

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-20

Code: 20A411T

I B.Tech. I Semester Supplementary Examinations Dec 2023 / Jan 2024

Basic Electrical and Electronics Engineering

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(**Compulsory question**)

- | | | |
|---|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) Define the terms Voltage and Current | CO1 | L1 |
| b) Write the Statement of Thevenin's Theorem. | CO2 | L1 |
| c) What is static Resistance of Semiconductor diodes? | CO3 | L1 |
| d) Write the differences between Half wave rectifier and Full wave rectifier? | CO4 | L1 |
| e) Draw the Input & Output Characteristics of CB configurations. | CO5 | L1 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | BL |
|---|-------|-----|----|
| UNIT-I | | | |
| 2. Describe the construction and operation of Function Generator with neat diagram. | 12M | CO1 | L2 |
| OR | | | |
| 3. a) Define Inductance and derive the Energy stored in the Inductor. | 6M | CO1 | L1 |
| b) Describe the expression for energy stored in the capacitor? | 6M | CO1 | L1 |
| UNIT-II | | | |
| 4. a) State and explain the Kirchhoff's Laws? | 6M | CO2 | L2 |
| b) State and explain the Ohm's Law? | 6M | CO2 | L2 |
| OR | | | |
| 5. State and explain the Thevenin's theorem with suitable example? | 12M | CO2 | L3 |
| UNIT-III | | | |
| 6. a) Draw and explain the V-I characteristics of P-N Junction diode? | 6M | CO3 | L2 |
| b) Explain how zener diode acts as a Voltage regulator? | 6M | CO3 | L3 |
| OR | | | |
| 7. a) Write in detail about classification of semi-conductors | 6M | CO3 | L2 |
| b) What is meant by Zener breakdown and explain the operation of a Zener diode. | 6M | CO3 | L1 |
| UNIT-IV | | | |
| 8. a) Draw the circuits of a full wave rectifier using 2-diodes and 4-diodes. | 7M | CO4 | L1 |
| b) Discuss the relative merits and demerits. | 5M | CO4 | L2 |
| OR | | | |
| 9. Draw and explain the operation of Half wave Rectifiers? | 12M | CO4 | L2 |
| UNIT-V | | | |
| 10. Discuss the Construction and operation of P-N-P transistor with neat sketches? | 12M | CO5 | L2 |
| OR | | | |
| 11. Outline the input-output characteristics of a transistor in CB configuration. | 12M | CO5 | L4 |

*** End ***

Hall Ticket Number :

R-20

Code: 20A312T

I B.Tech. I Semester Supplementary Examinations Dec 2023 / Jan 2024

Engineering Drawing
(Common to CE, EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five questions by choosing one question from each unit (5 x 14 = 70 Marks)

Marks CO Blooms Level

UNIT-I

2. P, Q and R are the centres of three circles of diameters 75mm, 45 mm and 30 mm respectively. PQ = 95 mm, QR=50 mm and PR = 75 mm. Draw a circle touching the three circles.

14M CO1 L2

OR

3. Q is a diameter of a circle and is 75 mm long. A piece of string is tied tightly round the circumference of the semi-circle starting from P and finishing at Q. The end Q is then untied and the string, always kept taut, is gradually unwound from the circle, until it lies along the tangent at P. Draw the curve traced by the moving extremity of the string.

14M CO1 L2

UNIT-II

4. A line PQ is 75 mm long and lies in an auxiliary inclined plane (A.LP.) which makes an angle of 45° with the H.P. The front view of the line measures 55 mm and the end P is in the V.P. and 20 mm above the H.P. Draw the projections of PQ and find (i) its inclinations with both the planes and (ii) its traces.

14M CO2 L2

OR

5. A line AB is in the first quadrant. Its end A and B are 20 mm and 60 mm in front of the V.P. respectively. The distance between the end projectors is 75 mm. The line is inclined at 30° to the H.P. and its H.T. is 10 mm above xy. Draw the projections of AB and determine its true length and the V.T.

14M CO2 L2

UNIT-III

6. Draw the projections of a circle of 50 mm diameter having its plane vertical and inclined at 30° to the V.P. Its centre is 30mm above the H.P. and 20 mm in front of the V.P. Show also its traces.

14M CO3 L2

OR

7. A square ABCO of 50 mm side has its corner A in the H.P., its diagonal AC inclined at 30° to the H.P. and the diagonal BO inclined at 45° to the V.P. and parallel to the H.P. Draw its projections.

14M CO3 L2

UNIT-IV

8. Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the H.P., with the axis inclined at 45° to the V.P.

14M CO4 L3

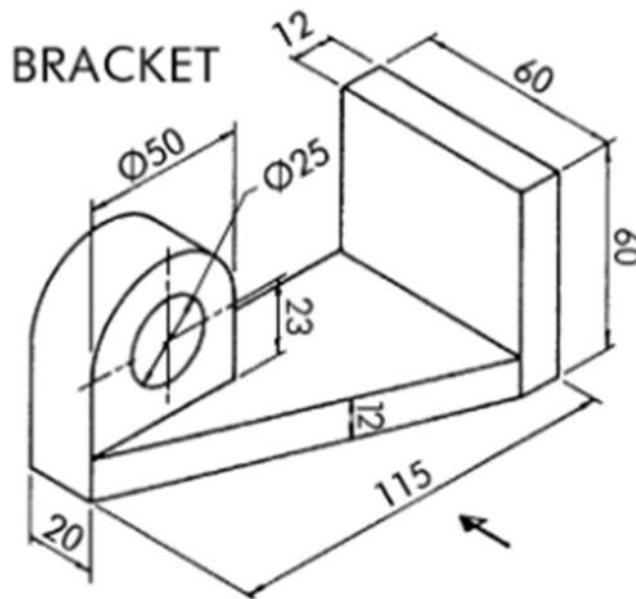
OR

9. A thin 30° - 60° set square has its longest edge in the VP and inclined at 30° to HP. Its surface makes an angle of 45° with the VP. Draw the projections.

14M CO4 L3

UNIT-V

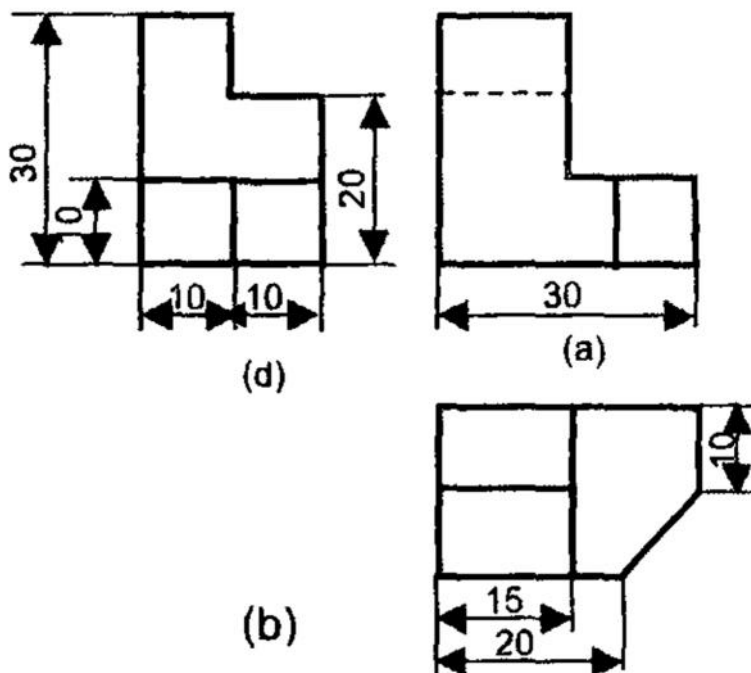
10. Draw the front view, top view and right side view for the following figure



14M CO5 L4

OR

11. Draw the isometric view for the following figure



14M CO5 L4

*** End ***

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-20

Code: 20A511T

I B.Tech. I Semester Supplementary Examinations Dec 2023 / Jan 2024

Problem Solving through C Programming

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(**Compulsory question**)

- | | | |
|---|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) What is the size of integer data type? | CO1 | L1 |
| b) Differentiate do-while and while statements. | CO2 | L2 |
| c) List the various storage classes in C. | CO3 | L1 |
| d) What is a void pointer? | CO4 | L1 |
| e) Give various modes of opening a file. | CO5 | L1 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

- | | | | |
|--|----|-----|-------|
| 2. a) What are the various steps to solve a problem?
Explain them by taking an example. | 6M | CO1 | L1,L2 |
| b) Draw a flow chart to find the largest of three numbers in C. | 6M | CO1 | L3 |

OR

- | | | | |
|---|----|-----|-------|
| 3. a) Explain the Structure of C program. | 6M | CO1 | L2,L3 |
| b) How many keywords does C Language support?
Explain. | 6M | CO1 | L1,L2 |

UNIT-II

- | | | | |
|---|----|-----|-------|
| 4. a) Explain Nested if else statements with an example. | 6M | CO2 | L2 |
| b) Write a C program to find the smallest number among three numbers. | 6M | CO2 | L1,L3 |

OR

- | | | | |
|---|----|-----|-------|
| 5. a) Describe about two dimensional arrays, initializing the two dimensional arrays and accessing elements in such arrays. | 6M | CO2 | L2 |
| b) Write a program to find an element present in a given array by using any one search technique. | 6M | CO2 | L1,L3 |

UNIT-III

6. Explain briefly about string handling functions in C with examples. 12M CO3 L2

OR

7. a) Differentiate call by value and call by reference with example 6M CO3 L1,L3
 b) Illustrate the concept of recursion. 6M CO3 L2

UNIT-IV

8. a) Define a pointer. How to initialize and declare pointer variables? Explain the same with examples 6M CO4 L1,L2
 b) Explain how to pass one dimensional arrays to functions 6M CO4 L2

OR

9. a) Write advantages and disadvantages of pointers 6M CO4 L1,L3
 b) Write a C program to find the greatest and smallest element in an array using pointers. 6M CO4 L1,L3

UNIT-V

10. a) Differentiate between structures and unions, and write the syntax for nested structures 6M CO5 L1,L2
 b) What is an enumerated data type? Explain with example. 6M CO5 L1,L2

OR

11. a) Explain the syntax for Nested structures. Describe Nested structures with an example. 6M CO5 L2
 b) Write a C program to reverse the contents of a file 6M CO5 L1,L2

*** End ***

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-20

Code: 20AC11T

I B.Tech. I Semester Supplementary Examinations Dec 2023 / Jan 2024

Algebra and Calculus
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two marks**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

- | | | |
|--|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) Define the rank of the Matrix | CO1 | L1 |
| b) Define index and signature of a Quadratic form | CO2 | L1 |
| c) Define the rank of the Matrix and signature of a Quadratic form. If $x = r \cos \theta, y = r \sin \theta$ then find $\frac{\partial(x,y)}{\partial(r,\theta)}$ | CO3 | L3 |
| d) Evaluate $\int_0^{\pi/2} \int_0^2 \int_0^2 xy^2z \, dz \, dy \, dx$ | CO4 | L5 |
| e) Define Gamma function | CO5 | L1 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

- | | | |
|---|----|-----------|
| 2. a) Reduce the matrix to Echelon form and find its rank | | |
| $\begin{bmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ -1 & 1 & 0 & 1 \end{bmatrix}$ | 6M | CO1 L3 |
| b) Investigate the values of λ and μ so that the equations $2x+3y+5z=9, 7x+3y-2z=\mu$ have (i) no solution, (ii) a unique solution and (iii) an infinite number of solutions. | 6M | CO1 L3 |

OR

- | | | |
|---|-----|-----------|
| 3. Find for what value of λ the system of equations $x+y+z=1, x+2y+4z=\lambda, 4y+10z=\lambda$ has a solution and solve them completely in each case. | | |
| | 12M | CO1 L3 |

UNIT-II

- | | | |
|--|-----|-----------|
| 4. State and verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$ and hence find A^4 . | | |
| | 12M | CO2 L2 |

OR

5. If $A = \begin{bmatrix} 4 & -8 & -2 \\ 1 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ then find the matrix P (model matrix) which transforms the matrix A to a Diagonal matrix. 12M CO2 L3

UNIT-III

6. a) Using Maclaurin's series, expand $\log(1+x)$ in powers of x. 6M CO3 L3
 b) Using Maclaurin's series, find the minimum value of $x^2 + y^2 + z^2$ given $x + y + z = 3a$. 6M CO3 L3

OR

7. a) If $x + y + z = a$, $x + y + z = u$, $y + z = uv$, $z = uvw$, then evaluate $\frac{\partial(x,y,z)}{\partial(u,v,w)}$. 6M CO3 L5
 b) If $x + y + z = a$, find the maximum value of $x^2 y^2 z^2$ under the condition that $x + y + z = a$. 6M CO3 L3

UNIT-IV

8. Evaluate the integral $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} y \, dy \, dx$. 12M CO4 L5

OR

9. Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} e^{x+y+z} \, dz \, dy \, dx$. 12M CO4 L5

UNIT-V

10. a) Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. 6M CO5 L2
 b) Evaluate $\int_0^1 x^{\frac{3}{2}} (1-x^2)^{\frac{5}{2}} \, dx$. 6M CO5 L5

OR

11. a) State and prove relation between Beta and Gamma functions. 6M CO5 L2
 b) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}} \, dx$ in terms of beta function. 6M CO5 L5

*** End ***

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-20

Code: 20AC12T

I B.Tech. I Semester Supplementary Examinations Dec 2023 / Jan 2024

Applied Physics

(Common to EEE, ECE and AI&ML)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(**Compulsory question**)

- | | | |
|---|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) State Principle of Superposition theorem | CO1 | L2 |
| b) What is dielectric constant and susceptibility | CO2 | L1 |
| c) What is optical fiber | CO3 | L1 |
| d) What is semiconductor and give examples | CO4 | L1 |
| e) Write any two properties of superconductors | CO5 | L1 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | BL |
|--|-------|-----|----|
| UNIT-I | | | |
| 2. Describe the single slit Fraunhofer diffraction and its intensity | 12M | CO1 | L2 |
| OR | | | |
| 3. a) What is polarization and mention types | 4M | CO1 | L1 |
| b) Describe the construction and working of Nicol prism | 8M | CO1 | L2 |
| UNIT-II | | | |
| 4. a) What is electric dipole moment and write expression | 3M | CO2 | L1 |
| b) Deduce the ionic polarizability of dielectric | 9M | CO2 | L4 |
| OR | | | |
| 5. a) Define magnetic dipole moment | 2M | CO2 | L1 |
| b) Derive dipole moments of magnetic material | 10M | CO2 | L3 |
| UNIT-III | | | |
| 6. Deduce the expression for acceptance angle and numerical aperture | 12M | CO3 | L4 |
| OR | | | |
| 7. a) Explain the construction of optical fiber | 4M | CO3 | L2 |
| b) Describe the optical fiber communication system | 8M | CO3 | L2 |
| UNIT-IV | | | |
| 8. State Hall effect and derive Hall co-efficient | 12M | CO4 | L3 |
| OR | | | |
| 9. a) Explain intrinsic semiconductor | 6M | CO4 | L2 |
| b) Derive Fermi energy in intrinsic semiconductor | 6M | CO4 | L3 |
| UNIT-V | | | |
| 10. a) What is superconductor | 2M | CO5 | L1 |
| b) Explain Josephson effect and V-I characteristics | 10M | CO5 | L2 |
| OR | | | |
| 11. a) Explain basic principles of nanomaterials | 6M | CO5 | L2 |
| b) Narrate the ball milling synthesis of nanomaterials | 6M | CO5 | L3 |

*** End ***