

Code: 5GC13

I B.Tech. I Semester Supplementary Examinations February 2022

Engineering Physics

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

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

Marks

UNIT-I

1. a) Derive the expressions for diameters of dark and bright Newton's rings 7M
- b) Distinguish He-Ne laser from Ruby laser 7M

OR

2. a) Analyze the optical signal transmission through graded-index optical fiber. 7M
- b) The refractive indices of core and cladding of an optical fiber are 1.50 and 1.45 respectively. Calculate the Numerical aperture, acceptance angle and critical angle of optical fiber. 7M

UNIT-II

3. a) Prove that FCC has closely packed structure by calculating packing fractions of S.C, B.C.C and F.C.C 10M
- b) Evaluate the glancing angle on the cube (1 1 0) of rock salt crystal ($a=0.2814$ nm) corresponding to second order diffraction maximum for the X-ray of wavelength 0.071 nm. 4M

OR

4. a) Analyze the various detection methods for ultrasonics 7M
- b) Describe Non Destructive Testing of materials 7M

UNIT-III

5. a) State and Explain Heisenberg's uncertainty principle 7M
- b) Derive Schrodinger's 1-D time independent wave equation for a free particle. 7M

OR

6. a) Classify the solids into metals, semiconductors and insulators 7M
- b) Explain the Fermi-Dirac distribution function along with its temperature dependence. 7M

UNIT-IV

7. a) State the Hall Effect and also derive the Hall coefficient 7M
- b) Explain the construction and working of LED 7M

OR

8. a) Analyze the formation of paired electrons in superconductors by using the B.C.S theory. 7M
- b) Write short notes on high T_c superconductors 7M

UNIT-V

9. a) Distinguish the soft and hard magnetic materials 7M
- b) A magnetic material has a magnetization of 3300 A/m and flux density of 0.0044 Wb/m². Compute the magnetizing force and the relative permeability of the material. 7M

OR

10. a) Explain the construction and working of Ball mill method to prepare nanoparticles. 7M
- b) Write the properties of nanomaterials 7M

Hall Ticket Number :

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R-15

Code: 5G111

I B.Tech. I Semester Supplementary Examinations February 2022

Problem Solving Techniques and introduction to C Programming

(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)

Marks

UNIT-I

1. a) What is a flow chart? How it is different from an Algorithm 7M
- b) Illustrate different phases of Software Development Life Cycle (SDLC) with a neat diagram. 7M

OR

2. a) What is Programming Language? What is the generation of programming Language? Describe it briefly. 7M
- b) Give short notes on computer environments. 7M

UNIT-II

3. a) What is a variable? What are the rules for declaring variables? Give examples of valid and invalid variables 7M
- b) Describe Structure of C program with an example. 7M

OR

4. a) Explain about the basic data types in C language with examples 7M
- b) Explain with examples, any two types of operators in c programming language. 7M

UNIT-III

5. a) Explain for loop and nested for loop in c programming language. 7M
- b) Write a program to print sum of odd numbers between 1 and 100 using for loops. 7M

OR

6. a) Explain with examples, if...else and nested if....else statements. 7M
- b) Write a program to find the largest among three numbers. 7M

UNIT-IV

7. a) How single dimensional arrays and multidimensional arrays are declared and initialized? Explain with suitable examples. 7M
- b) How to declare and initialization of strings? Explain them with examples. 7M

OR

8. a) Explain any five string handling functions with suitable examples, 7M
- b) Write a C program for addition of two matrices. 7M

UNIT-V

9. a) Discuss in details about local variables and global variables with respect to their scope and extent. 7M
- b) Explain about the actual arguments and formal argument in functions. What is the difference between these arguments? 7M

OR

10. a) What are the different ways of passing parameters to the function? Explain. 7M
- b) Write a c program to find the factorial of a number using recursive function. 7M

Hall Ticket Number :

R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations February 2022

Engineering Mathematics-I

(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)

UNIT-I

1. a) Find the Orthogonal trajectories of the family of parabolas $y^2 = 4ax$ 7M
 b) A bacterial culture, growing exponentially, increases from 100 to 400 grams in 10 hours. How much was present after 3 hours 7M

OR

2. Find the Orthogonal trajectories of the family of curves $r^n = a^n \cos n_\theta$ 14M

UNIT-II

3. Solve $(D^2 - 6D + 25)y = e^{2x} + \sin x + x$ 14M

OR

4. Using the method of variation of parameters, solve $(D^2 + a^2)y = \sec ax$ 14M

UNIT-III

5. a) Expand $\sin x$, by using Maclaurin's theorem. 7M
 b) Verify Lagrange's Mean value theorem for $f(x) = e^x$ in $[0,1]$ 7M

OR

6. a) Expand $\sin x$ in powers of $\left(x - \frac{f}{2}\right)$ 7M
 b) Expand e^x in powers $(x-1)$ upto four terms. 7M

UNIT-IV

7. If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$, then prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$ 14M

OR

8. Given $x + y + z = a$, find the maximum value of $x^m y^n z^p$ 14M

UNIT-V

9. Trace the curve $x^3 + y^3 = 3axy$ 14M

OR

10. Trace the curve $r^2 = a^2 \cos 2_\theta$ 14M
