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<b>R-19</b>
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**Code: 19AC12T**

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

**Applied 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)

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. Demonstrate the experimental procedure of Newton's ring method to determine radius of curvature of plano convex lens.	14M	1	L3
<b>OR</b>			
2. a) Distinguish between the interference and diffraction.	4M	1	L4
b) Explain the experimental procedure to determine wavelength of light by using diffraction grating.	10M	1	L2
<b>UNIT-II</b>			
3. a) Derive the equation of Clausius-Mosotti relation in dielectric materials.	6M	2	L2
b) Define ionic polarization and derive the equation for ionic polarizability.	8M	2	L2
<b>OR</b>			
4. a) Define magnetic susceptibility and explain Weiss domain theory for ferromagnetic materials.	10M	2	L2
b) Calculate the relative permeability of a ferromagnetic material is a field of strength 220 A/m produces a magnetization 3300 A/m in it.	4M	2	L3
<b>UNIT-III</b>			
5. Derive the Mazwell's equations in both differential and integral form.	14M	3	L2
<b>OR</b>			
6. a) Discuss the construction and working principle of optical fiber	4M	3	L3
b) Explain signal propagation in step index single mode and multimode optical fibers.	10M	3	L2
<b>UNIT-IV</b>			
7. a) Describe energy band theory to classify solids	6M	4	L1
b) Explain intrinsic and extrinsic semiconductors.	8M	4	L2
<b>OR</b>			
8. a) Discuss the various applications of semiconductors.	4M	4	L3
b) Explain intrinsic and extrinsic semiconductors.	10M	4	L2
<b>UNIT-V</b>			
9. a) Describe the BCS theory of superconductivity.	8M	5	L3
b) Explain type-I and type-II superconductors.	6M	5	L2
<b>OR</b>			
10. a) Write various applications of nanomaterials.	6M	5	L3
b) Explain synthesis of nanomaterials by chemical vapor deposition method.	8M	5	L2

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**R-19**

**Code: 19A411T**

I B.Tech. I Semester Supplementary Examinations December 2022

**Essentials 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 )

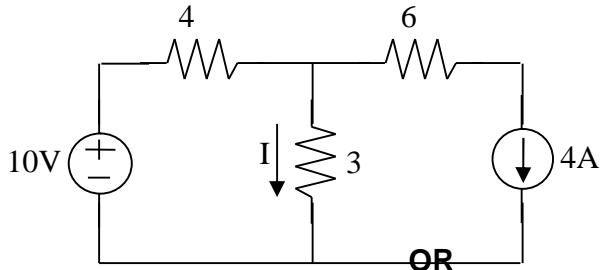
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**UNIT-I**

- |   | Marks | CO | BL |
|---|-------|----|----|
| 1. What is potentiometer? Explain the types of Potentiometers with neat sketch.             | 14M   | 1  | 1  |
| <b>OR</b>   |       |    |    |
| 2. a) What is Ohm's Law? What are its limitations?  | 5M    | 1  | 3  |
| b) Write voltage, current, power and energy relations for the circuit elements given below. |       |    |    |
| i) Resistor      ii) Inductor      iii) Capacitor   | 9M    | 1  | 3  |

**UNIT-II**

- |   |    |   |   |
|---|----|---|---|
| 3. a) State the following                                 |    |   |   |
| i) Ohm's law    ii) KVL    iii) KCL                       | 9M | 2 | 2 |
| b) Find the current 'I' using Kirchoffs Current Law (KCL) |    |   |   |



- |  |     |   |   |
|--|-----|---|---|
| 4. State and explain Thevenin's and Norton's Theorem with simple Example each. | 14M | 2 | 2 |
|--|-----|---|---|

**UNIT-III**

- |  |    |   |   |
|--|----|---|---|
| 5. a) Draw and explain the characteristics of PN junction diode. | 8M | 3 | 2 |
| b) How a PN junction diode acts as a switch? Explain.            | 6M | 3 | 3 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 6. a) Draw and explain the characteristics of Zener diode. | 7M | 3 | 2 |
| b) Explain breakdown mechanism in Zener diode.             | 7M | 3 | 2 |

**UNIT-IV**

- |   |     |   |   |
|---|-----|---|---|
| 7. Design a Full-wave center-tap rectifier with capacitor filter and explain its operation. | 14M | 4 | 4 |
|---|-----|---|---|

**OR**

- |   |     |   |   |
|---|-----|---|---|
| 8. With neat waveforms explain the half wave Rectifier with Choke filter and also derive an expression for its ripple factor. | 14M | 4 | 2 |
|---|-----|---|---|

**UNIT-V**

- |   |     |   |   |
|---|-----|---|---|
| 9. Draw and explain the input and output characteristics of transistor in CE configuration. | 14M | 5 | 2 |
|---|-----|---|---|

**OR**

- |  |    |   |   |
|--|----|---|---|
| 10. a) Explain Base width modulation of CB Configuration.  | 6M | 5 | 2 |
| b) The leakage currents of the transistor with usual notations are $I_{CEO}=410\mu A$ ; $I_{CBO}=5\mu A$ . Calculate $I_C$ . | 8M | 5 | 3 |

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<b>R-19</b>
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**Code: 19A312T**

I B.Tech. I Semester Supplementary Examinations December 2022

**Engineering Graphics & Design**

(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)

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**UNIT-I**

- |    |  |     |   |   |
|----|--|-----|---|---|
| 1. | Construct a hyperbola, when the distance of the focus from the directrix is 65mm and eccentricity is 3/2. Also draw tangent and normal to the curve as a point 45mm from directrix | 14M | 1 | 2 |
|----|--|-----|---|---|

**OR**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 2. | Construct a parabola with base 60mm and length of the axis 40mm by using Rectangle method | 14M | 1 | 2 |
|----|---|-----|---|---|

**UNIT-II**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 3. | Draw an involute for a hexagon of side 20mm. Also draw a normal and tangent to the curve at a distance of 80mm from the center of hexagon | 14M | 2 | 2 |
|----|---|-----|---|---|

**OR**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 4. | A circle of 50mm diameter rolls on the circumference of another circle of 175mm diameter & outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. | 14M | 2 | 2 |
|----|---|-----|---|---|

**UNIT-III**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 5. | A line PQ, 50mm long is perpendicular to H.P. and 15mm in front of V.P. The end P, nearer to H.P is 20mm above it. Draw the projections of a line | 14M | 3 | 3 |
|----|---|-----|---|---|

**OR**

- |    |  |     |   |   |
|----|--|-----|---|---|
| 6. | A 100mm long line is parallel to and 40mm above the H.P. Its two ends are 25mm and 50mm in front of the V.P respectively. Draw its projections and find its inclination with the V.P | 14M | 3 | 3 |
|----|--|-----|---|---|

**UNIT-IV**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 7. | A square ABCD of 40mm side has a corner on the HP and 20mm in front of the VP. All the sides of the squares are equally inclined to the HP and parallel to the VP. Draw its projections | 14M | 4 | 3 |
|----|---|-----|---|---|

**OR**

- |    |  |     |   |   |
|----|--|-----|---|---|
| 8. | A regular pentagon of 25mm side has one side on the ground. Its plane is inclined at 45° to the HP and perpendicular to the VP. Draw its projections | 14M | 4 | 3 |
|----|--|-----|---|---|

**UNIT-V**

- |    |   |     |   |   |
|----|---|-----|---|---|
| 9. | A hexagonal pyramid, base 25mm side and axis 50mm long, has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to VP. Draw its projections | 14M | 5 | 3 |
|----|---|-----|---|---|

**OR**

- |     |   |     |   |   |
|-----|---|-----|---|---|
| 10. | A pentagonal prism is resting on one of the corners of its base on the HP. The longer edge containing that corner is inclined at 45° to the base. The axis of the prism makes an angle of 30° to the V.P. Draw the projections of the solid | 14M | 5 | 3 |
|-----|---|-----|---|---|

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**R-19**

**Code: 19A511T**

I B.Tech. I Semester Supplementary Examinations December 2022

**Problem Solving 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)

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**UNIT-I**

Marks

- 1. a) What are identifiers? What are the rules for declaring identifiers? Give example. 8M
- b) What is constant? Describe its classification with example 6M

**OR**

- 2. What is flowchart? Describe various symbols used in flowcharts and draw flowchart for reversing the digits of a given number. 14M

**UNIT-II**

- 3. a) Explain various iterative statements available in C language with examples. 8M
- b) Write a program to find out whether the given number is Armstrong or not? 6M

**OR**

- 4. a) What are the limitations of switch () case statement? 7M
- b) Write a program to calculate bill of a job work done as follows. Use if else statement.
  - i. Rate of typing 3 Rs. / page.
  - ii. Printing of 1<sup>st</sup> copy 5 Rs. /page & later every copy 3 Rs. /page. 7M

**UNIT-III**

- 5. a) Explain any five string manipulation library functions with examples. 9M
- b) What is mean by recursion? Explain the purpose of recursive function. 5M

**OR**

- 6. What is function parameter? Explain different types of parameters in C functions. 14M

**UNIT-IV**

- 7. What is dynamic memory allocation? Write and explain the different dynamic memory allocation functions in C. 14M

**OR**

- 8. a) What is a pointer? Explain how the pointer variable declared and initialized. 7M
- b) Write advantages and disadvantages of pointers 7M

**UNIT-V**

- 9. a) Explain how the structure variable passed as a parameter to a function with example. 7M
- b) Write a C program to read and display a text from the file. 7M

**OR**

- 10. a) What is a self-referential structure? Give an example. 5M
- b) What is a file? Explain how the file open and file close functions 9M

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<b>R-19</b>
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**Code: 19AC11T**

I B.Tech. I Semester Supplementary Examinations December 2022

**Algebra and Calculus**  
(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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Marks    CO    BL

**UNIT-I**

1. Solve the system of equations  
 $x + 3y + 2z = 0, 2x - y + 3z = 0, 3x - 5y + 4z = 0, x + 17y + 4z = 0$  14M    1    3

**OR**

2. Find the rank of  $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ -2 & -3 & 1 & 2 \\ -3 & -4 & 5 & 8 \\ 1 & 3 & 10 & 14 \end{bmatrix}$  14M    1    3

**UNIT-II**

3. Verify Cayley-Hamilton theorem for the matrix  $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$  and hence find  $A^{-1}$   
 using Cayley-Hamilton theorem. 14M    2    2

**OR**

4. Diagonalize the matrix  $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{bmatrix}$  14M    2    2

**UNIT-III**

5. a) Find the first and second partial derivatives of  $z = x^3 + y^3 - 3axy$  7M    3    3  
 b) If  $z = f(x + ct) + g(x - ct)$  then prove that  $\frac{\partial^2 z}{\partial t^2} = c^2 \frac{\partial^2 z}{\partial x^2}$  7M    3    2

**OR**

6. Find the maximum and minimum values of  $x^3 + y^3 - 3axy$  14M    3    3

**UNIT-IV**

7. a) Expand  $\log_e x$  in powers of  $(x - 1)$  7M    4    3  
 b) Using Maclaurin's series, expand  $\sin x$  in powers of  $x$ . 7M    4    3

**OR**

8. Trace the curve  $y^2(a - x) = x^2(a + x)$  14M    4    4

**UNIT-V**

9. Evaluate  $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy dx$  by changing the order of integration. 14M    5    3

**OR**

10. Evaluate  $\int_0^{f/2} \sin^2 n \cos^4 n \, dn$  14M    5    3

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