**Code No. 14502/CBCS**

# FACULTY OF ENGINEERING

**B. E. (CSE) I – Semester (CBCS) (Backlog) Examination, March/April 2021**

**Subject: Computer Programming & Problem Solving**

**Time: 2 hours** **Max. Marks: 70**

**Note: Missing Data, if any, may be suitably be assumed.**

## PART – A

**Answer any five questions.** **(5x2 = 10 Marks)**

1. What are the data types in 'C' language?
2. Draw a flow chart to find biggest of three numbers.
3. What is a recursive function?
4. Discuss about Bitwise operators.
5. Define preprocessors.
6. Write a program to add two matrices of order 2x2.
7. What is a pointer? Give an example.
8. Find the length of a given string using string functions.
9. Differentiate between structure and Union.
10. What are the modes of files?

## PART – B

**Answer any four questions.** **(4x15 = 60 Marks)**

11. Convert the following:
    (i) $110110_{(2)}$ to decimal (ii) 250 to octal (iii) $10111.11_{(2)}$ to decimal
    (iv) $3AB_{16}$ to decimal
12. (a) What are storage classes? Explain.
    (b) Write a program to find fibonacci series using recursive functions.
13. (a) Explain about passing an Array to a function.
    (b) Differentiate between malloc() and calloc() memory functions.
14. (a) Write briefly on:
        (i) Enumerated Types.
        (ii) Type definition (typedef)
    (b) Write a program to copy the content of one file to another file.
15. (a) Explain about Bubble sort with an example.
    (b) Write the use of command-line argument.
16. (a) Write a program to multiply two matrices of 2x2 order.
    (b) Explain about string input functions.
17. Write short notes on:
    (a) Loop control statements.
    (b) Binary search.

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**Code No. 14419**

# FACULTY OF ENGINEERING

## B.E./B.Tech. (Bridge Course) I-Semester (Backlog) Examination, March/April 2021

**Subject : Programming in C**

**Time: 2 hours** **Max. Marks: 75**

**Note: Missing Data, if any, may be suitably be assumed.**

### PART – A

**Answer any seven questions.** **(7x3=21 Marks)**

1 Write a flowchart to find roots of a quadratic equation?
2 What is C expression? Write an example.
3 How strings are stored in C ?
4 Define scope in C.
5 List the advantages that are associated with the use of functions in C language.
6 List out explain any 3 string functions in C.
7 Differentiate between getchar( ) and gets( ) functions.
8 What is type definition? Illustration it with its syntax and example.
9 Write a program that adds two numbers by using pointers.
10 Write the output for the following program

```
void main ( ) {
        int a = 24, b = 13, c, d;
    c = + + a + b;
    d = a + --b;
    print (“a = %d”, a); print (“b = %d”, b);
    print (“c = %d”, c); print (“d = %d”, d);
}
```

### PART – B

**Answer any three questions.** **(3x18 = 54 Marks)**

11 (a) Explain the structure of a C program in detail.
(b) Mention the steps involved in creating and running the C program.

12 (a) Illustrate the importance of Precedence and Associativity in Evaluating Expressions.
(b) Write a program to calculate the bill amount for an item given its quantity sold, value, discount and tax.

13 (a) Write a program to enter a number and then calculate the sum of its digits.
(b) With the help of syntax and flowchart, explain any two iterative statements?

14 Explain the categories of functions, with examples.

15 Explain about multidimensional arrays. Write a C program that accept two matrices and display their product.

16 (a) What is a structure? Explain how it differs from arrays.
(b) Define String. What are the various string manipulation functions available in C?

17 (a) Give brief note on the following file positioning functions:
(i) ftell( ) (ii) rewind( ) (iii) fseek( )
(b) Write a C program to illustrate pointer arithmetic.

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**Code No. 14001**

# FACULTY OF ENGINEERING

## B.E. I-Year (Backlog) Examination, March/April 2021

### Subject: Mathematics - I

**Time: 2 hours** **Max. Marks: 75**

**Note: Missing Data, if any, may be suitably be assumed.**

## PART – A

**Answer any seven questions.** **(7x3=21 Marks)**

1 Discuss the convergence of the harmonic series $\sum_{n=1}^{\infty} \frac{1}{n}$.

2 Discuss the convergence of the series $\sum \frac{1}{n^2}$ using Raabe's test.

3 Using the Lagrange's mean value theorem show that $|\cos b - \cos a| \leq |b - a|$.

4 Find the equation of the tangent and radius of curvature at the origin to $3x^2y + 3xy^2 + y^3 + x^2 - 2y^2 - 5y = 0$.

5 Show that $\underset{(x,y)\to(0,0)}{Lt} \frac{xy}{x^2 + y^2}$ do not exist.

6 Find $\frac{df}{dt}$ at $t = 0$ where $f(x, y) = x \cos y + e^x \sin y$, $x = t^2 + 1, y = t^3 + t$.

7 If $z = f(x, y)$, $x = r\cos\theta$, $y = r\sin\theta$, then show that $\left(\frac{\partial f}{\partial x}\right)^2 + \left(\frac{\partial f}{\partial y}\right)^2 = \left(\frac{\partial f}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial f}{\partial \theta}\right)^2$.

8 Obtain the Taylor's linear approximation to the function $f(x, y) = 2x^2 - xy + y^2 + 3x - 4y + 1$ about point (–1, 1).

9 Define basis and dimension.

10 Define linearly dependence and independence of vectors.

## PART – B

**Answer any three questions.** **(3x18 = 54 Marks)**

11 (a) Discuss the convergence of the series $\sum_{n=1}^{\infty} a_n$ where $a_n = \left(1 + \frac{1}{n^p}\right)^{-n^{p+1}}$ with $p > 0$.

(b) Discuss the convergence of the geometric series $\sum_{n=1}^{\infty} \frac{1.4.7\ldots(3n-2)}{2.5.8\ldots(3n-1)}$ where r is any real number.

12 (a) Find the evolutes of the curve $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

(b) Find the asymptotes of the curve $(2x + 3)y = (x - 1)^2$.

13 (a) Evaluate $\oint_C \left[(x^2 + y^2)dx + (y + 2x)\right]dy$ where $C$ is the boundary of the region in the first quadrant that is bounded by the curves $y^2 = x$ and $x^2 = y$.

(b) If $\vec{a}$ is a constant vector and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ show that curl $(\vec{a} \times \vec{r}) = 2\vec{a}$.

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14 (a) Evaluate $\iint_S (\vec{v}.\,\hat{n})\,dA$ , where $\vec{v} = x^2 z\,\hat{i} + y\,\hat{j} - xz^2\,\hat{k}$ and $S$ in the boundary of the region bounded by the paraboloid $z = x^2 + y^2$ and the plane $z = 4y$.

(b) Show that the vector field $\vec{F} = 2x(y^2 + z^3)\,\hat{i} + 2x^2 y\,\hat{j} + 3x^2 z^2\,\hat{k}$ is conservative. Find its scalar potential and the work done in moving a particle from (-1, 2, 1) to (2, 3, 4).

15 (a) Show that the variable u = $x$ – y + z , v = $x$ + y – z, w = $x^2$ + $x$z – $x$y, are functionally related. Find the relationship between them.

(b) If f($x$, $y$) = $\tan^{-1}$ ($x$, $y$) find an approximate value of f(1.1, 0.8) using the Taylor's series (i) linear approximation and (ii) quadratic approximation.

16 (a) Determine the value of k for which the system of equations $x$ – ky + z = 0, k$x$ + 3y – kz = 0, 3$x$ + y – z = 0 has (i) only trivial solution, (ii) non-trivial solution.

(b) Reduce the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 1 & 5 & 5 \end{bmatrix}$ to row echelon form and find its rank.

17 (a) Show that the matrix $A = \begin{bmatrix} 3 & 1 & -1 \\ -2 & 1 & 2 \\ 0 & 1 & 2 \end{bmatrix}$ is diagonalizable. Hence, find P such that $P^{-1}$ AP is a diagonal matrix. Then, obtain the matrix B = $A^2$ + 5A + 3I.

(b) Examine whether the matrix $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ is diagonalizable. If so, obtain the matrix P such that $P^{-1}$ AP is a diagonal matrix.

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