R-15

Code: 5GC13

I B.Tech. I Semester Supplementary Examinations March 2021

Engineering Physics

(Common to EEE & ECE)

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. What is interference? With a neat diagram, explain that the diameter of bright Newton's Ring is directly proportional to the square root of the odd number.   14M

OR

2. What is optical fiber? Discuss briefly principle, construction and working of an optical fiber.   14M

UNIT–II

3. Show that FCC is most closely packed of the three cubic structures by working out its packing fractions.   14M

OR

4. What is piezoelectric effect? Draw a neat diagram and explain the piezoelectric generator for production of ultrasonic waves?   14M

UNIT–III

5. Obtain the expression for energy levels of a particle of mass m which is free to move in a region of zero potential between two rigid walls of x=0 and x=L.   14M

OR

6. Explain the behaviour of an electron moving in a field of periodic potential using Kronig and Penny model.   14M

UNIT–IV

7. Explain with a suitable diagram working of Hall effect and its uses.   14M

OR

8. a) Describe with an appropriate diagram working of a P-N junction diode.   7M

    b) Elaborate Josephson effects and their applications.   7M

UNIT–V

9. a) Derive an equation for magnetic moment of atom.   7M

    b) How optical and mechanical properties of nanomaterials varies with their size.   7M

OR

10. Write a detailed note on nanoscience and nanotechnology.   14M

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Code: 5GC14

I B.Tech. I Semester Supplementary Examinations March 2021

Engineering Mathematics-I

(Common to All)

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. Find the Orthogonal trajectories of the family of curves $r = a(1 + \cos θ)$

OR

2. Solve $2xy\,dy - (x^2 + y^2 + 1)dx = 0$

UNIT–II

3. Using the method of variation of parameters, solve $(D^2 + 4)y = \tan 2x$

OR

4. Solve $(D^2 + 4D + 20)y = 23\sin t - 15\cos t$.

UNIT–III

5. Verify Rolle's theorem for the function $f(x) = (x - a)^m(x - b)^n$, where *m* and *n* are positive integers, in [a, b].

OR

6. Verify Lagrange's Mean value theorem for $f(x) = e^x \ in\ [0,1]$

UNIT–IV

7. Find a point on the plane *3x+2y+z-12=0*, which is nearest to the origin.

OR

8. If $x = r\cos θ$, $y = r\sin θ$, then find $\dfrac{\partial(x, y)}{\partial(r, θ)}$.

UNIT–V

9. Trace the curve $y^2(a + x) = x^2(3a - x)$.

OR

10. Trace the curve $x^3 + y^3 = 3axy$

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I B.Tech. I Semester Supplementary Examinations March 2021

Problem Solving Techniques and Introduction to C Programming

(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) Write an algorithm to check the given number is perfect number or not.

   b) List and explain various symbols used in flowcharts with figures

OR

2. Discuss about different computer languages with examples.

UNIT–II

3. Explain with examples the different types of operators used in C.

OR

4. a) Describe the structure of a C program with example

   b) Explain about data types in C programming language.

UNIT–III

5. a) In what way a do – while loop differs from while loop. Explain.

   b) Write a C program to find whether the given number is prime numbers or not.

OR

6. Explain the syntax of else if ladder and write a C program to read the value of x and evaluate the following function.

$$Y= \begin{cases} 1 \text{ for } x>0 \\ 0 \text{ for } x=0 \\ -1 \text{ for } x<0 \end{cases}$$

Using else if statement and nested if statement.

UNIT–IV

7. Describe creation and initialization of two dimensional arrays and write a C program to perform sum of two matrices.

OR

8. Define string and explain various string input/output functions with suitable examples.

UNIT–V

9. What is function? Explain different parameter passing methods in functions with example.

OR

10. a) Explain about static and register storage classes.

    b) Write a C program to find factorial of a number using recursion.

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