**R-15**

**Code: 5G121**

I B.Tech. II Semester Supplementary Examinations August 2021

# C Programming and Data Structures

( Common to All Branches )

Max. Marks: 70                                                                                    Time: 3 Hours

Answer *all five* units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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### UNIT–I

1.  a)  What is the use of command line arguments
    b)  Write a program using pointers to compute the sum of all elements stored in an array.

**OR**

2.  a)  How pointers permit inter function communication.
    b)  How do you simulate arrays using pointers? Illustrate.

### UNIT–II

3.  a)  How to copy and compare structure variables? Illustrate with example.
    b)  Write and Explain syntax of the following functions: (i) fopen() (ii) fclose() (iii) fread() (iv) fwrite()   (v) rewind() (vi)fprintf() (vii) fscanf() (viii) feof().

**OR**

4.  a)  Explain the following:
        i. Nested structures ii. Array of structures
    b)  Define union. List out the differences between unions and structures

### UNIT–III

5.  a)  What is Data Structure? Explain in detail about different type of data structures.
    b)  Write the steps for evaluating postfix expression

**OR**

6.  Show the stack after each operation of the following sequence that starts with the empty stack: push(a), push(b), pop, push(c), push(d), pop.

### UNIT–IV

7.  What is a Singly Linked List.? Explain different operations of a singly linked list with suitable examples.

**OR**

8.  Write a C function to insert and delete a node from the front end in case of doubly linked list.

### UNIT–V

9.  Define and describe the terms: Tree, Binary Tree, Complete Binary Tree and Degree of a tree.

**OR**

10.  Define Graph and describe various representations of a graph with suitable examples.

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**Code: 5G523**

I B.Tech. II Semester Supplementary Examinations August 2021
## Engineering Drawing-II
( Common to EEE, ECE, CSE & IT )

Max. Marks: 70                                                                 Time: 3 Hours
Answer *any five* full questions by choosing one question from each unit ( 5x14 = 70 Marks )
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### UNIT–I

1.  The top view of a plane object is a regular hexagon of side 40mm, with a central hole of 30mm diameter and with two sides of the hexagon is parallel to XY, when the surface of the object is inclined at $45^0$ to H.P. Draw the true shape of the object.                    14M

**OR**

2.  A thin rectangular plate of sides of 60mm×30mm has its shortest side in the VP and inclined at $30^0$ to the HP. Project its top view if its front view is a square of 30mm long sides.        14M

### UNIT–II

3.  Draw the projections of a hexagonal pyramid with side of base 30mm and axis 65mm long, which is resting with a slant face on H.P such that its axis is parallel to V.P.              14M

**OR**

4.  Draw the projections of a cylinder of base 30mm diameter and axis 50mm long, when it is resting on HP on its base.                    14M

### UNIT–III

5.  Draw an isometric projection of
    i) a square plane of side 40mm
    ii)a rectangular plane 60mm x 80mm
    Both in the horizontal and the vertical plane                    14M

**OR**

6.  A cylinder of base 30mm diameter and axis 40mm long which lies on H.P on a point of its rim, with its axis inclined at $30^0$ to H.P. Draw the projections of the cylinder when its top view of the axis is perpendicular to V.P.                    14M

### UNIT–IV

7.  Draw the isometric view of a square prism with side of base 40mm and length of axis 70mm, when its axis is (i) vertical and (ii) horizontal.                    14M

**OR**

8.  Draw the isometric view of a cone of base 40mm and length of axis 70mm, when its axis is (i) vertical and (ii) horizontal.                    14M

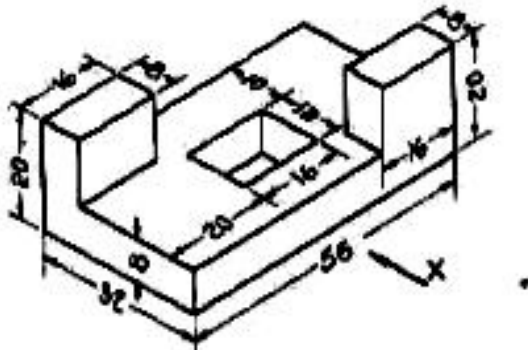### UNIT–V

9.  The Figure shows a machine block. Draw its (i) Front view (ii) Top view (iii) Side view. Assume all the dimensions are in 'mm '.



(a)
                                                                                             14M
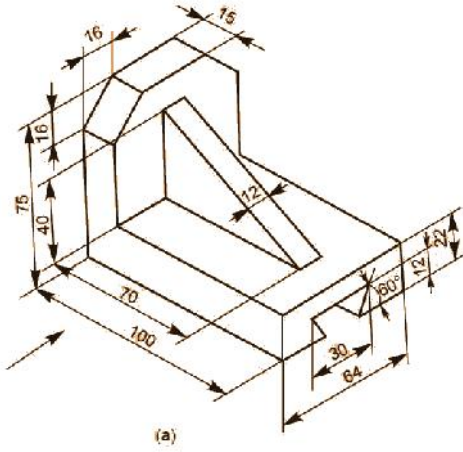
**OR**

10. Draw the orthographic view of the following figure



                                                                                             14M

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**Code: 5GC24**

I B.Tech. II Semester Supplementary Examinations August 2021

**Engineering Mathematics-II**

( Common to All Branches )

Max. Marks: 70                                                                                          Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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### UNIT–I

1.  Evaluate the integral by changing the order of integration $\int_0^a \int_{\frac{x^2}{a}}^{2a-x} x\, y^2 dy\, dx$

**OR**

2.  Evaluate the double integral $\iint_R \sqrt{x^2 + y^2}\, dx\, dy$ by changing into polar coordinates, where 'R' is

    the region in the xy plane bounded by the circles $x^2 + y^2 = 4$

### UNIT–II

3.  Find the Laplace Transform of $\int_0^t \frac{e^{-t}\,\text{Sin}\,t}{t}\, dt$

**OR**

4.  Find $L^{-1}\left\{ \dfrac{1}{(s-1)(s+3)} \right\}$

### UNIT–III

5.  Solve $y'' + 2y' - 3y = \sin t,\ y(0) = 0,\ y'(0) = 0$ Using Laplace Transform

**OR**

6.  Solve the differential equation $\dfrac{d^2 x}{dt^2} - 4\dfrac{dx}{dt} - 12x = e^{3t}$ given that $x(0) = 1, x'(0) = -2$ using

    Laplace Transform

### UNIT–IV

7.  Show that $\nabla^2\left(\dfrac{1}{r}\right) = 0$

**OR**

8.  Evaluate the line integral of $\int_c (xy + y^2)\, dx + x^2 dy$ where 'c' is the square formed by the

    lines $y = \pm 1$ and $x = \pm 1$

### UNIT–V

9.  Evaluate by stoke's theorem for a vector field $\overline{F} = (2x - y)\overline{i} - y z^2\, \overline{j} - y^2 z\overline{k}$ over the upper

    half surface of $x^2 + y^2 + z^2 = 1$ bounded by projection on xy-plane.

**OR**

10. Verify Green's Theorem in the plane for $\int_c \left[(3x^2 - 8y^2)\, dx + (4y - 6xy)\, dy\right]$ where 'c' encloses

    the region bounded by $y = \sqrt{x}$ and $y = x^2$

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I B.Tech. II Semester Supplementary Examinations August 2021

## Engineering Physiscs

( Common to CE , ME, CSE & IT )

Max. Marks: 70                                                                              Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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### UNIT–I

1.  a)  Discuss the working of He-Ne laser                                              8M
    b)  Summarize the applications of LASER                                             6M

**OR**

2.  a)  Differentiate Step-Index and Graded-Index optical fibers                        8M
    b)  Brief the working principle of optical fiber                                    6M

### UNIT–II

3.  a)  Differentiate SC with BCC                                                       8M
    b)  Discuss the rules to find Miller Indices and find Miller Indices of a plane (2a,3b,2c)   6M

**OR**

4.  a)  Explain production and detection of ultrasonics in detail                       7M
    b)  Formulate applications of Ultrasonics                                           7M

### UNIT–III

5.  a)  Derive Schrodinger's time independent wave equation                             10M
    b)  Brief the physical importance of  Schrodinger's equation                        4M

**OR**

6.  Analyze motion of electron in periodic potential of metal                           14M

### UNIT–IV

7.  a)  Differentiate intrinsic and extrinsic semiconductors                            8M
    b)  Explain direct and indirect band gap semiconductors                             6M

**OR**

8.  a)  State and explain Hall effect                                                   8M
    b)  Brief Joshepson's effect with types                                             6M

### UNIT–V

9.  a)  Differentiate any three  of dia , para , ferro, antiferro and ferrite           6M
    b)  classify soft and hard magnetic materials                                       8M

**OR**

10. a)  Justify magnetic moment by the origin of materials                              8M
    b)  classify the ferromagnetics by hysteresis property                              6M

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**Code: 5GC25**

I B.Tech. II Semester Supplementary Examinations August 2021

## Mathematical Methods-II

( Common to CSE & IT )

Max. Marks: 70                                                                                    Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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### UNIT–I

1. By the method of least squares, fit a parabola of the form y=a+bx+cx² for the following data.

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Y | 2.3 | 5.2 | 9.7 | 16.5 | 29.4 | 35.5 | 54.4 |

**OR**

2. By the method of least squares, find the straight line that best fits the following data.

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 14 | 27 | 40 | 55 | 68 |

### UNIT–II

3. Given $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}$ with initial condition $y = 1$ at $x = 0$. Find y for $x = 0.1$ by Picard's method.

**OR**

4. Using Modified Euler's method find an appropriate value of y when x = 0.1 and x = 0.2, given that $\dfrac{dy}{dx} = x - y$ and y = 1 when x = 0.

### UNIT–III

5. a) Obtain the Fourier series for $f(x) = x^2$ in the interval $-f < x < f$

   b) Find the half range cosine series for the function $f(x) = x$, when $0 < x < f$

**OR**

6. Find the half range cosine series for $f(x) = x(2-x)$ in $0 \le x \le 2$ and hence prove that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \frac{1}{6^2} + \ldots = \frac{f^2}{12}$$

### UNIT–IV

7. Find the Fourier cosine transform of $f(x) = \dfrac{1}{a^2+x^2}$,  and Fourier sine transform of $f(x) = \dfrac{x}{a^2+x^2}$

**OR**

8. Derive the Fourier transform of $f(x) = \begin{cases} x, & |x| \le a \\ 0, & |x| > a \end{cases}$

### UNIT–V

9. Obtain the solution of PDE $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$

**OR**

10. Eliminate the arbitrary function f from $z = x - y + f(x, y)$

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