Reg. No. | | | | | | | | | |

# BCACACN 103

## First Semester B.C.A. Degree Examination, February/March 2023
## (NEP – 2020) (2021 – 22 Batch Onwards)
## MATHEMATICAL FOUNDATION (DSCC)

Time : 2 Hours | Max. Marks : 60

***Note :*** *Answer* ***any six*** *questions from Part –* ***A*** *and* ***one full*** *question from* ***each*** *Unit in Part –* ***B.***

PART – A **(6×2=12)**

1. a) Write the binomial theorem.
   b) Find the value of :
      i) $\log_4 256$
      ii) $\log_2 64$.
   c) Find the coordinates of the centroid of a triangle whose vertices are (3, –2) (–1, –4) and (–5, 6).
   d) Represent the angles 90° and 135° in radians.
   e) Differentiate $4x^3 - 7x^4$ with respect to x.
   f) Define diagonal matrix. Give an example.
   g) Find the first term and the common difference in an AP if $n^{th}$ term is 7n – 3.
   h) Define Echelon form of a matrix with an example.

PART – B

**Unit – I**

2. a) Prove that $\frac{\log\sqrt{27} + \log\sqrt{8} - \log\sqrt{125}}{\log 6 - \log 5} = \frac{3}{2}$.
   b) Find the $7^{th}$ term in the expansion of $\left(x^3 - \frac{1}{x}\right)^9$.
   c) Find the equation of straight line passing through (2, 4) and perpendicular to 5x – 7y = 100. **(4+4+4)**

**P.T.O.**

3. a) If $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$, find x.

   b) Show that the quadrilateral with points (2, –1) (3, 4) (–2, 3) and (–3, –2) is a rhombus.

   c) Find the centre and radius of the circle, whose equation is $x^2 + y^2 - 4x + 8y - 5 = 0$. **(4+4+4)**

## Unit – II

4. a) Find the value of $\frac{\tan 45^\circ}{\text{cosec}30^\circ} + \frac{\sec 60^\circ}{\cot 45^\circ} + \frac{5}{2} \cdot \frac{\sin 90^\circ}{\cos 0^\circ}$.

   b) Evaluate $\lim_{x \to 2} \frac{2x^2 - 7x + 6}{5x^2 - 11x + 2}$.

   c) Evaluate $\int \left(7x^2 - 3x + 8 - \frac{1}{\sqrt{x}} + \frac{1}{x} + \frac{1}{x^2}\right) dx$. **(4+4+4)**

5. a) Consider $f(x) = \frac{x^2 - 4}{x - 2}$ for $x < 2$,

   $f(x) = 4$ for $x = 2$,

   $f(x) = 2$ for $x > 2$, explain the continuity at $x = 2$.

   b) If $\theta$ is in fourth quadrant and $\cos\theta = \frac{5}{13}$, find value of $\frac{13\sin\theta + 5\sec\theta}{5\tan\theta + 6\,\text{cosec}\theta}$.

   c) Differentiate $9x^4 - 7x^3 + 8x^2 - \frac{8}{x} + \frac{10}{x^3}$ with respect to x. **(4+4+4)**

## Unit – III

6. a) If $A = \begin{pmatrix} 2 & 0 & 4 \\ 6 & 2 & 8 \\ 2 & 4 & 6 \end{pmatrix}$ $B = \begin{pmatrix} 10 & 0 & 4 \\ -2 & 15 & 7 \\ 2 & 2 & 2 \end{pmatrix}$ $C = \begin{pmatrix} 0 & 0 & 4 \\ -2 & 0 & 7 \\ 2 & 1 & 5 \end{pmatrix}$.

   Find $3(A + B) - 2(C + A)$.

   b) Find the adjoint of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$. **(6+6)**

7. a) If $A = \begin{pmatrix} 3 & -3 & 0 \\ 6 & 3 & 9 \\ 12 & 3 & 24 \end{pmatrix}$ $B = \begin{pmatrix} 2 & 3 & 0 \\ 6 & -9 & 3 \\ 3 & 3 & -3 \end{pmatrix}$. Find $(AB)' = B'A'$.

b) Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 5 \\ 2 & 4 & 8 \end{bmatrix}$.

c) If $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$, show that $A^2 = 2A$. **(6+3+3)**

## Unit – IV

8. a) Show that matrix $\begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ satisfies its characteristic equation.

b) Find the three numbers in an AP whose sum is 30 and product is 840. **(6+6)**

9. a) Using Cramer's rule, solve the equations $x + y + z = 11$, $2x - 6y - z = 0$ and $3x + 4y + 2z = 0$.

b) Three numbers whose sum is 18 are in AP and if 2, 4, 11 are added to them respectively, the resulting numbers are in GP. Determine the numbers. **(6+6)**

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**BCACACN 102**

# First Semester B.C.A. Degree Examination, February/March 2023
## (NEP 2020)
## (2021 – 22 Batch Onwards)
## PROGRAMMING IN C (DSCC)

Time : 2 Hours | Max. Marks : 60

***Note :*** *Answer* ***any six*** *questions from Part –* ***A*** *and* ***one full*** *question from* ***each*** *Unit in Part –* ***B****.*

PART – A **(6×2=12)**

1. a) Give basic structure of a C program.
   b) Correct the errors : #define Pi = 3.14;
   c) Write the equivalent 'C' expression for the equation given below :
   $A = [3b^2 + 4c^2] \div x$
   d) Write the general format of simple if statement. Give example.
   e) Specify the different ways to read a string from keyboard.
   f) What is a pointer ? How do you declare a pointer variable in C ?
   g) Give any two differences between structure and union.
   h) Differentiate actual parameters and formal parameters.

PART – B

**Unit – I**

2. a) What are constants ? How they are classified ? Give example for each.
   b) Explain int, float and char data types in 'C' with example. **(6+6)**

3. a) How do you read and print single character and integer in 'C' ? Give example.
   b) Explain the following tokens used in C.
      i) Keyword ii) Identifier.
   c) Explain the salient features of 'C' language. **(4+4+4)**

P.T.O.

## Unit – II

4. a) Differentiate while loop and do..while loop with syntax and example.
   b) Explain the different arithmetic operators in 'C' with syntax and example. **(6+6)**

5. a) Explain switch statement with its syntax and example.
   b) Write a 'C' program to find sum of digits and reverse of a given number. Also check if it is palindrome or not. **(6+6)**

## Unit – III

6. a) Explain the following functions with syntax, usage and example.
      i) strlen( )
      ii) strcpy( )
      iii) strcat( )
   b) Write a 'C' program to find minimum and maximum in a given list of 'N' numbers. **(6+6)**

7. a) List any six advantages of pointers.
   b) Explain with example how to declare and initialize one dimensional array. **(6+6)**

## Unit – IV

8. a) Explain structure definition with syntax and example.
   b) Explain any two categories of user defined function. **(6+6)**

9. a) Explain function definition with syntax and example.
   b) Explain structure within a structure with an example. **(6+6)**

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# BCACACN 101

## First Semester B.C.A. Degree Examination, February/March 2023
## (NEP – 2020)
## (2021 – 22 Batch Onwards)
## FUNDAMENTALS OF COMPUTERS
## (DSCC)

Time : 2 Hours | Max. Marks : 60

***Note :*** *Answer* ***any six*** *questions from Part –* ***A*** *and* ***any one*** *full question from* ***each*** *Unit in Part –* ***B****.*

PART – A

**(6×2=12)**

1. a) What is Cache memory ?
   b) Differentiate RAM and ROM.
   c) Define System Software. Give example.
   d) Convert $(AB2)_{16}$ to Binary and Octal.
   e) Write the BCD and Excess-3 Codes for 57.
   f) Write 1's and 2's Complement for $(10101011)_2$.
   g) Draw the logic circuit for F (x, y, z) = x y + x′ z′ using basic gate.
   h) Write the Truth Table and Logic expression of the OR gate.

PART – B

**Unit – I**

2. a) List and explain characteristics of Computer.
   b) Differentiate LCD and CRT monitors. **(6+6)**

3. a) Write an algorithm and flowchart to display the maximum of three numbers.
   b) Explain the applications of Computers in different fields. **(6+6)**

P.T.O.

## Unit – II

4. a) What is System Utility ? Explain any five functions of System Utility.

   b) Write a note on :

      i) Word Processors

      ii) Spreadsheet Software **(6+6)**

5. a) Briefly explain different phases of the Program Development Cycle.

   b) Define Operating System. List and explain basic functions of an Operating System. **(6+6)**

## Unit – III

6. a) State and prove any two theorems of Boolean algebra.

   b) Perform the subtractions 272 – 354 using 9's and 10's Complement Methods. **(6+6)**

7. a) State and prove distributive law using truth table.

   b) Using Boolean Theorems and postulates, prove $x'y'z + x'yz + xy' = x'z + xy'$

   c) Perform the following subtraction using 1's complement method.

   $(101011)_2 - (111001)_2$. **(4+4+4)**

## Unit – IV

8. a) Express the Boolean function F(A, B, C) = A + B′C as sum of minterms and product of maxterms.

   b) Solve the expression $F(A, B, C, D) = \sum(0, 2, 8, 10, 14) + \sum d(5, 15)$ using K-Maps and draw the logic diagram for minimized expression. **(6+6)**

9. a) Simplify the SOP expression $F(A, B, C, D) = \sum(0, 2, 3, 5, 7, 8, 9, 10, 11, 13, 15)$ using K-Maps. Draw the logic diagram for the minimized expression.

   b) What are universal gates ? Prove that NAND is universal gate. **(6+6)**