

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
LINEAR ALGEBRA & CALCULUS

(Common to all Branches)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions **10 x 2 = 20 Marks**)

- | | | |
|-----|--|-----------|
| 1 a | Find the rank of the matrix $A = \begin{bmatrix} 1 & 1 & -1 & 1 \\ 1 & -1 & 2 & -1 \\ 3 & 1 & 0 & 1 \end{bmatrix}$. | CO1 L2 2M |
| b | Determine k such that the system of homogeneous equations $2x + y + z = 0$, $x + y + 3z = 0$, $4x + 3y + kz = 0$ has non-trivial solution. | CO1 L2 2M |
| c | Let λ be an Eigen value of A and X be its corresponding eigenvector. Then, Show that A^{-1} (if it exists) has Eigen value $\frac{1}{\lambda}$. | CO2 L2 2M |
| d | Convert the symmetric matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 3 & 3 & 1 \end{bmatrix}$ into the quadratic form. | CO2 L2 2M |
| e | State Lagrange's mean value theorem. | CO3 L1 2M |
| f | Find c of Lagrange's mean value theorem for $f(x) = x^2$ in $[1, 5]$. | CO3 L2 2M |
| g | Evaluate $\lim_{x \rightarrow 1} \frac{2x^2y}{x^2+y^2+1}$ | CO4 L5 2M |
| h | Define Extreme value of a function of two variables. | CO5 L1 2M |
| i | If $x = r \cos \theta$, $y = r \sin \theta$, find $\frac{\partial(x, y)}{\partial(r, \theta)}$. | CO6 L2 2M |
| j | Evaluate $\int_0^2 \int_0^x y \, dy \, dx$ | CO6 L5 2M |

PART-B

(Answer all Five Units **5 x 10 = 50 Marks**)

UNIT-I

- | | | |
|---|--|------------|
| 2 | Solve the following system of equations by Gauss-Jacobi Iteration method
$27x + 6y - z = 85$; $x + y + 54z = 110$; $6x + 15y + 2z = 72$. | CO2 L3 10M |
|---|--|------------|

OR

- | | | |
|-----|--|-----------|
| 3 a | Reduce the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$ into Echelon form and find its rank? | CO1 L3 5M |
|-----|--|-----------|

- | | | |
|---|---|-----------|
| b | Solve completely the system of equations
$4x + 2y + z + 3w = 0$; $6x + 3y + 4z + 7w = 0$; $2x + y + w = 0$. | CO1 L3 5M |
|---|---|-----------|

UNIT-II

- | | | |
|---|---|------------|
| 4 | Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and find A^{-1} and A^4 using Cayley Hamilton theorem | CO2 L3 10M |
|---|---|------------|

OR

- 5 a Determine the eigenvalues and eigenvectors of $A = \begin{bmatrix} 1 & -4 & -4 \\ 8 & -11 & -8 \\ -8 & 8 & 5 \end{bmatrix}$. CO2 L2 5M

- b Identify the nature of the Quadratic form
 $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ CO2 L2 5M

UNIT-III

- 6 a Verify Lagrange's Mean value theorem for the functions
 $f(x) = x(x-1)(x-2)$ in $\left[0, \frac{1}{2}\right]$. CO3 L2 5M

- b Using the Maclaurin series, expand $f(x) = \tan x$ up to the term containing x^5 . CO4 L3 5M

OR

- 7 a Prove that $\frac{\pi}{3} - \frac{1}{5\sqrt{3}} > \cos^{-1}\left(\frac{3}{5}\right) > \frac{\pi}{3} - \frac{1}{8}$ using Lagrange's mean value theorem. CO3 L2 5M

- b Show that $\log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$ by Maclaurin's theorem CO4 L2 5M

UNIT-IV

- 8 a If $u = \frac{x+y}{1-xy}$ and $v = \tan^{-1}x + \tan^{-1}y$, find $\frac{\partial(u,v)}{\partial(x,y)}$? CO5 L1 5M

- b Examine the function for extreme value
 $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$; ($x>0, y>0$). CO5 L4 5M

OR

- 9 a If $x = r \cos \theta, y = r \sin \theta$ then prove that $\frac{\partial(x,y)}{\partial(r,\theta)} \times \frac{\partial(r,\theta)}{\partial(x,y)} = 1$. CO5 L2 5M

- b Find the Maclaurin's expansion of $f(x,y) = e^x \log(1+y)$ up to terms of 3rd degree. CO5 L3 5M

UNIT-V

- 10 a Evaluate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2) dx dy$. CO6 L5 5M

- b Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z dz dx dy$. CO6 L5 5M

OR

- 11 a Find the area bounded by the curves $y = x^2$ and $y = x+2$. By double integrals. CO6 L3 5M

- b By changing into polar coordinates, evaluate $I = \int_0^1 \int_0^{\sqrt{1-y^2}} (x^2 + y^2) dx dy$. CO6 L5 5M

*** END ***

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
ENGINEERING GRAPHICS

(Common to CSE, ECE, EEE, CSIT)

Time: 3 Hours**Max. Marks: 70**

(Answer all the Questions 5 x 14 = 70 Marks)

UNIT-I

- 1 Construct an ellipse, with distance of the focus from the directrix as 50 mm and eccentricity as $\frac{2}{3}$. Also draw normal and tangent to the curve at a point 40 mm from the directrix. **CO1 L6 14M**

OR

- 2 Construct a cycloid, given the diameter of the generating circle as 40mm. Draw a tangent and normal to the curve at a point on it, 35mm from the base line. **CO1 L6 14M**

UNIT-II

- 3 Draw the projections of the following points, keeping the distance between the projectors as 25mm on the same reference lines. **CO2 L1 14M**

A – 20mm above HP and 30mm in front of VP

B – 20mm above HP and 30mm behind VP

C – 20mm below HP and 30mm behind VP

D – 20mm below HP and 30mm in front of VP

E – On HP and 30mm in front of VP

F – On VP and 20mm above HP

G – Lying on both HP and VP

OR

- 4 A line AB of 100mm length is inclined at an angle of 30° to HP and 450 to VP. The point A is 15mm above HP and 20mm in front of VP. Draw the projections of the line **CO2 L1 14M**

UNIT-III

- 5 a Draw the projections of a cylinder of base 30mm diameter and axis 50mm long, when it is resting on H.P on one of its bases. **CO3 L6 7M**
b Draw the projections of a cone of base 30mm diameter and axis 50mm long, when it is resting on H.P on one of its bases. **CO3 L6 7M**

OR

- 6 A cone of diameter 50 mm and axis 60 mm has its generator in the VP and the axis is parallel to the HP. Draw its projections. **CO3 L6 14M**

UNIT-IV

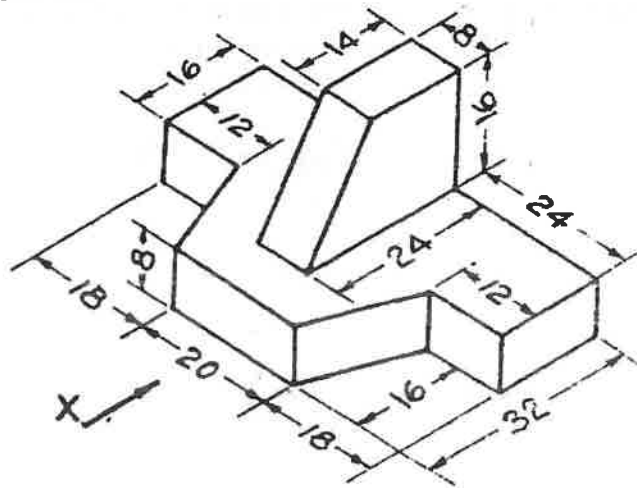
- 7 A pentagonal pyramid with edge of base 25 mm and axis 65 mm long, its base is resting on HP. It is cut by a section plane, inclined at 60° to HP and perpendicular to VP it bisects the axis. Draw the projections and obtain the true shape of the section. **CO4 L6 14M**

OR

- 8 A cone of base 50 mm diameter and height 65 mm rests with its base on HP. A section plane perpendicular to VP and inclined at 30° to HP bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone. **CO4 L1 14M**

UNIT-V

- 9 Draw three views of the blocks shown pictorially in figure according to first angle projection **CO6 L6 14M**



OR

- 10 Draw the isometric view of a hexagonal prism of base side 30 mm and axis 70mm. The prism rests on its base on the HP with an edge of the base parallel to the VP. **CO5 L1 14M**

***** END *****



SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
BASIC CIVIL & MECHANICAL ENGINEERING
(Common to CE, ME, CSM, CIC, CAD, CCC & CAI)

*Note: Answer **PART-A** from pages 2 to 20 and **PART-B** from 21 to 39.

Time: 3 Hours

Max. Marks: 70

PART-A (CIVIL)

(Answer all the Questions 5 x 1 = 5 Marks)

- | | | | | | |
|---|---|--|-----|----|----|
| 1 | a | List various sources of water. | CO1 | L2 | 1M |
| | b | What is means by surveying. | CO2 | L1 | 1M |
| | c | What are the uses of contour mapping. | CO2 | L1 | 1M |
| | d | Differentiate between true meridian and magnetic meridian. | CO3 | L1 | 1M |
| | e | What are the reasons to build a tunnel? | CO3 | L1 | 1M |

(Answer all Three Units 3 x 10 = 30 Marks) (CIVIL)

UNIT-I

- | | | | | | |
|---|---|---|-----|----|----|
| 2 | a | List out various forms of steel used in construction. Explain briefly. | CO1 | L2 | 5M |
| | b | Which are steel channel sections available in the market? Give neat sketches. | CO1 | L1 | 5M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 3 | a | Write about good qualities of cement. | CO1 | L1 | 5M |
| | b | List out grades of cement and their uses. | CO1 | L1 | 5M |

UNIT-II

- | | | | | | |
|---|--|--|-----|----|-----|
| 4 | | The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings: 2.230; 1.610; 0.980; 2.090; 2.865; 1.265; 0.600; 1.980; 1.045; 2.685 metres. Enter the above readings in a page of a level book and calculate the R.L. of points by rise and fall method. The R.L. of B.M. is 100.000m. | CO2 | L3 | 10M |
|---|--|--|-----|----|-----|

OR

- | | | | | | |
|---|--|---|-----|----|-----|
| 5 | | Explain briefly the various types of levelling instruments. | CO2 | L2 | 10M |
|---|--|---|-----|----|-----|

UNIT-III

- | | | | | | |
|---|--|--|-----|----|-----|
| 6 | | Briefly discuss about quality of water. What are the important requirements of water for domestic use? | CO3 | L2 | 10M |
|---|--|--|-----|----|-----|

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 7 | a | What are the purposes for constructing a dam? | CO3 | L1 | 5M |
| | b | Explain briefly about how dams are classified according to material use. | CO3 | L2 | 5M |

PART-B(MECHANICAL)

(Answer all the Questions 5 x 1 = 5 Marks)

- | | | | | | |
|---|---|--|-----|----|----|
| 1 | f | Define Strength of a material. | CO1 | L1 | 1M |
| | g | Explain the Role of Ceramics in Engineering? | CO1 | L1 | 1M |
| | h | What are smart materials and mention examples. | CO2 | L1 | 1M |
| | i | Define CNC Machining. | CO2 | L1 | 1M |
| | j | List out the basic components of Robot. | CO3 | L1 | 1M |

(Answer all Three Units 3 x 10 = 30 Marks) (MECHANICAL)

UNIT-IV

- | | | | | | |
|---|--|--|-----|----|-----|
| 8 | | Explain the Role of mechanical engineering in society? | CO1 | L1 | 10M |
|---|--|--|-----|----|-----|

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 9 | a | Draw the flow chart classifying engineering materials. | CO1 | L1 | 5M |
| | b | Differentiate between metals and Nonmetals. | CO1 | L1 | 5M |

UNIT-V

- | | | | | | |
|----|---|--|-----|----|----|
| 10 | a | Illustrate the working of Four stroke diesel engine with a neat sketch | CO2 | L2 | 5M |
| | b | Differentiate between two stroke engine and four stroke engine | CO2 | L2 | 5M |

OR

- | | | | | | |
|----|--|--|-----|----|-----|
| 11 | | What is 3D printing and explain the advantages of 3D printing? | CO2 | L1 | 10M |
|----|--|--|-----|----|-----|

UNIT-VI

- | | | | | | |
|----|--|---|-----|----|-----|
| 12 | | Illustrate the working of steam power plant with a neat sketch. | CO3 | L2 | 10M |
|----|--|---|-----|----|-----|

OR

- | | | | | | |
|----|---|---|-----|----|----|
| 13 | a | Explain applications of robots in various industries. | CO3 | L2 | 5M |
| | b | Explain the main Robot anatomy with neat sketch. | CO3 | L2 | 5M |

***** END *****

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
INTRODUCTION TO PROGRAMMING

(Common to All)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

- | | | | | | |
|---|---|--|-----|----|----|
| 1 | a | List the different flow chart symbols. | CO1 | L1 | 2M |
| | b | What is meant by type conversion? | CO1 | L1 | 2M |
| | c | Summarize break and continue keyword. | CO2 | L2 | 2M |
| | d | Write the syntax for nested if else statement. | CO2 | L1 | 2M |
| | e | What is a String? Give example. | CO3 | L1 | 2M |
| | f | List the different string handling functions | CO3 | L1 | 2M |
| | g | Compare Arrays and Pointers. | CO4 | L4 | 2M |
| | h | What is meant by structure and write the syntax for structure declaration. | CO6 | L1 | 2M |
| | i | What is meant by call-by-value? | CO5 | L1 | 2M |
| | j | List the different file operations in C. | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- | | | | | | |
|-----------|---|---|-----|----|----|
| 2 | a | Define a flow chart. List the different symbols in flowchart. | CO1 | L1 | 5M |
| | b | Draw a flowchart for computing the Simple interest. | CO1 | L2 | 5M |
| OR | | | | | |
| 3 | a | What is meant by data type. List the different data types with their sizes. | CO1 | L1 | 5M |
| | b | Define a variable. Write the variable declaration. What are the rules for declaring a variable? | CO1 | L1 | 5M |

UNIT-II

- | | | | | | |
|---|---|--|-----|----|----|
| 4 | a | Write the syntax and illustrate the following statements with example
i) if Statement ii) if else Statement iii) else if ladder iv) Nested if
statements v) Switch Case. | CO2 | L3 | 5M |
| | b | Develop a 'C' program to perform the basic arithmetic operations using
switch case statement. | CO2 | L6 | 5M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 5 | a | Explain the For Loop with syntax and example. | CO2 | L2 | 5M |
| | b | Compose a C program to print following series
1
2 2
3 3 3
4 4 4 4 | CO2 | L6 | 5M |

UNIT-III

- | | | | | | |
|---|---|--|-----|----|----|
| 6 | a | Explain the One-Dimensional array with example. | CO2 | L2 | 5M |
| | b | Compose a C program for Transpose of a given matrix. | CO2 | L6 | 5M |

OR

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
ENGINEERING CHEMISTRY

(Common to CE & ME)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10×2=20 Marks)

- | | | | | | |
|---|---|---|-----|----|----|
| 1 | a | What are scales and sludge's? | CO1 | L1 | 2M |
| | b | List two disadvantages of using hard water in boilers. | CO1 | L1 | 2M |
| | c | Differentiate electrochemical cell and electrolytic cell. | CO2 | L2 | 2M |
| | d | What is Pilling Bedworth rule? | CO2 | L1 | 2M |
| | e | What are additional polymers? Give one example. | CO3 | L1 | 2M |
| | f | What is meant by combustion of fuels? | CO4 | L1 | 2M |
| | g | What are composite materials? | CO5 | L1 | 2M |
| | h | Define cloud point. | CO5 | L1 | 2M |
| | i | What is Freundlich's adsorption isotherm? | CO6 | L1 | 2M |
| | j | What is physical adsorption? | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5×10=50 Marks)

UNIT-I

- | | | | | | |
|---|---|--|-----|----|----|
| 2 | a | Describe the ion-exchange process for demineralization of water. | CO1 | L2 | 6M |
| | b | What are the advantages and disadvantages of ion-exchange process? | CO1 | L1 | 4M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 3 | a | Discuss the causes and prevention of priming and foaming in boiler | CO1 | L2 | 5M |
| | b | Explain in detail about the specifications of drinking water. | CO1 | L2 | 5M |

UNIT-II

- | | | | | | |
|---|---|--|-----|----|----|
| 4 | a | Describe the construction and working of Hydrogen-Oxygen fuel cell | CO2 | L2 | 5M |
| | b | Explain the charging and discharging reactions of Lithium-ion battery. | CO2 | L2 | 5M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 5 | a | What is cathodic protection? Explain the sacrificial anodic protection. | CO2 | L2 | 5M |
| | b | Describe the mechanism of differential aeration corrosion with example. | CO2 | L2 | 5M |

UNIT-III

- | | | | | | |
|---|---|---|-----|----|----|
| 6 | a | What is functionality of a monomer? Explain its significance. | CO3 | L2 | 5M |
| | b | Discuss about the synthesis and properties of Polystyrene. | CO3 | L2 | 5M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 7 | a | Discuss the ultimate analysis of coal with its significance. | CO4 | L2 | 5M |
| | b | Explain the importance of blended petrol using ethanol as fuel. | CO4 | L2 | 5M |

UNIT-IV

- | | | | | | |
|---|--|---|-----|----|-----|
| 8 | | Classify and discuss the functions and properties of lubricating oils with suitable examples. | CO5 | L2 | 10M |
|---|--|---|-----|----|-----|

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 9 | a | Explain the factors affecting the refractory materials. | CO5 | L2 | 5M |
| | b | Explain about setting and hardening of Portland cement. | CO5 | L2 | 5M |

UNIT-V

- | | | | | | |
|----|--|--|-----|----|-----|
| 10 | | Explain the preparation of nano-metals by chemical and electrochemical method. | CO6 | L2 | 10M |
|----|--|--|-----|----|-----|

OR

- | | | | | | |
|----|---|--|-----|----|----|
| 11 | a | Discuss Langmuir adsorption isotherm. | CO6 | L2 | 5M |
| | b | Explain about the stabilization of colloids by Solid-Liquid Interface. | CO6 | L2 | 5M |

*** END ***

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024

CHEMISTRY

(Common to CSM, CIC, CAD, CCC & CAI)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

- | | | | | | |
|---|---|---|-----|----|----|
| 1 | a | State Heisenberg Uncertainty principle and mention the terms. | CO1 | L2 | 2M |
| | b | Find the bond order of CO molecule based on MOT. | CO1 | L3 | 2M |
| | c | Define Semi Conductor. Give any two examples. | CO2 | L2 | 2M |
| | d | What are Nano particles? Mention its applications. | CO2 | L1 | 2M |
| | e | Define Electro Chemical Sensor and write its Classification. | CO3 | L2 | 2M |
| | f | Define Fuel cells. Name any two fuel cells. | CO3 | L2 | 2M |
| | g | Identify Monomers present in Bakelite and Nylon-6,6 | CO4 | L2 | 2M |
| | h | List out the applications of Conducting Polymers. | CO4 | L1 | 2M |
| | i | Give the selection rules associated with IR Spectroscopy. | CO5 | L2 | 2M |
| | j | Define Stationary phase and Mobile Phase. | CO5 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- | | | | | | |
|---|---|---|-----|----|----|
| 2 | a | Derive Schrodinger Wave equation. | CO1 | L3 | 5M |
| | b | Give the important postulates of Molecular orbital theory | CO1 | L2 | 5M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 3 | a | Illustrate the energy diagram and bond order of CO molecule. | CO1 | L2 | 5M |
| | b | Explain π - molecular orbital of 1, 3- Butadiene with a neat sketch. | CO1 | L2 | 5M |

UNIT-II

- | | | | | | |
|---|---|--|-----|----|----|
| 4 | a | Explain in detail about classification and doping of semiconducting materials. | CO2 | L2 | 5M |
| | b | Explain the Classification of Super capacitors with suitable examples. | CO2 | L2 | 5M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 5 | a | Discuss the properties and applications of Nano materials. | CO2 | L2 | 5M |
| | b | Describe the classification and properties Graphene nanoparticles. | CO2 | L2 | 5M |

UNIT-III

- | | | | | | |
|---|---|---|-----|----|----|
| 6 | a | Discuss the titration curves obtained in weak acid and strong base with suitable example. | CO3 | L2 | 5M |
| | b | Explain the reactions involved in Li-Ion Secondary Batteries. | CO3 | L2 | 5M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 7 | a | With a neat sketch explain Hydrogen-Oxygen fuel cell. | CO3 | L3 | 6M |
| | b | Explain about potentiometric redox titrations with example. | CO3 | L2 | 4M |

UNIT-IV

- | | | | | | |
|---|---|--|-----|----|----|
| 8 | a | Describe the Anionic and Cationic Polymerization mechanism. | CO4 | L2 | 6M |
| | b | Explain synthesis and applications of Poly tetra fluoro ethylene (PTFE). | CO4 | L2 | 4M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 9 | a | Describe the preparation, properties and applications of Buna-N & S. | CO4 | L2 | 5M |
| | b | Give a detailed note on Bio – degradable polymers. | CO4 | L2 | 5M |

UNIT-V

- | | | | | | |
|----|---|--|-----|----|----|
| 10 | a | Explain the electronic transitions of UV-Visible Spectroscopy. | CO5 | L2 | 5M |
| | b | Explain in detail different regions and Instrumentation IR Spectroscopy. | CO5 | L2 | 5M |

OR

- | | | | | | |
|----|---|---|-----|----|----|
| 11 | a | Discuss the principle and instrumentation of HPLC chromatography. | CO5 | L2 | 5M |
| | b | List out the important applications of HPLC. | CO5 | L1 | 5M |

*** END ***

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
ENGINEERING PHYSICS

(Common to CSE, ECE, EEE & CSIT)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

- | | | | | | |
|---|---|---|-----|----|----|
| 1 | a | Define interference. | CO1 | L1 | 2M |
| | b | What is plane polarized light? | CO1 | L1 | 2M |
| | c | What are lattice parameters? | CO2 | L1 | 2M |
| | d | Draw the planes for given Miller indices (111) and (202) in cubic system. | CO2 | L3 | 2M |
| | e | Define dielectric polarization. | CO3 | L1 | 2M |
| | f | What is Hysteresis? | CO4 | L1 | 2M |
| | g | What are matter waves ? | CO5 | L1 | 2M |
| | h | What is Fermi energy level? | CO5 | L1 | 2M |
| | i | What is extrinsic semiconductor? | CO6 | L1 | 2M |
| | j | What are the drift and diffusion current densities in semiconductors? | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- | | | | | | |
|---|---|--|-----|----|----|
| 2 | a | State and explain principle of superposition. | CO1 | L2 | 4M |
| | b | Discuss the theory of interference of light due to thin films by reflection with suitable ray diagram. | CO1 | L2 | 6M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 3 | a | Explain the Polarization by reflection with neat sketch. | CO1 | L2 | 5M |
| | b | Illustrate the Double refraction in crystal. | CO1 | L4 | 5M |

UNIT-II

- | | | | | | |
|---|---|---|-----|----|----|
| 4 | a | What are Miller indices? Mention the procedure to find Miller indices | CO2 | L1 | 6M |
| | b | Write the important features of Miller indices | CO2 | L1 | 4M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 5 | a | Explain how crystal structure determined by Laue X-Ray diffraction method. | CO2 | L2 | 7M |
| | b | What are the advantages of Laue X-Ray diffraction method? | CO2 | L1 | 3M |

UNIT-III

- | | | | | | |
|---|---|---|-----|----|----|
| 6 | a | Obtain Clausius-Mosotti equation and explain how it can be used to determine the dipole moment of a polar molecule. | CO3 | L4 | 7M |
| | b | A solid elemental dielectric with 3×10^{28} atoms/ m^3 shows an electronic polarisability of 10^{-40} F-m ² assuming the internal electric field to be a Lorenz field. Calculate a dielectric constant of the material. | CO3 | L1 | 3M |

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 7 | a | Explain hysteresis of ferromagnetic material. | CO4 | L2 | 5M |
| | b | Distinguish between soft and hard magnetic materials. | CO4 | L2 | 5M |

UNIT-IV

- | | | | | | |
|---|---|---|-----|----|----|
| 8 | a | Derive Schrödinger's time independent wave equation | CO5 | L3 | 7M |
| | b | Explain the physical significance of wave function | CO5 | L2 | 3M |

OR

- | | | | | | |
|---|---|--|-----|----|----|
| 9 | a | What are the postulates of classical free electron theory? | CO5 | L1 | 4M |
| | b | Derive an expression for electrical conductivity in a metal by using classical free electron theory. | CO5 | L3 | 6M |

UNIT-V

- 10 a Derive the expression for the conductivity of intrinsic semiconductor . CO6 L3 7M
b The following data are given for an intrinsic Ge at 300K. Calculate the CO6 L3 3M
conductivity of the sample? ($n_i = 2.4 \times 10^{19} \text{ m}^{-3}$, $\mu_e = 0.39 \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$,
 $\mu_p = 0.19 \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$)

OR

- 11 a Describe the Hall Effect in semiconductors. CO6 L2 8M
b What are the applications of Hall Effect? CO6 L1 2M

***** END *****



SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations July/August-2024
BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to CSE, ECE, EEE & CSIT)

*Note: Answer **PART-A** from pages 2 to 20 and **PART-B** from 21 to 39.

Time: 3 Hours

Max. Marks: 70

PART-A (ELECTRICAL)

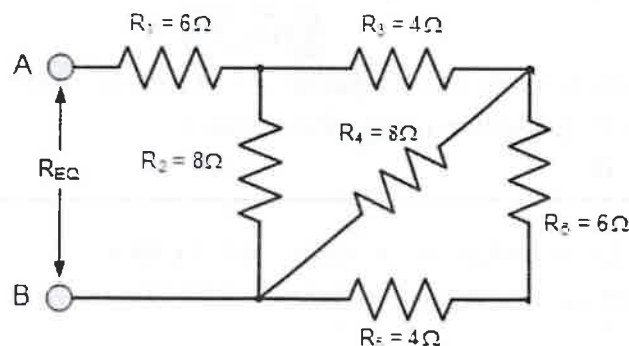
(Answer all the Questions 5 x 1 = 5 Marks)

- | | | | | | |
|---|---|---|-----|----|----|
| 1 | a | Define Impedance. | CO1 | L1 | 1M |
| | b | List any Five parts of a Transformer. | CO2 | L1 | 1M |
| | c | What are the different types of Earthing? | CO2 | L1 | 1M |
| | d | Define Faradays law. | CO3 | L1 | 1M |
| | e | What is a step-down transformer? | CO3 | L1 | 1M |

(Answer all Three Units 3 x 10 = 30 Marks) (ELECTRICAL)

UNIT-I

- | | | | | | |
|---|---|--|-----|----|----|
| 2 | a | Find equivalent resistance when three resistors are connected in parallel. | CO1 | L1 | 4M |
| | b | Find the equivalent resistance for the circuit shown below. | CO1 | L1 | 6M |



OR

- | | | | | | |
|---|---|---|-----|----|----|
| 3 | a | Explain the concept of impedance in an A.C circuits. | CO1 | L2 | 2M |
| | b | Define the following | CO1 | L1 | 8M |
| | | i) Waveform, ii) Time period, iii) frequency, iv) Amplitude | | | |

UNIT-II

- | | | | | | |
|---|--|--|-----|----|-----|
| 4 | | Draw and Explain the constructional diagram of a single phase transformer in detail. | CO2 | L5 | 10M |
|---|--|--|-----|----|-----|

OR

- | | | | | | |
|---|---|---|-----|----|----|
| 5 | a | Explain the operating principles of Moving Iron instruments | CO2 | L2 | 5M |
| | b | Determine the unknown resistance using Wheatstone bridge | CO2 | L2 | 5M |

UNIT-III

- | | | | | | |
|---|---|---|-----|----|----|
| 6 | a | Define Earthing and explain the types of earthing | CO3 | L5 | 6M |
| | b | What are the advantages of earthing? | CO3 | L1 | 4M |

OR

- | | | | | | |
|---|--|--|-----|----|-----|
| 7 | | What is solar power plant? Explain the operation with layout | CO3 | L1 | 10M |
|---|--|--|-----|----|-----|

PART-B(ELECTRONICS)

(Answer all the Questions 5 x 1 = 5 Marks)

- | | | | | | |
|---|---|---|-----|----|----|
| 1 | f | Define biasing. | CO4 | L2 | 1M |
| | g | How PN diode is formed? | CO4 | L1 | 1M |
| | h | What is an emitter? | CO5 | L1 | 1M |
| | i | List the names of universal gates with symbols | CO6 | L1 | 1M |
| | j | What are the basic properties of Boolean algebra? | CO6 | L1 | 1M |

(Answer all Three Units 3 x 10 = 30 Marks) (ELECTRONICS)

UNIT-IV

- | | | | | | |
|---|---|---|-----|----|----|
| 8 | a | Define Zener diode and its characteristics. | CO4 | L1 | 5M |
| | b | What is Zener effect? | CO4 | L2 | 5M |

OR

- | | | | | | |
|---|--|--|-----|----|-----|
| 9 | | With the neat sketch ,Explain the operation of an NPN transistor and PNP transistor. | CO4 | L5 | 10M |
|---|--|--|-----|----|-----|

UNIT-V

- | | | | | | |
|----|--|---|-----|----|-----|
| 10 | | Draw the block diagram of Electronic Instrumentation System and explain the function of each block. | CO5 | L2 | 10M |
|----|--|---|-----|----|-----|

OR

- | | | | | | |
|----|--|---|-----|----|-----|
| 11 | | Briefly explain the Working of Common Emitter Amplifier with proper circuit and wave forms. | CO5 | L5 | 10M |
|----|--|---|-----|----|-----|

UNIT-VI

- | | | | | | |
|----|---|--|-----|----|----|
| 12 | a | Explain differences between combinational and sequential circuits. | CO6 | L2 | 5M |
| | b | Perform the following addition using excess-3 code
i)386+756 ii)12+38 | CO6 | L3 | 5M |

OR

- | | | | | | |
|----|---|---|-----|----|----|
| 13 | a | What is BCD codes and what are the various BCD codes | CO6 | L1 | 6M |
| | b | Perform the following Decimal addition to 8421 BCD code.
i)48+58, ii)186+237 | CO6 | L4 | 4M |

***** END *****