I B.Tech. I Semester Supplementary Examinations December 2022
Fundamentals of Electrical & Electronics Engineering
(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)
****

UNIT–I

1.		Classify the types of resistors. Explain any three types with neat diagram.	14M

OR

2.	a)	What is tolerance? What are the color codes used to indicate the tolerance value and write their range?	7M
	b)	Differentiate ideal and practical voltage source.	7M

UNIT–II

3.	a)	State and explain Kirchhoff's laws.	7M
	b)	State and explain super position theorem.	7M

OR

4.	a)	Determine the equivalent capacitance when three capacitors with values 3F, 4Fand 6F are connected in series.	7M
	b)	State and explain Thevenin's theorem.	7M

UNIT–III

5.	a)	Draw and explain the energy band diagrams of intrinsic and extrinsic semiconductors	7M
	b)	What is mean by avalanche breakdown? Explain.	7M

OR

6.	a)	How a PN junction diode acts as a switch? Explain.	6M
	b)	Write short notes on i) Junction capacitance ii) Temperature dependence on V-I characteristics of a PN junction diode.	8M

UNIT–IV

7.		Explain the operation of full wave rectifier with capacitor input filter and derive the expression for ripple factor.	14M

OR

8.		With neat diagrams and wave forms explain the operation of Bridge rectifier and derive the expressions for E_{dc}, I_{dc}	14M

UNIT–V

9.	a)	What is DSO? Explain its operation.	7M
	b)	Compare CB, CE configurations of a transistor.	7M

OR

10.		Explain the operation of CRO with neat diagram.	14M

***

I B.Tech. I Semester Supplementary Examinations December 2022
Problem Solving Techniques and 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)
****

UNIT–I

1. a) Differentiate between computer hardware and software   7M
    b) Write an algorithm to find product of two integers using repetitive addition   7M

OR

2. a) Explain in detail about the software development method.   7M
    b) List and explain various symbols used in flowcharts with figures   7M

UNIT–II

3. a) Discuss about operator precedence in expression evaluation with a suitable
       example.   7M
    b) Give the format for conditional operator. When is it used?   7M

OR

4. a) Explain different data types supported by C language with their memory
       requirements.   7M
    b) Describe the structure of a C program with example   7M

UNIT–III

5. a) Write a C Program to check weather given number is Amstrong number or not   7M
    b) Explain the significance of 'break' and 'continue' statement with a sample program.   7M

OR

6. a) Write 'C' program to print the Fibonacci sequence.   7M
    b) In what way a do – while loop differs from while loop. Explain.   7M

UNIT–IV

7. a) Write a program to print an array in reverse order   7M
    b) Write a C Program to delete 'n' characters in a given string   7M

OR

8. a) What is an Array? How to declare and initialize a one dimensional array?   4M
    b) Explain different string manipulation functions with example   10M

UNIT–V

9. a) What is the scope of variables of type extern, auto, register and static? Explain
       with example.   10M
    b) What is meant by user defined function? Explain with an example C program   4M

OR

10. a) What is a function? What are its advantages? Explain various parameter passing
       techniques.   10M
    b) Write a function that checks whether a given year is leap year or not.   4M

***

Code: 7GC14

I B.Tech. I Semester Supplementary Examinations December 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 eigen values and eigen vectors of $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ **7M**

   b) Prove that if $\lambda_1, \lambda_2, \lambda_3, \ldots\ldots \lambda_n$ are eigen values of A then $\lambda_1^2, \lambda_2^2, \lambda_3^2, \ldots\ldots \lambda_n^2$ are the eigen values of A².   **7M**

OR

2. If A= $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ verify Cayley-Hamilton theorem. Find A^4 and A^{-1} using Cayley-Hamilton.   **14M**

| UNIT–II |

3. Show that the matrix $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ is Skew-Hermitian and hence find eigen values and eigen vectors.   **14M**

OR

4. a) Prove that The Eigen values of a Hermitian matrix are all real.   **7M**

   b) Define Hermitian, skew-Hermitian, Unitary Matrices and give example for each   **7M**

| UNIT–III |

5. a) A bacterial culture, growing exponentially, increases from 100 to 400gms in 10 Hrs. How much was present after 3 Hrs. from the initial instant?   **7M**

   b) Find the orthogonal trajectory of the family of confocal conics

   $$\frac{x^2}{a^2} + \frac{y^2}{b^2 + \lambda} = 1, \text{ where } \lambda \text{ being the parameter.}$$ **7M**

OR

6. Find the orthogonal Trajectories of the family of curves

   $x^2 + y^2 + 2gx + c = 0$ where g is parameter.   **14M**

| UNIT–IV |

7. Solve $\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} + 4y = 8x^2 e^{2x} \sin 2x$ **14M**

OR

8. Using the Method of variation of Parameters, solve $\dfrac{d^2y}{dx^2} - y = \dfrac{2}{1+e^x}$ **14M**

| UNIT–V |

9. Prove that (if 0<a<b<1), $\dfrac{b-a}{1+b^2} < \tan^{-1}b - \tan^{-1}a < \dfrac{b-a}{1+a^2}$. Hence show

   that $\dfrac{\pi}{4} + \dfrac{3}{25} < \tan^{-1}\dfrac{4}{3} < \dfrac{\pi}{4} + \dfrac{1}{6}.$ **14M**

OR

10. a) Verify Rolle's theorem for $\dfrac{\sin x}{e^x}$ *in* $(0, \pi).$ **7M**

    b) Verify Lagrange's mean value theorem for $f(x) = (x-1)(x-2)(x-3)$ in $[0, 4]$ **7M**

***

I B.Tech. I Semester Supplementary Examinations December 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)

****

UNIT–I

1. a) Define interference of light.   4M

   b) Explain Fraunhoffer diffraction of light at single slit and its intensity distribution.   10M

OR

2. a) Write a note on applications of optical fibers in the field of sensors and medicine.   7M

   b) Distinguish between interference and diffraction of light.   7M

UNIT–II

3. Show that FCC crystal is more tightly packed than BCC and SC crystal based on the packing fractions of the corresponding crystals.   14M

OR

4. a) Explain the terms (i) screw and edge dislocations (ii) Burger's vector.   10M

   b) For a simple cubic lattice find the ratios of interplanar separation $d_{111}:d_{110}:d_{100}$ 4M

UNIT–III

5. a) Calculate the wavelength associated with electron with energy 2000eV.   7M

   b) Distinguish between classical free electron theory and quantum free electron theory of metals.   7M

OR

6. a) Develop Schroendinger's time dependent wave equation.   9M

   b) State and explain Heisenberg's uncertainty principle.   5M

UNIT–IV

7. Define magnetic dipole moment. List out various sources of magnetic dipole moment in magnetic materials.   14M

OR

8. a) Illustrate the intrinsic and extrinsic form of semiconductors and construct covalent and energy band diagrams.   7M

   b) Express the working principle of pn junction diode with neat diagram.   7M

UNIT–V

9. a) Give an account of BCS theory of super conductivity.   9M

   b) What are nano materials? Write the significance of nano scale.   5M

OR

10. a) Mention the significance of penetration depth in superconductors.   9M

    b) Explain properties of superconductors.   5M

*** *