1 & -1 \end{bmatrix}$.

b. Show that the matrix $A = \begin{bmatrix} 1 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ satisfies its characteristic equation .

c. Reduce the matrix $A = \begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 9 \\ -1 & -3 & -4 & -3 \end{bmatrix}$ to it's normal form and find the rank.

d. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$. Show that $A^2 - 4A - 5I_3 = 0$.

PART - D

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

- a. Show that $A(4, 1), B(7, 4), C(13, -2)$ are the vertices of right angled triangle. Also find its area .
- b. If the midpoints of the sides of a triangle are $(-1, 2), (6, 1)$ and $(3, 5)$. Find the co-ordinates of the vertices .
- c. Find the equation of the side AB and the median through C of the triangle formed by the points $A(-5, 5), B(-1, 7)$ and $C(3, -3)$.
- d. Find the area of the quadrilateral $ABCD$ where $A(7, 21), B(1, 1), C(7, -3)$ and $D(12, 2)$.

PART - E

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

- a. If $\sec \theta = \frac{13}{5}$, θ is acute . Find the values of the trigonometric functions of θ . Find the value of $\frac{2 \sin \theta - 3 \cos \theta}{4 \sin \theta - 9 \cos \theta}$.
- b. Find $\lim_{x \rightarrow 0} \frac{x}{\sqrt{1+x} - \sqrt{1-x}}$.
- c. Differentiate $\frac{(x+1)(2x-1)}{x-3}$ with respect to x .
- d. Find the maximum and minimum values of the function $x^3 - 2x^2 - 4x - 1$.

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.C.A. FIRST SEMESTER DEGREE EXAMINATION JANUARY 2023**

**COMPUTER APPLICATIONS
Fundamentals of Computers**

Duration:2 Hours

Max Marks:60

PART A

Answer any FIVE questions:

(5×2= 10)

- 1) What is an LCD monitor?
- 2) Write short notes on algorithm.
- 3) Define boolean algebra.
- 4) How to represent XOR & NOR gates in digital electronics?
- 5) What is a touch screen?
- 6) What is a NAND gate? Write its logic symbol.

PART B

Answer any FIVE questions :

(5×6= 30)

- 7) Write a note on One variable K map with example.
- 8) Draw a flow chart to find sum of three numbers.
- 9) Convert the following octal numbers a) 456 b) 367 c) 574 to binary.
- 10) What are the various logic operations? Explain.
- 11) Explain the components of a computer system with neat diagram.
- 12) Give any six features of a good programming language.

PART C

Answer any TWO questions :

(2×10= 20)

- 13) Explain the classification of computers.
- 14) What is a) system software b) application software? Explain with example.
- 15) Convert the octal number a) 4532 b) 6734 c) 6540 to binary and decimal.

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.C.A. FIRST SEMESTER DEGREE EXAMINATION JANUARY 2023**

COMPUTER APPLICATIONS

Programming in C

Duration:2 Hours

Max Marks:60

PART A

Answer any FIVE questions:

(5×2= 10)

- 1) What are string constants? Give an example.
- 2) Write the syntax of nested if-else in C.
- 3) What is the purpose of toupper() function? Give an example.
- 4) Differentiate Structures and Unions.
- 5) What is conditional operator? Write its syntax.
- 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) Write a note on a) Arithmetic operators b) Relational operators
- 9) Explain linear search with example.
- 10) Explain the concept of structures with the help of an example.
- 11) Write a C program to calculate and display the first 'n' Fibonacci numbers.
- 12) Explain getchar() and putchar() function with syntax and example.

PART C

Answer any TWO questions :

(2×10= 20)

- 13) a) Explain any two datatypes in C with examples.
b) What is a variable? With an example, explain how to declare and initialize a variable.
- 14) Explain with example program and syntax a) break b) exit
- 15) Discuss pointer increment and scale factors with examples.
