

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS
(EEE, ME & ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Solve $(1+y^2)dx = (\tan^{-1} y - x)dy$ L1 6M
b) Solve $x \frac{dy}{dx} + y = x^3 y^6$ L3 6M

OR

- 2 a) Solve $(D^2 + 5D + 6)y = e^x$. L2 6M
b) Solve $(D^2 - 3D + 2)y = xe^{3x} + \sin 2x$. L3 6M

UNIT-II

- 3 a) Solve $(D^2 + 4)y = \sec(2x)$ by the method of variation of parameters L6 6M
b) Solve $(x^2 D^2 - 4xD + 6)y = x^2$. L3 6M

OR

- 4 Find the current 'i' in the LCR circuit assuming zero initial current and charge q. If R=80 ohms, L=20 henrys, C=0.01 farads and E=100 V. L2 12M

UNIT-III

- 5 a) Form the partial differential equation by eliminating the arbitrary constants a, b from $\log(az - 1) = x + ay + b$. L5 6M
b) Form the partial differential equation by eliminating the arbitrary function from $lx + my + nz = f(x^2 + y^2 + z^2)$. L5 6M

OR

- 6 Solve $u_x - 4u_y = 0$ and $u(0, y) = 8e^{-3y}$ by the method of separation of variables. L3 12M

UNIT-IV

- 7 a) If $w=f(z)$ is analytic then show that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |Re f(z)|^2 = 2|f'(z)|^2$ L1 6M
b) Find all values of k such that $f(z) = e^x(\cos ky + i \sin ky)$ is analytic L2 6M

OR

- 8 a) Find the image of the infinite strip $0 < y < \frac{1}{2}$ under $w = \frac{1}{z}$. L2 6M
b) Find the bilinear transformations which maps the points $z = \infty, i, 0$ into the points $w = -1, -i, 1$. L1 6M

UNIT-V

- 9 a) Evaluate $\int_c \frac{\log z dz}{(z-1)^3}$ where $c: |z-1| = \frac{1}{2}$. L2 6M
b) Find Laurent series of $f(z) = \frac{z}{(z+1)(z+2)}$ about $z = -2$ L2 6M

OR

- 10 Show that $\int_0^{2\pi} \frac{d\theta}{1 - 2a \cos \theta + a^2} = \frac{2\pi}{1 - a^2}$ where $a^2 < 1$ L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech 1 Year II Semester Regular & Supplementary Examinations Aug- 2023
PROBABILITY & STATISTICS
(CSE, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if (i) The two cards are drawn together. (ii) The two cards drawn one after other with replacement. L1 6M
- b) A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the Probability that (i) 3 boys are selected (ii) exactly 2 girls are selected. L5 6M

OR

- 2 Two dice are thrown. Let X assign to each point (a,b) in S the maximum of its numbers i.e., $X(a,b) = \max(a,b)$. Find the probability distribution. X is a random variable with $X(s) = \{1,2,3,4,5,6\}$. Also find the mean and variance of the distribution. L5 12M
- 3 a) Derive mean and variance of Binomial distribution L5 6M
b) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys. Assume equal probabilities for boys and girls. L3 6M
- 4 Find the mean and variance of a Normal distribution in which 7% of items are under 35 and 89% are under 63. L1 12M

UNIT-III

- 5 Obtain the rank correlation coefficient for the following data : L5 12M
- | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|
| X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 |
| Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 |

OR

- 6 Find two regression equations from the following data L5 12M

X	10	25	34	42	37	35	36	45
Y	56	64	63	58	73	75	82	77

UNIT-IV

- 7 a) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? L2 6M
- b) A sample of 64 students have mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56kgs and standard deviation 25kgs. L2 6M

OR

L1 6M

- 8 a)

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

 Fit a second degree polynomial to the above data by the method of Least squares. L1 6M

L1 6M

- b) By method of least squares fit a straight line to the following data

X	1	2	3	4	5
Y	14	27	40	55	68

UNIT-V

- 9 a) Samples of two types of electrical light bulbs were tested for length of life and following data were obtained L2 6M
- | | | |
|----------------|----------|----------|
| Sample numbers | Type I | Type II |
| Sample mean | 1234 hrs | 1036 hrs |
| Sample S.D | 36 hrs | 40 hrs |
- Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life. L4 6M
- b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard. L4 6M
- OR
- 10 A random sample of 10 boys had the following I.Q's : L1 12M
70,120,110,101,88,83,95,98,107 and 100 (a) Do these data support the assumption of a population mean I.Q of 100? (b) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie.

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
ENGINEERING GRAPHICS

(CSM & CAD)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

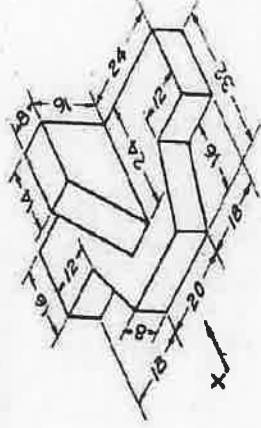
- [UNIT-I]**
- Construct a parabola with base 120 and length of the axis 60 by using Rectangle method. L1 12M
 - Construct an ellipse having major axis is equal to 100 mm and the minor axis is equal to 70 mm. Use the concentric circle method. L2 12M
- OR
- [UNIT-II]**
- Draw the projections of the following points, keeping the distance between the projectors as 25mm on the same reference lines. L2 12M
 - A - 15mm above HP and 30mm in front of VP
 - B - 20mm above HP and 25mm behind VP
 - C - 15mm below HP and 30mm behind VP
 - D - 15mm below HP and 30mm in front of VP
 - E - On HP and 25mm in front of VP
 - F - On VP and 25mm above HP
 - G - Lying on both HP and VP
- OR
- A line CD of 90mm length is inclined at an angle of 30° to HP and 45° to VP. The point C is 20mm above HP and 25mm in front of VP. Draw the projections of the line. L2 12M
- [UNIT-III]**
- An equilateral triangular plane ABC of side 40mm has its plane parallel to VP and 20mm away from it. Draw the projections of the plane when one of its sides is (i) perpendicular to HP (ii) parallel to HP and (iii) inclined to HP at an angle of 45°. L2 12M
- OR
- 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. L2 12M
- [UNIT-IV]**
- A square pyramid of base 40 mm and axis 60 mm long. Its base lies on VP with its axis parallel to HP. A cut sectional plane, 60° to VP and it pass 10mm away from the axis. Draw the projections sectional front view. L2 12M
- OR
- A square pyramid, with side of base 30 mm and axis 50 mm long, is resting on its base on HP with an edge of the base parallel to VP. It is cut by a section plane, perpendicular to VP and inclined at 45° to HP. The section plane is passing through the mid-point of the axis. Draw the development of the surface of the cut pyramid. L2 12M

[UNIT-V]

- Draw the isometric projection 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. L2 12M

OR

- Draw three views of the blocks shown pictorially in figure according to first angle projection. L2 12M



SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B. Tech I Year II Semester Regular & Supplementary Examinations August- 2023
APPLIED PHYSICS
(ECE & EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Discuss the theory of interference of light due to thin films by reflection with suitable ray diagram. L1 4M
b) Derive the condition for bright and dark rings interference in the case of thin films by reflected light. L4 8M

OR

- 2 a) Define diffraction? Distinguish between Fraunhofer and Fresnel's Diffraction. L4 8M
b) Define following terms i. Grating spectrum ii. Grating element L1 4M

UNIT-II

- 3 a) Derive an expression for electrical conductivity in a metal by quantum free electron theory. L4 6M
b) Write brief note on Fermi Dirac distribution. What is the effect of temperature on Fermi Dirac distribution function? L1 6M

OR

- 4 a) State and Explain Gauss's Theorem for divergence. L2 8M
b) If electric field $\vec{E} = x^2 \hat{i} + 2y^2 \hat{j} + 3z^2 \hat{k}$ then find the divergence of \vec{E} . L3 4M

UNIT-III

- 5 a) Describe the construction and working principle of He-Ne Laser with the help of a neat diagram. L2 8M
b) What are the advantages of He-Ne laser. L1 4M

OR

- 6 a) What is the acceptance angle of an optical fiber and derive an expression for it. L1 8M
b) An optical fibre has a core refractive index of 1.44 and cladding refractive index of 1.40. Find its numerical aperture and acceptance angle. L3 4M

UNIT-IV

- 7 a) Define the following terms (i) Carrier Concentration (ii) Fermi level (iii) Electrical Conductivity (iv) Energy band gap. L1 8M
b) Enumerate the expression for intrinsic carrier concentration. L2 4M

OR

- 8 a) Describe the Hall Effect in semiconductors. L2 8M
b) What are the applications of Hall Effect? L1 4M

UNIT-V

- 9 a) What is Meissner effect? Explain how Superconductors are behaving like a Diamagnetic material. L2 4M
b) Explain the Type-I and Type-II superconductors. L2 8M

OR

- 10 a) What are the techniques available for synthesizing nanomaterials? L1 4M
b) Explain ball milling technique for synthesis of nanomaterial. L2 8M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
ENGINEERING PHYSICS

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|--|----|----|
| 1 | a) What is Interference and write their conditions. | L1 | 4M |
| | b) Describe the formation of Newton's ring with necessary theory with relevant diagram and derive the expressions for dark and bright fringes. | L3 | 8M |

OR

- | | | | |
|---|--|----|----|
| 2 | a) Define diffraction? Distinguish between Fraunhofer and Fresnel's diffraction. | L2 | 4M |
| | b) In the study of Fraunhofer diffraction due to single slit how the diffraction fringes formed. | L4 | 8M |

UNIT-II

- | | | | |
|---|---|----|----|
| 3 | a) Show that FCC is mostly closed packed structure than BCC and SC. | L2 | 8M |
| | b) Write the important features of Miller indices. | L2 | 4M |

OR

- | | | | |
|---|---|----|----|
| 4 | a) Explain the principle, procedure and advantage of Debye-Scherrer (Powder method) of X-ray diffraction. | L3 | 9M |
| | b) Find the angle at which the third order reflection of X-ray of 0.79\AA wavelength can occur in a calcite crystal of 3.04×10^{-10} m spacing? | L4 | 3M |

UNIT-III

- | | | | |
|---|---|----|----|
| 5 | a) Define absorption coefficient of sound and derive it? | L3 | 4M |
| | b) What are the basic requirements of acoustically good hall? | L2 | 8M |

OR

- | | | | |
|---|---|----|----|
| 6 | a) Write the properties of Ultrasonic waves. | L3 | 6M |
| | b) Explain the detection methods of Ultrasonic waves. | L3 | 6M |

UNIT-IV

- | | | | |
|---|--|----|----|
| 7 | a) How ultrasonics are produced by using piezoelectric generator? | L2 | 8M |
| | b) A quartz crystal has a thickness of 4×10^{-3} and density 3×10^3 kg/m ³ . Calculate its fundamental frequency. Give the Youngs modulus of crystal is 8.2×10^{10} N/m ² . | L4 | 4M |

OR

- | | | | |
|---|---|----|----|
| 8 | a) Define the following i) Elasticity ii) isotropic materials iii) rigid body iv) Plasticity v) Hooke's law | L3 | 5M |
| | b) What is stress? Explain different types of stresses. | L3 | 7M |

UNIT-V

- | | | | |
|---|---|----|----|
| 9 | a) What is Meissner effect? Explain how Superconductors are behave like a Diamagnetic material. | L2 | 4M |
| | b) Explain BCS theory of superconductors | L2 | 8M |

OR

- | | | | |
|----|--|----|----|
| 10 | a) Explain Sol-Gel technique for synthesis of nanomaterials? | L3 | 8M |
| | b) What are the applications of nanomaterials in different fields. | L3 | 4M |

Q.P. Code: 20ME0301b

R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY; PUTTUR
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B.Tech I Year II Semester Regular & Supplementary Examinations August-2023

ENGINEERING GRAPHICS

(CSE & CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- UNIT - I**
1. Draw a parabola having a distance of 50 mm between the focus and directrix and Draw 12M
normal and tangent to the parabola at a point 35 mm from the focus.
 2. Develop the involute of a regular hexagon of side 20 mm. Draw a tangent and normal to 12M
the curve at a distance of 100 mm from the centre of the hexagon.
 3. Draw the projections of the following points, keeping the distance between the projectors 12M
as 25mm on the same reference lines.
A - 20mm above IP 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 45° to VP. The point 12M
A is 15mm above HP and 20mm in front of VP. Draw the projections of the line
5. A square plane ABCD of side 30mm is parallel to HP and 20mm away from it. Draw the 12M
projections of the plane, when (i) two of its sides are parallel to VP and (ii) and one of its
side is inclined at 30° to VP.

OR

6. A pentagonal prism of base side 30mm and axis 60mm has one of its rectangular faces on 12M
the HP and the axis inclined at 45° to the VP. Draw its projections.

UNIT - IV

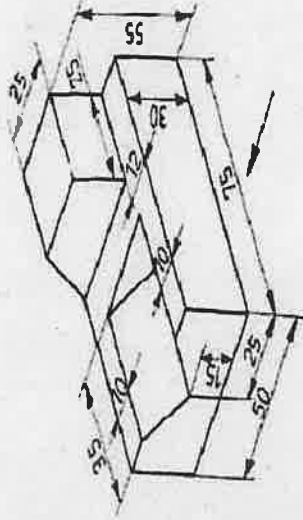
7. A hexagonal prism of side of base 30 mm and length of axis 75 mm is resting on its base 12M
on HP. It is cut by a section plane inclined at 45° to HP and passing through top corner.
Draw the front and sectional top views of the solid and true shape of the section.
8. A square prism of side of base 40 mm and axis 80 mm long, is resting on its base on HP 12M
such that, a rectangular face of it is parallel to VP. Draw the development of the prism.

Q.P. Code: 20ME0301b

R20

UNIT - V

9. Draw the isometric projection of a pentagonal prism of base side 35 mm and axis 60mm. 12M
The prism rests on its base on the HP with an edge of the base parallel to the VP.
10. Draw three views of the blocks shown pictorially in figure according to first angle 12M
projection



SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023
PROBABILITY & STATISTICS
(CAD & CSM)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 In a certain college 25% of boys and 10% of girls are studying mathematics. L1 12M
The girls constitute 60% of the student body. (a) What is the probability that mathematics is being studied? (b) If a student is selected at random and is found to be studying mathematics, find the probability that the student is a girl? (c) a boy.

OR

- 2 a) In a certain town 40% have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. A person is selected at random from the town. i) If he has brown hair, what is the probability that he has brown eyes also? ii) If he has brown eyes, determine the probability that he does not have brown hair? L2 6M
b) The probability that students A, B, C, D solve the problem are $1/3, 2/5, 1/5$ and $1/4$ respectively. If all of them try to solve the problem, what is the probability that the problem is solved. L3 6M

UNIT-II

- 3 In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find (i) How many students score between 12 and 15 (ii) How many students score above 18? (iii) How many students score below 8? L3 12M

OR

- 4 If the masses of 300 students are normally distributed with mean 68kgs and standard deviation 3kgs. How many students have masses i) Greater than 72kgs ii) Less than or equal to 64kg iii) Between 65 and 71 kgs inclusive. L3 12M

UNIT-III

- 5 a) Find the median to the following data: L3 6M

x	5	8	11	14	17	20	23
f	2	8	12	20	10	6	3

- b) The first four moments of a distribution about the value 5 of the variables are 2, 20, 40 and 50. Calculate mean, variance, μ_1 and μ_2 of the distribution. L5 6M

OR

- 6 Ten competitors in a musical test were ranked by the three judges A, B and C in the following order. Using rank correlation coefficient method, discuss which pair of judges has the nearest approach to common likings in music. L3 12M

Ranks by A	1	6	5	10	3	2	4	9	7	8
Ranks by B	3	5	8	4	7	10	2	1	6	9
Ranks by C	6	4	9	8	1	2	3	10	5	7

UNIT-IV

- 7 a) A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased? L4 6M
b) In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations? L4 6M

OR

- 8 a) Fit a parabola for the following data using method of least squares. L4 6M

X	0	1	2	3	4
Y	1	5	10	22	38

- b) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. L1 6M

UNIT-V

- 9 a) In one sample of 8 observations the sum of the squares of deviations of the sample values from the sample was 84.4 and in the other samples of 10 observations it was 102.6. Test whether this difference is significant at 5% level. L4 6M
b) Blood pressure of 5 women before and after intake of a certain drug is given below. Test whether the significant change in blood pressure at 1% level of significance. L4 6M

Before	110	120	125	132	125
After	120	118	125	136	121

OR

- 10 Two random samples reveal the following results: Test whether the samples came from the same normal population. L4 12M

Sample	Size	Sample Mean	Sum of squares of deviations from the mean
1	10	15	90
2	12	14	108

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Supplementary Examinations August- 2023

ENGINEERING CHEMISTRY

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|--|----|----|
| 1 | a) Explain about the priming and foaming? | L2 | 6M |
| | b) Explain the process of scale and sludge formation in boilers. | L2 | 6M |

OR

- | | | | |
|---|---|----|-----|
| 2 | Explain with a neat sketch the various steps involved in Municipal Water Treatment. | L2 | 12M |
|---|---|----|-----|

UNIT-II

- | | | | |
|---|--|----|----|
| 3 | a) What is Electroplating? Explain electroplating of Nickel and Copper? | L1 | 6M |
| | b) What is Differential Aeration cell corrosion? Give the suitable Examples. | L1 | 6M |

OR

- | | | | |
|---|---|----|----|
| 4 | a) What is primary Battery? Write a note on Zinc-air battery | L1 | 6M |
| | b) Explain the Construction and working of Lead acid battery. | L2 | 6M |

UNIT-III

- | | | | |
|---|---|----|----|
| 5 | a) Distinguish between Thermoplastics and Thermosetting plastics. | L2 | 6M |
| | b) Describe the preparation, properties and uses of Bakelite. | L4 | 6M |

OR

- | | | | |
|---|--|----|----|
| 6 | a) Explain the Proximate analysis of coal with its significance. | L2 | 6M |
| | b) Discuss the ultimate analysis of coal with its significance. | L1 | 6M |

UNIT-IV

- | | | | |
|---|---|----|-----|
| 7 | Define lubricant? Give the classification and examples of the lubricants? | L2 | 12M |
|---|---|----|-----|

OR

- | | | | |
|---|--|----|-----|
| 8 | Define Cement. Explain in detailed about manufacture of Portland Cement? | L3 | 12M |
|---|--|----|-----|

UNIT-V

- | | | | |
|---|--|----|-----|
| 9 | Give an account of chemical and electrochemical methods of preparation of nano metals. | L2 | 12M |
|---|--|----|-----|

OR

- | | | | |
|----|--|----|-----|
| 10 | Explain principle, instrumentation and applications of Scanning Electron microscopy (SEM). | L2 | 12M |
|----|--|----|-----|

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023

C PROGRAMMING AND DATA STRUCTURES

(Common to EEE, MECH & ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Discuss clearly about bitwise operators and its working with examples. L3 6M
b) Write a C program to print all Armstrong numbers with in the given range. L3 6M

OR

- 2 a) With an example discuss and compare exit control and entry control loops. L3 6M
b) With an illustration explain the structure of C program. L3 6M

UNIT-II

- 3 a) Define an array and explain the declaration, accessing elements of 3 dimensional arrays with an example. L3 6M
b) Define recursion and write a C program to find factorial of the given number using recursion. L3 6M

OR

- 4 a) Write a C program to check whether the given word contains vowels or not. If yes print the count of vowels. L3 6M
b) Explain any four preprocessing commands with examples. L2 6M

UNIT-III

- 5 a) Define a pointer and explain the advantages and disadvantages of the pointers with examples. L2 6M
b) compare enumerated data type, structure and union with illustrations. L4 6M

OR

- 6 Write a C program to explain to read and store 'n' number of student details (Roll no, branch, name, percentage, grade). Display the topper details branch wise. L3 12M

UNIT-IV

- 7 a) Write a note on queue, its types and applications. L2 6M
b) Write a C program to create circular linked list. L3 6M

OR

- 8 a) Define stack and explain how to evaluate postfix expression with an example using stack. L3 6M
b) Write a C program to implement a double linked list. L3 6M

UNIT-V

- 9 a) Write a C program to perform merge sort. L2 6M
b) Explain binary search process with an example. L2 6M

OR

- 10 a) Write a C program to perform quick sort. L2 6M
b) With an example explain insertion sort. L2 6M

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(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations Aug- 2023

APPLIED CHEMISTRY
(CSE, CSM, CAD & CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Define Conductometric titrations. Discuss all types of Acid-Base Conductometric titrations and Explain the nature of the graphs. L3 12M

OR

- 2 What is secondary Battery? Explain the Construction and working of Lead acid battery. L2 12M

UNIT-II

- 3 a) Explain De-Broglie's equation L1 6M
b) Explain Heisenberg Uncertainty principle L1 6M

OR

- 4 a) What is Crystal field theory? L1 4M
b) Explain the crystal field splitting in octahedral and tetrahedral Complexes L2 8M

UNIT-III

- 5 Explain the mechanism of Addition polymerization L2 12M

OR

- 6 a) Distinguish between Thermoplastics and Thermosetting plastics L3 6M
b) Write a short note on Co-polymerization with examples. L3 6M

UNIT-IV

- 7 Explain the principle, working and applications of Thin layer chromatography L2 12M

OR

- 8 a) Explain the principle and instrumentation of Gas Chromatography L2 8M
b) Write any four applications of Gas Chromatography L1 4M

UNIT-V

- 9 Explain in detail about principle and application of semiconductors? L2 12M

OR

- 10 a) What is meant by Nanomaterials ? How are Nanomaterials Classified. L3 6M
b) Explain Catalytical and medical in the application of supramolecules L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year II Semester Regular & Supplementary Examinations August-2023
FUNDAMENTALS OF ELECTRICAL CIRCUITS
(EEE)

Time: 3 Hours

Max. Marks: 60

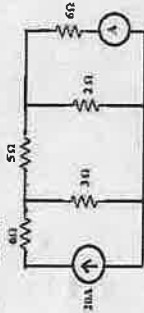
Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain in detail about passive elements. L1 6M
b) Derive an expression for RMS values of sine wave form. L2 6M
- 2 a) Derive the relation of voltage and current for pure resistor, inductor & capacitor? L2 8M
b) Define Admittance and impedance L2 4M
- 3 a) State and explain Super position theorem with one suitable example L3 8M
b) State and explain Millman's theorem L2 4M

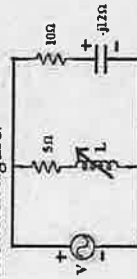
UNIT-II

- 4 Determine the ammeter reading where it is connected to 6 Ω resistor as shown in below figure. The internal resistance of the ammeter is 2 Ω, by using compensation theorem. L3 12M



UNIT-III

- 5 a) Explain about Series resonance with phasor diagrams. L2 6M
b) Determine the resonant frequency, quality factor and bandwidth of coil for the series circuit consisting of $R=10\ \Omega$, $L=0.1\text{H}$ and $C=10\ \mu\text{F}$ L3 6M
- 5 a) Find the value of 'L' at which the circuit resonates at a frequency of 1000 rad/sec in the circuit shown in figure. L3 6M



UNIT-IV

- 7 a) Define the following terms (i) Resonant frequency, (ii) Quality factor (iii) Bandwidth L2 6M
b) Derive the expressions for mutual inductance with expressions L3 6M
Two inductors whose self-inductances are of 75mH and 55mH respectively are connected together in parallel aiding. Their mutual inductance is given as 22.5mH. Calculate the total inductance of the parallel combination. (a) aiding each other, (b) opposing each other L3 6M

OR

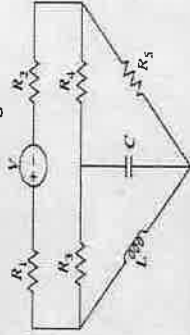
- 8 a) Explain parallel connection of coupled inductors L2 6M
b) Two coils connected in series have a self-inductance of 20mH and 60mH respectively. The total inductance of the combination was found to be 100mH. Determine the amount of mutual inductance that exists between the two coils (a) aiding each other, (b) opposing each other L3 6M

UNIT-V

- 9 Define the following terms (i) Planar Graph (ii) Sub-graph (iii) Tree (iv) Co-tree (v) Tie set (vi) Cut set L2 12M

OR

- 10 a) Draw the dual of the network shown in Figure. L2 6M



- b) Explain about Duality of networks L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
FUNDAMENTALS OF DIGITAL COMPUTING SYSTEMS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the operating system in detail. L2 6M
b) Briefly explain the computer hardware of a computer system. L2 6M

OR

- 2 a) Describe the features of IBM -Z series mainframe computers. L2 6M
b) Interpret the concept of virtualization and describe its importance. L2 6M

UNIT-II

- 3 a) Explain the relationship among the following words: system, environment, boundary and interface with a neat sketch. L2 6M
b) With an example, discuss the relationship between a system and its environment. L2 6M

OR

- 4 a) Describe the advantages of client-server computing with some examples. L2 6M
b) Explain the three tier database architecture with a neat diagram. L2 6M

UNIT-III

- 5 a) Discuss various number systems of a computer. L2 8M
b) Tabulate the numbers up to 15 which can be represented in base-2, base-8, base-10 and base -16. L2 4M

OR

- 6 a) Convert the following numbers from decimal to binary and then to hexadecimal: (i) (27.625)₁₀ (ii) (4192.37761)₁₀ L2 6M
b) Convert the following numbers from their given base to decimal: L2 6M
(i) (0.1001001)₂ (ii) (0.3A2)₁₆ (iii) (0.2A1)₁₂

UNIT-IV

- 7 a) Define image metadata. Give at least three examples of metadata that would be required for a bitmap image. L2 6M
b) With a neat sketch, explain the bitmap image storing format GIF. L2 6M

OR

- 8 a) List the advantages of data compression. L1 4M
b) Distinguish lossless and lossy data compressions algorithms. L4 8M

UNIT-V

- 9 a) Define complement 9's and 10's complement of a given number and explain the relation between them. L1 6M
b) Define one's complement, two's complement form and explain the relation between them. L2 6M

OR

- 10 a) Compute the floating-point representation for 0.0000019557. L3 4M
Compute division of the following two numbers, normalize the result L3 8M
b) obtained and round it to 3-bit.
i) 04220000 / 02712500 ii) 625.2035 / 25.7585 iii) 7024.775E2 / 512.225E0

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023

BASICS OF ENGINEERING MECHANICS

(MECH)

Time: 3 Hours

Max. Marks: 60

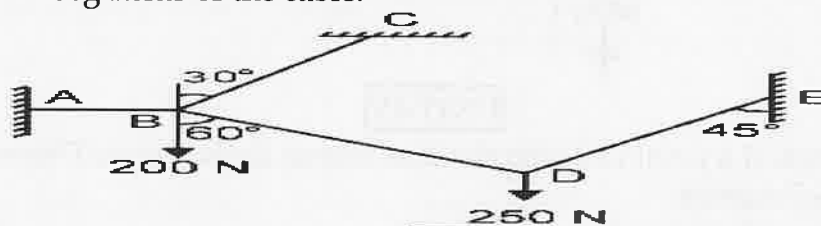
Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Classify different systems of forces with suitable examples. L2 6M
 b) The resultant of two forces when they act at right angles is 10N, whereas when they act at an angle of 60° the resultant is $\sqrt{148}$. Determine the magnitude of the two forces. L3 6M

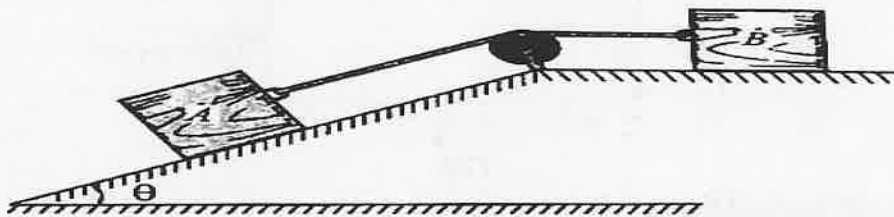
OR

- 2 A system of connected flexible cable shown in Figure is supporting two vertical forces 200 N and 250 N at points B and D. Determine the forces in various segments of the cable. L4 12M



UNIT-II

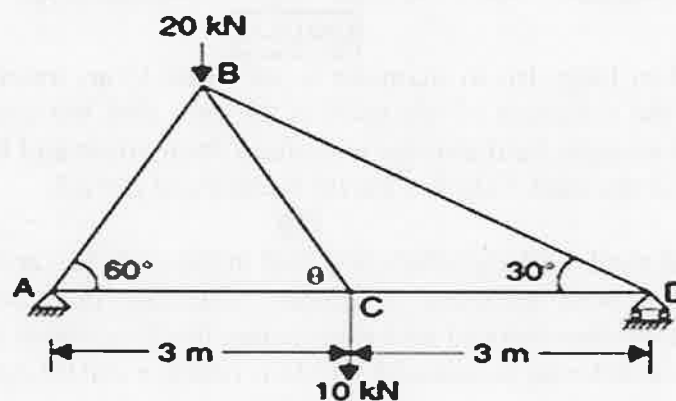
- 3 a) Find the value of ' θ ' if the block 'A' and 'B' shown in Figure have impending motion. Given weight of Block-A = 200 N and that of Block-B = 200 N, $\mu_A = \mu_B = 0.25$. L4 8M



- b) What are the various laws of friction? L2 4M

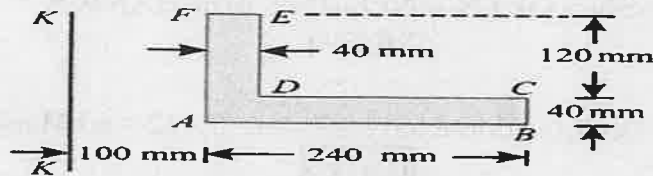
OR

- 4 a) State the assumptions made in truss analysis. L2 3M
 b) Determine the forces in all the members of the truss shown in Figure using method of joints. L4 9M



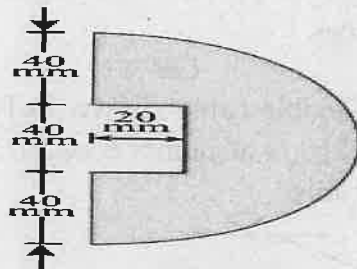
UNIT-III

- 5 Figure shows an area ABCDEF. Compute the moment of inertia of the above area about axis K-K. L3 12M



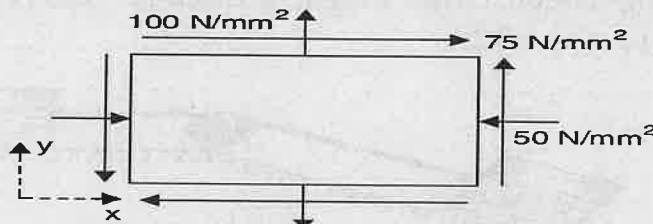
OR

- 6 Find the moment of inertia for the section shown in figure about its vertical centroidal axis. L3 12M



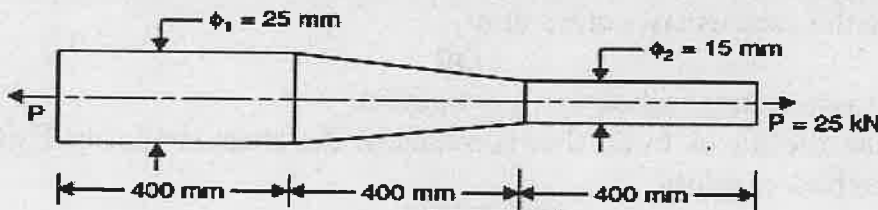
UNIT-IV

- 7 State of stress at a point in a material is as shown in the Figure Determine L4 12M
 (a) Principal stresses
 (b) maximum shear stress
 (c) Plane of maximum shear stress and
 (d) The resultant stress on the plane of maximum shear stress.



OR

- 8 Find the extension of the bar shown in Figure under an axial load of 25 kN. L4 12M



UNIT-V

- 9 A shell 3.25 m long, 1m in diameter is subjected to an internal pressure of 1 N/mm². If the thickness of the shell is 10 mm, find the circumferential and longitudinal stresses. Find also the maximum shear stress and the changes in the dimensions of the shell. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.3$. L3 12M

OR

- 10 A cylindrical shell 3m long which is closed at the ends has an internal diameter of 1m and a wall thickness of 15mm. Calculate the circumferential and longitudinal stresses induced and also change the dimensions of the shell if it is subjected to an internal pressure of 1.5 MPa. Take $E = 200 \text{ GN/m}^2$ and $\mu = 0.3$. L3 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023
COMMUNICATIVE ENGLISH
(CSE, CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- 1 a) Make three "will" questions and three "Yes/No" Questions with examples. L1 6M
b) Write a paragraph about "My favorite place". L1 6M
- 2 a) What are the prominent characteristics found in *Half a Rupee Worth*? L2 6M
b) Write a letter to the Principal of your College to issue Transfer Certificate and Study Certificate to join higher studies abroad. L1 6M
- 3 a) Fill in the blanks with suitable articles. L1 6M
i) Tina travels by _____ airplane.
ii) _____ Mahabharata is an epic.
iii) Make hay while _____ sun shines.
iv) Mike plays _____ jazz.
v) Erasmus is _____ one eyed man.
vi) Susanne is _____ University graduate.
- b) Fill in the blanks with suitable cohesive Devices.
(whereas, besides, and, though, while, before)
i) Jahnavi met her neighbor _____ she was leaving abroad.
ii) The thug had escaped _____ the cop arrived.
iii) Ram _____ Shyam are brothers.
iv) I left for Tirumala _____ my father left for Tiruvannamalai.
v) _____ he is physically challenged, he helps his friends.
vi) Anantha Krishna owns a car _____ a bike.
- 4 a) Describe the plight of Indian society in the *The Thakur's Well* by Munshi Premchand. L2 6M
b) Convert the following sentences into appropriate voice. L1 6M
i) Viswanath plays violin.
ii) Jahangir is watching a movie.
iii) Padmini has completed the work.
iv) Bhalladeva was killed by Baahubali.
v) Govinda Reddy had cleaned the jar.
vi) The computer can be fixed by Sam.
- 5 a) Explain Skimming and Scanning? L1 6M
b) Why Report Writing and Summarizing are used in day-to-day activities? L1 6M

OR

- 6 a) How does effective listening differ from hearing and also mention steps to improve your keen listening skills? L1 6M
b) Discuss the significant themes of "*I am not that Woman*". L2 6M
- 7 a) What are time wasters and mention the steps that you adopt to overcome it? L1 6M
b) Give suitable synonyms to the following words. L1 6M
i) Destiny
ii) Beautiful
iii) Humorous
iv) Sacred
v) Attitude
vi) Priority
- 8 a) Choose the following with appropriate adjective forms. L1 6M
(the tallest, well, most intelligent, best, much better, more nervous)
i) Now I understand English _____ than Durga.
ii) We think Lavanya is _____ than Durga.
iii) Our English Teacher speaks very _____.
iv) Jyothi is the _____ speaker in the class.
v) Of all three of you, Gagan is _____.
vi) Who is the _____ person you have ever spoken to?
b) Write a paragraph about your father's daily routine. L1 6M
- 9 a) Write an essay on Technology - A Boon or a bane. L1 6M
b) Correct the following sentences with suitable preposition. L1 6M
i) The dog is grateful for its owner.
ii) Raju is suffering with measles.
iii) I was born in 11th September, 2005.
iv) Ramakrishna Paramhansa is fond on sweets.
v) Humpty Dumpty sat at a wall.
vi) I came to college on June.
- 10 a) Abdul Kalam's family prayed till they got answers. What do you think about Prayer and its power? L2 6M
b) Kalam is a multifaceted personality. Write about his phenomenal qualities that you have come across in the lesson *The Power of Prayer*. L2 6M

OR

OR

OR

Q.P. Code: 20EC0402

R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
ELECTRONIC DEVICES AND CIRCUITS

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Derive the expression for forward dynamic resistance of a PN junction diode. L1 7M
b) Calculate the forward resistance of a PN Junction Diode when the forward current is 5mA at T = 300 K. Assume Silicon diode. L4 5M

OR

- 2 a) Explain Breakdown mechanisms in PN Junction Diode. L2 6M
b) What is a Clamper circuit? Describe about positive and negative clampers with neat circuit diagram. L1 4M
c) Design a Biased positive series clipper to clip the sinusoidal voltage waveform at +2 volts. The sinusoidal waveform has peak to peak amplitude of 10 volts. L3 2M

UNIT-II

- 3 a) Draw the circuit diagram of a Half Wave Rectifier and with the help of waveforms describe its operation. L1 6M
b) A Half Wave Rectifier is supplied from a 230V, 50 Hz supply with a step-down ratio of 3:1 to a resistive load of 10k Ω . The diode forward resistance is 75 Ω while transformer secondary is 10 Ω . Calculate maximum, average, RMS values of current, DC output voltage, efficiency of rectification and ripple factor. L4 6M

OR

- 4 a) With neat circuit diagram and waveforms, explain the operation of Full Wave Rectifier with Capacitor filter and derive the expression for its ripple factor. L3 6M
b) With neat diagram, explain the working of LED and list its advantages and applications. L3 6M

UNIT-III

- 5 a) Explain the current components of a PNP transistor. L2 6M
b) Explain the operation of N-Channel depletion type MOSFET with diagram. L2 6M

OR

- 6 a) With neat diagram, explain the Input and Output characteristics of a BJT in CB Configuration. Explain Early effect. L2 5M
b) With a neat diagram, explain how a transistor acts as an amplifier. L1 7M

UNIT-IV

- 7 a) Define transistor biasing and explain the need for biasing. L1 3M
b) Derive the expression for Stability Factor, S_f from Collector current equation. L4 4M
c) Explain the concept of DC and AC Load lines and discuss the criteria for fixing the Q-point. L2 5M

OR

- 8 a) Draw the circuit diagram of Self Bias of a Transistor and determine its Q-point. L3 6M
b) Estimate the condition for achieving Thermal Stability. L2 6M

UNIT-V

- 9 a) With neat diagram, summarize the parameters of CE amplifier using approximate analysis. L2 6M
b) Analyze CE amplifier with emitter resistance using simplified h-parameter model. L4 6M

OR

- 10 a) Draw the simplified h-parameter model for a transistor in CE, CB and CC configuration. L1 6M
b) Derive expressions for A_i , R_i , A_v and R_O for a Common Collector Amplifier using simplified hybrid model. L3 6M

Q.P. Code: 20EE0254

R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023
ELECTRICAL TECHNOLOGY
(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Explain the constructional details of a D.C generator L1 12M
OR
2 a) Write different applications of dc generators. L2 6M
b) A DC shunt generator has shunt field winding resistance of 100Ω it is supplying a load of 5KW at voltage of 250 volts if its armature resistance of 0.22Ω calculate the induced EMF of generator. L2 6M

UNIT-II

- 3 a) Derive the expression for electromagnetic torque equation in a DC motor. L3 6M
b) A 4 pole, 500 V DC shunt motor has 720 wave connected conductor on its armature. The full load armature current is 60 A & the flux per pole is 0.03 web, the armature resistance is 1.2Ω and the brush contact drop is 1V/brush. Calculate the full load speed of the motor. L4 6M

OR

- 4 Explain Swinburne's test for finding the efficiency of D.C machine. L1 12M

UNIT-III

- 5 Draw the constructional diagram of a single -phase transformer and explain all the parts. L2 12M

OR

- 6 a) In a 25KVA, 2000/200V, transformer has Iron and copper losses are 350W and 400W respectively. Calculate the efficiency at unity power factor (i) at full load (ii) at half Load. L3 6M
b) Develop the Equivalent circuit of a single phase transformer referred to secondary. L4 6M

UNIT-IV

- 7 a) Explain construction features of wound rotor machine. L2 6M
b) Explain construction features of cage rotor machine L3 6M

OR

- 8 a) Derive the relation between rotor starting torque and maximum torque. L3 6M
b) A three phase induction motor is running at 1740 r.p.m. On a 60Hz supply. Calculate number of poles, the slip and the rotor frequency. L4 6M

UNIT-V

- 9 Explain the working principle of a Synchronous generator. L2 12M

OR

- 10 A 200kVA, 415 V, 50 Hz, 3 ϕ alternator has effective armature resistance of 0.01Ω and an armature leakage reactance of 0.05Ω . Compute the voltage induced in the armature winding when the alternator is delivering rated current at a load p.f of (i) 0.8 Lagging (ii) 0.8 leading. L2 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023

BASIC THERMODYNAMICS

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What do mean by property? Distinguish between intensive and extensive property. L1 6M
b) Discuss about Work and Heat transfer with example. L3 6M

OR

- 2 a) Explain Zeroth law of thermodynamics. L2 6M
b) What is quasi static process? Explain in detail. L2 6M

UNIT-II

- 3 a) Define Statements of second law of thermodynamics. L2 6M
i) Clausius statement. ii) Kelvin-plank statement.
b) A tank containing air is stirred by a paddle wheel. The work input to the paddle wheel is 9000 kJ and the heat transferred to the surroundings from the tank is 3000 kJ. Determine: (i) Work done ; (ii) Change in internal energy of the system. L3 6M

OR

- 4 What is Steady Flow Process? Derive Steady Flow Energy Equation (SFEE) for an open system, Give SFEE for Nozzle, turbine and condenser. L2 12M

UNIT-III

- 5 A certain gas has $C_p = 1.968$ kJ/kg K, and $C_v = 1.507$ kJ/kg K. Find its molecular weight and gas constant. A constant volume chamber of 0.3m³ capacity contains 2kg of this gas at 50C. Heat is transferred to the gas until the temperature is 1000C. Find the work done, heat transferred and the changes in internal energy, enthalpy and entropy. L3 12M

OR

- 6 A mass of 0.25kg of an ideal gas has a pressure of 300 kPa, a temperature of 800C and a volume of 0.07 m³. The gas undergoes an irreversible adiabatic process to a final pressure of 300 kPa and final volume of 0.12m³, during which the work done on the gas is 25 kJ. Evaluate the C_p and C_v of the gas and the increase in entropy of the gas. L3 12M

UNIT-IV

- 7 a) A Carnot engine working between 4000 C and 400 C produce 130 KJ of work. Determine i) The thermal efficiency. ii) the heat added iii) The entropy changes during the heat rejection process. L3 6M
b) Show the enthalpy, entropy and volume of steam at 1.4 MPa. L3 6M

OR

- 8 Differentiate between Otto cycle, diesel cycle and dual combustion cycle. L4 12M

UNIT-V

- 9 In a steam turbine steam at 20 bar, 360°C is expanded to 0.08 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes, find per kg of steam the net work and the cycle efficiency. L4 12M

OR

- 10 a) Explain the Rankine cycle with PV and TS diagrams. L3 6M
b) A simple Rankine cycle works between pressures 28 bar and 0.06 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech I Year II Semester Regular & Supplementary Examinations August- 2023

DIGITAL LOGIC DESIGN

(CSE, CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) State and prove any four Boolean theorems of Boolean algebra. L3 6M
 b) Convert the following numbers. L3 6M
 (5164.4413)₈ to binary.
 Convert (A3C2.D)₁₆ to binary and then to octal.
 (1032.2)₈ to decimal.

OR

- 2 a) Solve for x L3 6M
 i) $(257)_8 = (x)_2$
 ii) $(BC2)_{16} = (x)_8$
 iii) $(33)_{10} = (201)_x$
 b) Prove De Morgan's theorems using Perfect Induction Method. L3 6M

UNIT-II

- 3 Simplify the following Boolean expression using k-map $F(w, x, y, z) = \Sigma(1,3,7,11,15) + d(2,5)$. L4 12M

OR

- 4 a) Implement EX-OR gate using NOR gates only. L4 6M
 b) Simplify the following Boolean function for minimal POS form using K-map $F(X,Y,Z) : X'YZ + XY'Z' + XYZ + XYZ$. L3 6M

UNIT-III

- 5 a) Design 32:1 Multiplexer using two 16:1 Muxs and one 2:1 Mux using block diagram representation. L3 6M
 b) Design the full adder circuit using half adders. L3 6M

OR

- 6 a) Explain Carry Look Ahead Adder circuit with the help of logic diagram. L2 6M
 b) Design the 3 bit magnitude comparator. L2 6M

UNIT-IV

- 7 a) With the help of logic diagram, obtain the characteristic table of D & T Flip-Flops. Also draw their graphic symbols. L4 6M
 b) Explain the steps involved in analysis of the clocked sequential circuits. L2 6M

OR

- 8 Design a 4 bit Decade counter. L3 12M

UNIT-V

- 9 Illustrate PLA for the following Boolean function. L3 12M
 $F1(A,B,C) = \Sigma m(3,5,7)$
 $F2(A,B,C) = \Sigma m(4,5,7)$

OR

- 10 Illustrate the PAL for the following Boolean functions. L3 12M
 (i) $A(w,x,y,z) = \Sigma m(0,2,6,7,8,9,12,13)$
 (ii) $B(w,x,y,z) = \Sigma m(0,2,6,7,8,9,12,13,14)$

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR (AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023
NUMERICAL METHODS, PROBABILITY & STATISTICS
 (CIVIL)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Find the real root of the equation $x^3 - x - 1 = 0$ using bisection method. L1 6M
 b) Compute $y(9)$ Using Newton's forward formula from the following table: L2 6M

x	8	10	12	14	16	18
y	10	19	32.5	54	89.5	154

OR

- 2 a) Find the root of the equation $x \cdot \log_{10}(x) = 1.2$ using the Regula-Falsi method. L3 6M
 b) Using Newton's backward formula compute $f(32)$ from the following table: L2 6M

x	25	30	35	40
$f(x)$	0.2707	0.3027	0.3386	0.3794

UNIT-II

- 3 Using modified Euler's method, find $y(0.2)$ and $y(0.4)$ given that $L3 12M$
 $\frac{dy}{dx} = y + e^x, y(0) = 0.$

OR

- 4 a) Use the Taylor's series method, find $y(1.1)$ and $y(1.2)$ correct to 3-decimal places given that $\frac{dy}{dx} = x + y, y(1) = 0.$ L2 6M
 b) Compute the value of $\int_1^2 \frac{dx}{1+x}$ using (i) trapezoidal rule, (ii) Simpson's 3/8 th rules. L2 6M

UNIT-III

- 5 a) Explain Measures of Central tendency. L5 4M
 b) i) The weights of 6 competitors in a game are given below 58, 62, 56, 63, 55, 61 kgs. Find arithmetic mean of weight of competitors. L3 4M
 ii) Find the median of the following values 26, 8, 6, 12, 15, 32. L1 4M

OR

- 6 a) State Baye's theorem. L1 2M
 b) In a certain college 25% of boys and 10% of girls are studying mathematics. The girls constitute 60% of the student body. L3 10M
 (i) What is the probability that mathematics is being studied?
 (ii) If a student is selected at random and is found to be studying mathematics, find the probability that the student is a girl? (iii) a boy?

UNIT-IV

- 7 a) Define Random variable. L1 2M
 b) Two dice are thrown. Let X assign to each point (a, b) in S the maximum of its numbers i.e, $X(a, b) = \max(a, b)$. Find the probability distribution. X is a random variable with $X(s) = \{1, 2, 3, 4, 5, 6\}$. Also find the mean and variance of the distribution. L3 10M

OR

- 8 a) A random variable X has the following probability function: L2 6M

x	0	1	2	3	4	5	6	7	8
$P(x)$	a	3a	5a	7a	9a	11a	13a	15a	17a

- (i) Determine the value of a,
 (ii) Evaluate $P(X < 3), P(X \geq 3), P(2 \leq X < 5).$
 b) Consider the Probability density function $f(x) = \begin{cases} k(3x^2 - 1), & -1 \leq x \leq 2 \\ 0, & \text{elsewhere} \end{cases}$
 (i) Evaluate k.
 (ii) Evaluate $P(-1 \leq x \leq 0).$

UNIT-V

- 9 Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y): L3 12M

X:	65	66	67	67	68	69	70	70	72
Y:	67	68	65	68	72	72	69	71	71

OR

- 10 a) Define Probability distribution function. L1 2M
 b) Derive the mean of Binomial distribution. L2 4M
 c) If 2% of light bulbs are defective. Find the probability that (i) At least one is defective (ii) $P(1 < X < 8)$ in a sample of 100. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

DIGITAL ELECTRONICS

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Convert the following numbers to Decimal and then to Octal. (i) L1 6M
(101101.1101)₂ (ii)(11011011.100101)₂.
b) Convert the following to Decimal and then to Hexadecimal. (i) L1 6M
(1234)₈ (ii) (11001111)₂

OR

- 2 Explain about Logic gates. with symbols and truth tables. L1 12M

UNIT-II

- 3 Minimize the following Boolean function using K-Map. L2 12M
(i) $F(A, B, C, D) = \sum m(0,1,2,3,11,12,14,15)$.
(ii) $F(A, B, C, D) = \prod M(0,2,4,10,11,14,15)$

OR

- 4 Minimize the given Boolean function $F(A,B,C,D) = \sum m(0,1,3,4,5,7,10,13,14,15)$ using tabulation method L2 12M

UNIT-III

- 5 What is combinational logic circuit? Give the analysis procedure for combinational logic circuit. L5 12M

OR

- 6 a) What is multiplexer? Design 16:1 multiplexer using 8×1 and 2×1 multiplexer. L1 6M
b) Design and implement the following using 8:1 MUX. L5 6M
(i) $F(A,B,C,D) = \sum m(2,4,5,7,10,14)$
(ii) $F(A,B,C,D) = \sum m(0,2,4,6,8,10,12,14)$

UNIT-IV

- 7 Design and implement a 3-bit ripple counter using a J-K flip flop. L3 12M
Draw the state diagram, logic diagram, and timing diagram for the same.

OR

- 8 What is Register Explain i) Parallel in Parallel out Register ii) Series in Parallel out Register. L3 12M

UNIT-V

- 9 Implement PLA circuit for the following functions $F_1(A,B,C) = \sum m(3,5,6,7)$, $F_2(A,B,C) = \sum m(0,2,4,7)$. L3 12M

OR

- 10 a) What is FSM? Give the applications of FSM. L3 6M
b) Explain about Memory decoding. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

**CAD/CAM
(MECH)**

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 Discuss clearly the functions of a graphics package. L2 12M

OR

2 With a neat sketch explain the main elements of CIM systems. L2 12M

UNIT-II

3 Explain the Constructive Solid Geometry (CSG) method of creating models. L2 12M

OR

4 a) Define solid modeling and explain any one type of solid modeling methods. L1 6M

b) Compare between 2-D and 3-D wire frame models. L2 6M

UNIT-III

5 a) Differentiate between Manual part programming and Computer assisted part programming. L4 6M

b) What are the advantages and disadvantages of Numerical control systems? L1 6M

OR

6 a) Differentiate between NC and CNC Machines. L4 6M

b) List out the merits and demerits of CNC machines. L1 6M

UNIT-IV

7 a) Write brief notes on Group Technology. L1 6M

b) Write short notes on Part Families. L1 6M

OR

8 Explain the components of FMS with a neat sketch. L2 12M

UNIT-V

9 Classify the CAPP systems and explain any one type of CAPP systems in detail. L2 12M

OR

10 a) Brief about the shop floor control. L1 6M

b) Explain the functions of shop floor control. L2 6M

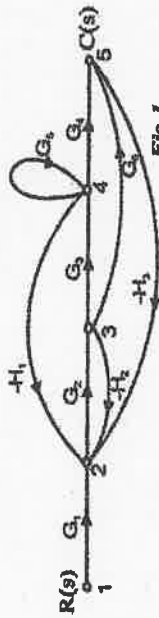
SIDDARtha INSTITUTE OF SCIENCE AND TECHNOLOGY; PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations August-2023
CONTROL SYSTEMS
(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I



Obtain the overall gain $C(S)/R(S)$ from signal flow graph shown in fig.1

OR

L4 12M

2 a) Give the block diagram reduction rules to find the transfer function of the system. L2 8M

b) List the properties of signal flow graph. L2 4M

UNIT-II

3 a) Find all the time domain specifications for a unity feedback control system whose open loop transfer function is given by $G(S) = 25/S(S+4)$. L2 6M

b) What is the Transient and steady state response of first and second order systems? L1 6M

OR

4 a) Measurements conducted on servo mechanism, show the system response to be $c(t) = 1 + 0.3e^{-60t} - 1.4e^{-10t}$. When subject to a unit step input. Obtain an expression for closed loop transfer function, determine the un damped natural frequency, damping ratio? L4 8M

b) For servo mechanisms with open loop transfer function given below what type of input signal give rise to a constant steady state error and calculate their values. $G(s)H(s) = \frac{10}{s^2(s+2)(s+4)}$ L2 4M

UNIT-III

5 With the help of Routh's stability criterion find the stability of the following systems represented by the characteristic equations: L2 6M

a) $s^4 + 8s^3 + 18s^2 + 16s + 5 = 0$.

b) $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$.

OR

6 Develop the root locus of the system whose open loop transfer function is L3 12M

$G(s) = \frac{K}{5(s+1)(s+2)}$

UNIT-IV

7 Develop the Bode plot for the transfer function $G(s) = \frac{Ks^{-0.25}}{s(s+2)(s+4)}$ L3 12M

OR

8 Sketch the polar plot for the open loop transfer function of a unity feedback system is given by $G(s) = \frac{1}{s(1+s)(1+2s)}$ Determine Gain Margin & Phase Margin. L5 12M

UNIT-V

9 A system is characterized by the following state space equations:

$\dot{X} = -2x_1 + x_2; \quad \dot{X}_2 = -3x_1 + u; \quad Y = x_1$

a) Find the transfer function of the system and Stability of the system.

b) Compute the State transition matrix. L1 6M

OR

10 a) What are the properties of State Transition Matrix? L1 6M

b) Diagonalize the following system matrix L3 6M

$A = \begin{pmatrix} 0 & 4 & -5 \\ 1 & 0 & 4 \\ 3 & 2 & 4 \end{pmatrix}$

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023
DISCRETE MATHEMATICS
(CSE, CSM, CAD, CIA)

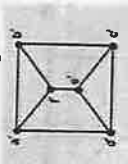
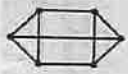
Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Show that in any graph the number of odd degree vertices is even. L2 6M
- b) Find whether the following two graphs are isomorphic? L2 6M



OR

- 2 a) State Euler's formula and Handshaking theorem. L2 6M
- b) Explain about BFS algorithm. L2 6M

UNIT-II

- 3 a) Obtain PCNF of $A = (P \wedge Q) \vee (\sim P \wedge Q) \vee (Q \wedge R)$ by constructing PDNF. L3 6M
- b) Show that $\sim P$ is a valid conclusion from the premises $(P \wedge \sim Q), \sim Q \vee R, \sim R$. L3 6M

OR

- 4 a) Show that $(\exists x)(P(x) \wedge Q(x)) \Rightarrow (\exists x)P(x) \wedge (\exists x)Q(x)$. L3 6M
- b) Show that $(\forall x)(P(x) \rightarrow Q(x)) \wedge (\forall x)(Q(x) \rightarrow R(x)) \Rightarrow (\forall x)(P(x) \rightarrow R(x))$. L3 6M

UNIT-III

- 5 a) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$, determine a relation R on A by $aRb \Leftrightarrow 3 \text{ divides } (a - b)$, show that R is an equivalence relation. L2 6M
- b) Verify $(x) = 2x + 1, g(x) = x$ for all $x \in R$ are bijective from $R \rightarrow R$. L3 6M

OR

- 6 a) Show that the set $\{1, 2, 3, 4, 5\}$ is not a group under addition and multiplication modulo 6. L3 6M
- b) Explain the concepts of homomorphism and isomorphism of groups with examples. L2 6M

UNIT-IV

- 7 a) How many permutations can be formed out of the letters of word "SUNDAY"? How many of these (i) Begin with S? (ii) End with Y? (iii) Begin with S & end with Y? (iv) S & Y always together? L3 6M
- b) Find the coefficient of $x^3 y^2 z^2$ in $(2x - y + z)^9$. L3 6M

OR

- 8 a) In how many ways can the letters of the word COMPUTER be arranged? How many of them begin with C and end with R? how many of them do not begin with C but end with R? L3 6M
- b) Find the minimum number of students in a class to be sure that 4 out of L3 6M

them are born on the same month?

UNIT-V

- 9 a) Solve $a_n = a_{n-1} + (n)$ for $n \geq 1$ by using substitution method. L2 6M
 - b) Find the sequence generated by the following generating function $(2x - 3)^3$. L2 6M
- OR
- 10 a) Solve $a_n - 7a_{n-1} + 10a_{n-2} = 4^n$. L3 6M
 - b) Solve the recurrence relation $a_r = a_{r-1} + a_{r-2}$ using generating function. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

HYDRAULIC ENGINEERING

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 Derive the condition for a trapezoidal channel to be most economical L2 12M

OR

2 The discharge of water through a rectangular channel of width 8 m is $15 \text{ m}^3 / \text{sec}$. When the depth of flow of water is 1.2 m. Calculate: (i) specific energy of the flowing water (ii) critical depth and critical velocity (iii) value of minimum specific energy. L3 12M

UNIT-II

3 What are assumptions of gradually varied flow? Derive the Dynamic equation of gradually varied flow. L1 12M

OR

4 The depth of flow of water, at a certain section of a rectangular channel of 2 m wide, is 0.3m. The discharge through the channel is $1.5 \text{ m}^3 / \text{s}$. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. L3 12M

UNIT-III

5 A jet of water of diameter 75mm moving with a velocity of 30 m/s , strikes a curved fixed plate tangentially at one end at an angle of 30° to the horizontal. The jet leaves the plate at an angle of 20 degrees to the horizontal. Find the force exerted by the jet on the plate in the horizontal and vertical direction. L3 12M

OR

6 Obtain the expression for the force exerted by jet of water on a fixed vertical plate in the direction of the jet. L3 12M

UNIT-IV

7 What is centrifugal pump? Explain the parts of centrifugal pump with neat sketch. L1 12M

OR

8 A centrifugal pump is to discharge $0.118 \text{ m}^3 / \text{sec}$ at a speed of 1450r.p.m. against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. L3 12M

UNIT-V

9 a) What is a turbine and give the classification in detail? Give the various efficiencies. L1 6M

b) Explain Radial flow reaction turbine with a neat diagram. L1 6M

OR

10 A Kaplan turbine runner is to be designed to develop 9100KW. The net available head is 5.6 m, If the speed ratio = 2.09, Flow ratio = 0.68, overall efficiency = 86% & diameter of the boss is $1/3$ the diameter of the runner. Find the diameter of the runner and its speed and the specific speed of the turbine. L3 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
 B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
ENTREPRENEURSHIP DEVELOPMENT
 (EEE, MECH, ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Elucidate the characteristics of entrepreneur. L3 6M
 b) Discuss about Entrepreneurs, Enterprises and Entrepreneurship. L2 6M

OR

- 2 a) Identify the problems faced by an entrepreneur in India. L2 6M
 b) Briefly explain various types of entrepreneurs. L3 6M

UNIT-II

- 3 a) How are MSMEs helpful in contributing to Economic Development? L4 6M
 b) Briefly explain classification of MSMEs. L3 6M

OR

- 4 a) If you start a business, which form of ownership would you prefer and why? L5 6M
 b) List out the advantages and disadvantages of sole proprietorship. L3 6M

UNIT-III

- 5 a) Distinguish the concept of Invention and innovation. L3 6M
 b) Briefly explain various types of innovation. L3 6M

OR

- 6 a) Explain about E-commerce in business. L2 6M
 b) Discuss in detail about the Intellectual Property Rights (IPRs). L2 6M

UNIT-IV

- 7 a) What is meant by Motivation? Explain Maslow's Need Hierarchy Theory in detail. L4 6M
 b) What is the scope of entrepreneurship development in India? L1 6M

OR

- 8 a) Identify the different phases of EDP. L2 6M
 b) What are the Opportunities for entrepreneurship in present scenario? L1 6M

UNIT-V

- 9 a) Make a note on features of the Project. L3 6M
 b) How does Project management help the entrepreneur in entrepreneurship? L3 6M

OR

- 10 a) Explain the steps involved in the preparation of project feasibility report. L3 6M
 b) What are the criteria for selecting a particular project? What are the subject matters behind preliminary project report preparation? L5 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
MICROPROCESSORS AND MICROCONTROLLERS
(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Illustrate the microcomputer system with example. L3 6M
b) Draw the block diagram of output section of Microcomputer. Describe the role of tri-state bus driver, decoder and latch. L4 6M

OR

- 2 a) How does Microprocessor works? Explain in details L1 6M
b) List different types of microcomputers and with examples. L1 6M

UNIT-II

- 3 a) Explain the functions of a program counter, stack pointer & ALU in 8085 microprocessor. L2 6M
b) Draw the flag register of the 8085 microprocessor and explain each bit in detail. L2 6M

OR

- 4 a) Discuss conditional jump and un conditional jump instruction with an example. L2 6M
b) List out the control and status signals in 8085 microprocessor L2 6M

UNIT-III

- 5 a) Draw the internal architecture of 8051 microcontroller and explain the function of each block present in it. L2 8M
b) List the features of 8051 microcontroller. L1 4M

OR

- 6 a) Draw and explain a special function of the interrupt enable (IE) register in 8051 microcontroller. L2 6M
b) Define and draw the formats for IP and TCON register in 8051 microcontroller. L2 6M

UNIT-IV

- 7 a) Describe the different types of addressing mode supported by 8051 microcontroller with suitable examples. L2 6M
b) Explain the moving data instructions of 8051 microcontroller with an example. L2 6M

OR

- 8 a) List various arithmetic operations performed in 8051 microcontroller. L1 6M
b) Explain any three arithmetic operations Instructions of 8051 microcontroller with an example. L2 6M

UNIT-V

- 9 a) Describe and draw the keyboard configurations. L4 6M
b) Design the x-y matrix keyboard and coded key board. L6 6M

OR

- 10 a) Explain and design the 2*4 coded keyboards. L2 6M
b) Illustrate the seven-segment numeric led Display and explain the operation of seven segment. L4 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(CSM & CAD)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Define Artificial Intelligence and Elaborate about its think ability. L1 6M
b) Explain the role of AI in News, publishing and writing. L3 6M

OR

- 2 a) Explain the role of AI in Education and Finance. L2 6M
b) How AI is transformed over the years? What are the languages supported by it. L2 6M

UNIT-II

- 3 a) What are the general steps in Problem Solving? Explain in detail why it is used in Artificial Intelligence. L1 6M
b) Explain about BFS. Deduce it with an example. List the Pros and Cons in it. L2 6M

OR

- 4 a) Write a short note on Problem Reduction "AND-OR" graphs with an example. L1 6M
b) Prepare a Graph tree for Minimax Search Procedure and explain it in detail with an example. L3 6M

UNIT-III

- 5 a) What is Mathematical Deduction? How it helps to solve Logic Problems. L1 6M
b) How effectively Propositional Calculus is used in AI? Explain. L2 6M

OR

- 6 a) What are the Uses of predicate logic? Make use of it and analyze the how it can create Resolution for it. L1 6M
b) What is set-of-support strategy and how predicate logic complements by making use of it. L1 6M

UNIT-IV

- 7 a) How representations and Mappings in KR is done? Explain. L1 6M
b) How non binary predicates are represented using semantic net. Explain with suitable example. L1 6M

OR

- 8 a) Justify the statement- "Set theory provides a good basis for understanding Frame Systems". L4 6M
b) List the set of primitives and conceptual tenses used in Conceptual Dependency. L4 6M

UNIT-V

- 9 a) Distinguish between forward chaining and backward chaining L3 6M
b) Why Expert System is required? What is the Technology used in it L2 6M

OR

- 10 a) What is Rule-based Systems? How Forward Chaining and Backward Chaining is used in Rule-based System L1 6M
b) Distinguish Model-based Expert system Vs Case based expert system L4 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August 2023

SENSORS AND INTERNET OF THINGS

(CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is Sensor? Distinguish any two Various types of sensors. L4 6M
b) List and define any three sensors with diagrams. L2 6M

OR

- 2 a) Classify Ultrasonic Sensor, Smoke, Gas and Alcohol Sensor L4 6M
b) Categorize Touch Sensor, Color Sensor, and Humidity Sensor with examples L4 6M

UNIT-II

- 3 a) Design and explain Connecting LEDs with Arduino. L6 6M
b) Develop the process to Connecting LCD with Arduino. L6 6M

OR

- 4 a) Illustrate the Controlling GPIO Outputs Using a Web Interface. L2 6M
b) Examine the Programming APIs / Packages. L3 6M

UNIT-III

- 5 List and explain the Open Source Platforms L1 12M

OR

- 6 Why it is necessary to Understanding Processing Code Structure explain clearly. L4 12M

UNIT-IV

- 7 Develop the process of Preparing the development environment. L3 12M

OR

- 8 a) Discuss about compiling in arduino. L2 6M
b) Simplify the process of uploading to the microcontroller. L4 6M

UNIT-V

- 9 Describe the levels of IoT with an example each with the help of neat diagrams. L2 12M

OR

- 10 a) Discriminate Industry applications in IOT. L5 6M
b) Justify Lifestyle related applications in IOT. L5 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

ENGINEERING GEOLOGY

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Define geology and explain different branches of geology? L1 6M
b) What is weathering? Enumerate the various types of rock weathering? L2 6M

OR

- 2 a) Discuss the scope of application of geological knowledge in the planning work. L2 6M
b) Describe the role of geological agents in weathering of rocks. L2 6M

UNIT-II

- 3 a) Define mineral and explain the various physical properties of minerals? L1 6M
b) Differentiate between Muscovite Mica and Biotite Mica. L4 6M

OR

- 4 a) Describe the physical properties of following minerals L1 6M
(i) Bauxite (ii) Calcite
b) Describe any two important rock forming minerals from the civil engineering point of view. L3 6M

UNIT-III

- 5 a) Define the term "rock" and describe the classification of rocks? L2 6M
b) What are extrusive and intrusive igneous rocks? Describe their salient features? L3 6M

OR

- 6 a) What is metamorphism? Discuss the various agents of metamorphism? L1 6M
b) In what way the granite, limestone and marble are used on the basis of their civil engineering applications? L3 6M

UNIT-IV

- 7 a) Classify and describe the different types of faults and summarize the effects of faulting on various engineering projects? L4 6M
b) What is a fold? Describe the different parts of fold with the help of well labeled neat sketch. L4 6M

OR

- 8 a) What are geophysical methods that help in knowing about subsurface features during civil engineering investigations? L2 6M
b) Discuss in detail about the electrical method of investigations for ground water exploration. L2 6M

UNIT-V

- 9 a) What are landslides? And explain the causes and effects of landslides. L3 6M
b) Explain the geological factors influencing water tightness and life of reservoirs. L2 6M

OR

- 10 a) Explain the relationship between valley topography and types of dams. L3 6M
b) Describe the geological consideration for successful tunneling. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
ELECTRICAL POWER TRANSMISSION SYSTEM

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is the necessity of transposition in transmission lines? L1 6M
- b) Find the expression for the inductance of single-phase two-wire transmission lines. L3 6M
- 2 a) Determine the loop inductance per phase/ km of a single-phase, conductors are arranged 2m apart. The conductor diameter is 1.2cm. L2 6M
- b) Explain the different types of conductors briefly. L2 6M

UNIT-II

- 3 a) An overhead 3-phase transmission line delivers 400 KW at 11KV at 0.8 pf lagging. The resistance and reactance conductors are 1.5Ω and 4Ω per phase respectively. Determine (i) The sending end voltage and power factor (ii) percentage regulation (iii) Transmission efficiency. L2 6M
- b) Explain the transmission efficiency and % regulation in the transmission line. L3 6M

OR

- 4 a) Evaluate the generalized circuit constants for (i) Short transmission line (ii) Medium line nominal T method (iii) Medium line nominal Π method. L4 6M
- b) Explain the Ferranti effect in transmission lines. L2 6M

UNIT-III

- 5 a) A three-phase overhead line is suspended by a suspension type insulator, which consists of three units. The potential across the top unit and middle unit are 12kV and 18kV respectively. Calculate: (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) Line voltage and (iii) string efficiency. L4 6M
- b) What do you understand by static shielding of insulators? L3 6M

OR

- 6 a) Write a short note on capacitance grading. L3 6M
- b) A certain 3-phase equilateral transmission line has a total corona loss of 53KW, 106kV, and a loss of 98KW at 110.9kV what is disruptive critical voltage? What is corona's loss at 113kV? L2 6M

UNIT-IV

- 7 a) Write a short note on the effect of wind and ice loading on the calculation of sag. L3 6M
- b) A transmission line has a span of 150m between level supports. The conductor has a cross-sectional area of 2 cm² the tension in the conductor is 2000kg. If the specific gravity of the conductor material is 9.9 gm/cm³ and wind pressure is 1.5kg/m in length. Calculate the sag what is vertical? L4 6M

OR

- 8 a) Explain about sag template. L2 6M
- b) A transmission line has a span of 200 meters between level supports. The conductor has a cross-sectional area of 1.29 cm², weighs 1170kg/km, and has breaking stress of 4218 kg/cm². Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square meter of a projected area. What is the vertical sag? L1 6M

UNIT-V

- 9 a) Derive the expression for insulation resistance of a cable. L3 6M
- b) Obtain the expression for the capacitance of a single core cable. L3 6M
- 10 a) List the advantages and disadvantages of underground cables L3 6M
- b) Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66kV system. The cable is 1 km long having a core diameter of 10 cm and an impregnated paper insulation of thickness of 7 cm. the relative permittivity of insulation may be taken as 4 and the supply at 50Hz. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
THEORY OF MACHINES
(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the effect of Gyroscopic couple on a Naval ship during pitching. L1 6M
 b) The turbine rotor of a ship has a mass of 8 tonnes and a radius of gyration 0.6 m. It rotates at 1800 r.p.m. clockwise, when looking from the stern. Determine the gyroscopic couple, if the ship travels at 100 km/hr and steer to the left in a curve of 75 m radius. L3 6M

OR

- 2 The turning moment diagram for a petrol engine is drawn to the following scales : Turning moment, 1 mm = 5 N-m ; crank angle, 1 mm = 1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm². The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m. L2 12M

UNIT-II

- 3 a) A multi-disc clutch has three discs on the driving shaft and two on the driven shaft. The outside diameter of the contact surfaces is 240 mm and inside diameter 120 mm. Assuming uniform wear and coefficient of friction as 0.3, find the maximum axial intensity of pressure between the discs for transmitting 25 kW at 1575 r.p.m. L2 6M
 b) Distinguish between a brake and a dynamometer. L2 6M

OR

- 4 A centrifugal clutch is to transmit 15 kW at 900 r.p.m. The shoes are four in number. The speed at which the engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150 mm and the center of gravity of the shoe lies at 120 mm from the center of the spider. The shoes are lined with Ferrodo for which the coefficient of friction may be taken as 0.25. Determine 1. Mass of the shoes, and 2. Size of the shoes, if angle subtended by the shoes at the center of the spider is 60° and the pressure exerted on the shoes is 0.1 N/mm². L2 12M

UNIT-III

- 5 A Porter governor has all four arms 250 mm long. The upper arms are attached on the axis of rotation and the lower arms are attached to the sleeve at a distance of 30 mm from the axis. The mass of each ball is 5 kg and the sleeve has a mass of 50 kg. The extreme radii of rotation are 150 mm and 200 mm. Determine the range of speed of the governor. L2 12M

OR

- 6 A Hartnell governor having a central sleeve spring and two right-angled bell crank levers moves between 290 r.p.m. and 310 r.p.m. for a sleeve lift of 15 mm. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. The levers are pivoted at 120 mm from the governor axis and mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed. Determine : 1. loads on the spring at the lowest and the highest equilibrium speeds, and 2. stiffness of the spring. L2 12M

UNIT-IV

- 7 A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions. L2 12M

OR

- 8 A single cylinder reciprocating engine has speed 240 r.p.m., stroke 300 mm, mass of reciprocating parts 50 kg, mass of revolving parts at 150 mm radius 37 kg. If two third of the reciprocating parts and all the revolving parts are to be balanced, find : 1. The balance mass required at a radius of 400 mm, and 2. The residual unbalanced force when the crank has rotated 60° from top dead centre. L5 12M

UNIT-V

- 9 Derive an expression for the natural frequency of the free longitudinal vibration by (i) Equilibrium method (ii) Energy method (iii) Rayleigh's method L4 12M

OR

- 10 Calculate the whirling speed of a shaft 20 mm diameter and 0.6 m long carrying a mass of 1 kg at its mid-point. The density of the shaft material is 40 Mg/m³, and Young's modulus is 200 GN/m². Assume the shaft to be freely supported. L4 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

ELECTRONIC CIRCUIT ANALYSIS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|--|----|----|
| 1 | a) List the applications of Cascode amplifier. | L1 | 6M |
| | b) Define Coupling and explain various types of coupling mechanisms used in multistage amplifiers. | L2 | 6M |

OR

- | | | | |
|---|---|----|-----|
| 2 | Deduce the expression for Current gain with resistive load and discuss the variation of frequency response with RL. | L4 | 12M |
|---|---|----|-----|

UNIT-II

- | | | | |
|---|--|----|----|
| 3 | a) List the characteristics of negative feedback amplifiers. | L1 | 6M |
| | b) Explain the effect of negative feedback on input resistance for Current shunt and Voltage shunt Feedback amplifier. | L2 | 6M |

OR

- | | | | |
|---|--|----|----|
| 4 | a) Explain in detail about the basic Amplifiers used in Feedback amplifiers. | L2 | 6M |
| | b) Explain Feedback amplifier topologies with necessary diagrams. | L2 | 6M |

UNIT-III

- | | | | |
|---|---|----|----|
| 5 | a) Explain the working principle of Wein-bridge oscillator using BJT and deduce the expression for frequency of oscillations. | L4 | 8M |
| | b) In a Wein-bridge oscillator, if the value of R is 100 K Ω , and frequency of oscillation is 10 KHz, Calculate the value of capacitor C. | L3 | 4M |

OR

- | | | | |
|---|---|----|----|
| 6 | a) Explain the working of a Crystal oscillator and sketch its characteristics | L3 | 8M |
| | b) In Colpitts oscillator, C1 = 0.2 μ F and C2 = 0.02 μ F. If the frequency of oscillation is 10kHz, Calculate the value of inductor. | L3 | 4M |

UNIT-IV

- | | | | |
|---|---|----|----|
| 7 | a) Classify the Large Signal Power Amplifier based on biasing condition. | L4 | 6M |
| | b) With neat diagram, explain Series fed directly coupled Class A Power Amplifier and determine its maximum efficiency. | L2 | 6M |

OR

- | | | | |
|---|---|----|----|
| 8 | a) Discuss about Transformer coupled Class A Power Amplifier with diagram and determine its Maximum efficiency. | L3 | 6M |
| | b) Discuss the stability considerations of a tuned amplifier. | L2 | 6M |

UNIT-V

- | | | | |
|---|---|----|----|
| 9 | a) With a neat circuit diagram explain the working of a collector coupled Astable multivibrator and draw the necessary waveforms. | L2 | 8M |
| | b) List the applications of Monostable multivibrator. | L1 | 4M |

OR

- | | | | |
|----|---|----|----|
| 10 | a) What is a Monostable multivibrator? Explain its working with the help of a neat circuit diagram and waveforms. | L2 | 6M |
| | b) Derive the expression for pulse width (T) of a collector coupled Monostable multivibrator. | L3 | 6M |

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

PYTHON PROGRAMMING

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is Dictionary? Explain the Methods available in Dictionary L1 6M
b) Discuss the basic Tuple Operations with examples. L2 6M

OR

- 2 Describe the List and its Methods with example. L1 12M

UNIT-II

- 3 a) List and explain different Arithmetic, Comparison and Assignment Operators supported by Python. L1 6M
b) Discuss the term: Range Write a for loop that prints numbers from 0 to 20, using range function. L2 6M

OR

- 4 a) i) Explain the Logical operators with example. L2 6M
ii) Write a python program to find whether a given number is Even or Odd.
b) Analyze the Python jump statements with suitable examples. L6 6M

UNIT-III

- 5 a) Define function and explain the types of functions with an example. L1 6M
b) Create Recursive function to find factorial of a number. L6 6M

OR

- 6 a) Illustrate lambda function with example. L3 6M
b) Demonstrate implementation of hierarchical inheritance in Python, with a program. L2 6M

UNIT-IV

- 7 a) Describe the types of namespaces in Python? L2 6M
b) Explain the from import statement in modules. L5 6M

OR

- 8 a) What is package in Python? Explain the use of packages in your program with an example code. L3 6M
b) Classify Errors and Exception Handling in Python programming. L4 6M

UNIT-V

- 9 a) Illustrate Python Runtime Services and Data Compression. L3 6M
b) Write a Python program to demonstrate the file I/O Write a Python program to demonstrate the file I/O. L4 6M

OR

- 10 a) Create a Python Program to display the current date and time. L6 6M
b) Describe the Filters in python. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
C PROGRAMMING AND DATA STRUCTURES

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Write the precedence and associativity chart of the all the operators in C language. L1 6M
b) Write a C program to check whether the given number is prime number or not without using looping statements. [HINT: use goto statement]. L3 6M

OR

- 2 a) i) Evaluate the expression: L3 3M
 $A + B \wedge C++ \&\& --D$ where $A=10, B=12, C=4, D=3$
ii) Briefly discuss about data types in C. L2 3M
b) Clearly discuss and compare else-if-ladder, nested and switch statements. L2 6M

UNIT-II

- 3 a) Discuss clearly about the storage classes with illustrations. L3 6M
b) Write a C program to check whether the given word contains vowels or not, if yes print the count of vowels. L3 6M

OR

- 4 a) Discuss clearly about multi-dimensional arrays with an example. L3 6M
b) Discuss about any four preprocessing commands with examples. L3 6M

UNIT-III

- 5 a) Explain the different dynamic memory allocation functions in C with examples. L2 6M
b) Compare arrays, strings, pointers L2 6M

OR

- 6 a) Explain the following with example: a) Pointer to structure. b) Pointer to function. L2 6M
b) Define structure and union and explain how to declare, use and initialize them in Programming with examples. L2 6M

UNIT-IV

- 7 a) What is the principle of stack. Write a C program to implement a stack using arrays. L3 6M
b) Compare linked list and arrays. L4 6M

OR

- 8 a) What is the principle of queue. Write a C program to implement a queue using arrays. L3 6M
b) To convert an expression from infix notation to postfix notation which data structure can be used and explain the step by step process with example. L3 6M

UNIT-V

- 9 a) Write a C program to perform insertion sort. L2 6M
b) Write the step-by-step process to sort the following elements using quick sort. 4, 56, 78, 2, 11, 29, 77, 56. L3 6M

OR

- 10 a) Write a C program to perform quick sort. L2 6M
b) Write an algorithm to perform binary search.. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is mean by OOP? Illustrate the concepts of OOP? L3 6M
b) Show what is varargs in java? Write the syntax and develop a program showing the varargs usage. L2 6M

OR

- 2 a) Define iteration statements. L4 2M
b) Explain about the Iteration statements. L2 10M

UNIT-II

- 3 a) Show the application of final keyword with variable, method and class in detail with an example. L1 9M
b) Give the difference between final and finalize. L2 3M

OR

- 4 a) Recall what is package? Explain how to create user defined package in java with example program. L2 6M
b) Write a java program to find the factorial value of the given number using user defined package concept. L6 6M

UNIT-III

- 5 a) Differentiate between checked and unchecked exceptions? L4 6M
b) Illustrate about try, catch, and throw statements using a java program. L3 6M

OR

- 6 a) Describe how to set the priority to threads? what are the different ranges. L1 6M
b) Write a java program to create two threads and execute simultaneously. L6 6M

UNIT-IV

- 7 a) Discuss in detail on collection interfaces and their methods. L2 6M
b) List and describe about collection class in java. L2 6M

OR

- 8 a) Develop a java Program to read from a file using file reader class? L6 8M
b) Explain file operations in java? L2 4M

UNIT-V

- 9 Illustrate the steps for creating simple login page using java swing with an example program. L3 12M

OR

- 10 a) Interpret the usage of Date and Time API with an example program L3 8M
b) Discuss in detail the operations on Streams. L2 4M

SIDDARATHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
GEOTECHNICAL ENGINEERING

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Describe the Indian Standard soil classification system. L1 6M
b) The dry unit weights of sand in the loosest and densest states are respectively 13.34 kN/m³ and 21.40 kN/m³. Assuming the specific gravity of the solids is 2.67, determine the relative density of sand with porosity of 30%. L3 6M
- 2 a) Write down the procedure for determination of permeability by constant head test in the laboratory. L2 6M
b) The falling head permeability test was conducted on a soil sample of 4cm diameter and 18 cm length. The head fell from 1.0 m to 0.40 m in 20 minutes. If the cross-sectional area of the stand pipe was 1 cm², determine the coefficient of permeability. L3 6M

UNIT-II

- 3 a) Differentiate between Standard proctor test and Modified proctor test L2 6M
b) An earth embankment is compacted at a water content 18% to a bulk density of 19.2 kN/m³. If the specific gravity of the sand is 2.7 find the void ratio and the degree of saturation of compacted embankment. L2 6M

OR

- 4 a) State the assumptions made in Terzaghi's theory of one-dimensional Consolidation. L1 6M
b) A 15 m thick hydraulically isotropic clay stratum overlies an impervious stratum. If the coefficient of consolidation is 5×10^{-4} cm²/s, find the time required for 50% and 90% consolidation ($T_v = 0.20$ and 0.85, respectively). L4 6M

UNIT-III

- 5 a) What do you understand by 'Pressure bulb'? Illustrate with sketches. L2 6M
b) A water tank is supported by a ring foundation having outer diameter of 10 m and inner diameter of 7.5 m. The ring foundation transmits uniform load intensity of 160 kN/m². Compute the vertical stress induced at depth of 4 m, below the centre of ring foundation. L3 6M

OR

- 6 a) Explain the principle of the direct shear test. L2 6M
b) The results for triaxial tests conducted on three samples of a soil are given below. Obtain the shear strength parameters of the soil. L3 6M

Cell pressure (kN/m ²)	100	200	450
Deviator stress (kN/m ²)	375	575	973

UNIT-IV

- 7 a) What are the factors causes the slope failures? L1 6M
b) Explain factor of safety with respect to shear strength, cohesion and friction? L2 6M

OR

- 8 a) Explain Taylor's stability number? L2 6M
b) Explain different types of slope failures with neat sketches. L1 6M
- 9 a) What are the different stages in sub soil exploration? L1 6M
b) Explain various uses of site investigations. L2 6M
- 10 a) Discuss the various open excavation methods for conducting soil exploration. L2 6M
b) List the various design features affecting the sample disturbance. L1 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
 B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
POWER ELECTRONICS
 (EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 Draw and explain V-I characteristics of SCR and Its working. L2 12M

OR

2 Explain the Resistance Capacitance firing circuit with the necessary waveforms. L2 12M

UNIT-II

3 Explain the operation of single-phase Full wave converter with R-Load at $\alpha=45$ with necessary wave forms. Also derive the output voltage, output current and RMS output voltages. L2 12M

OR

- 4 a) List the different applications of phase controlled converters. L4 6M
 b) What is the difference between half controlled converter and fully controlled converter. L4 6M

UNIT-III

- 5 a) What is a DC chopper? L1 3M
 b) Describe various types of chopper configurations. With appropriate diagram wherever necessary. L2 9M

OR

- 6 The buck converter has an input voltage of $E_{dc}=12V$. the required average output voltage is $E_0=5V$ at $R=500\Omega$ and the peak-to-peak output voltage is $20mV$, the switching frequency is $2kHz$. if the peak-to-peak ripple current of inductor is limited to $0.8A$, determine
 (a) the duty cycle. (b) the filter inductance L .
 (c) the filter capacitor C . (d) the critical values of L and C .

UNIT-IV

7 Explain the principle of operation of single phase to single phase step-up midpoint cycloconverter with RL Load $\alpha=90$ for Discontinuous conduction mode. L2 12M

OR

8 Draw and explain bridge type step-up cycloconverter with R-L Load for continuous conduction mode. L4 12M

UNIT-V

- 9 A single phase voltage controller is employed for controlling the power flow from $230V$, $50Hz$ source into a load circuit consisting of $R=3\Omega$ and $L=4\Omega$. Calculate
 (i) the range of firing angle.
 (ii) the maximum value of rms load current
 (iii) the maximum power and power factor.
 (iv) The maximum values of average and rms thyristor currents. L3 12M

OR

- 10 a) What are the applications of AC voltage controller? L1 6M
 b) What are the advantages and disadvantages of AC voltage controller? L1 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023

MATERIALS SCIENCE

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Describe with a neat sketch of FCC crystal structure and calculate its packing factor, coordinate number. L2 12M

OR

- 2 a) Compare the differences between crystalline and non-crystalline materials, defining both of them. L2 6M
b) Evaluate metallic bond and list out characteristics compound. L5 6M

UNIT-II

- 3 a) Draw a typical equilibrium diagram for a eutectic type of system with limited solid solubility and explain its important features. L2 6M
b) Draw an equilibrium diagram for an isomorphism system. L2 6M

OR

- 4 Explain the eutectoid and eutectic reactions in Cu-Ni & Al-Cu binary phase diagram? L2 12M

UNIT-III

- 5 a) Discuss effects of alloying elements on the properties of steel. L2 6M
b) Explain the structure and properties of Wrought iron cast iron? L2 6M

OR

- 6 a) Explain the structure and properties of Aluminium and its alloys? L2 6M
b) Draw and explain the copper-zinc equilibrium diagram L1 6M

UNIT-IV

- 7 With the help of temperature- time- transformation (TTT) diagram of eutectoid steel, brief on the microstructure and properties of the following heat treatment process. Annealing, normalizing, quench. L3 12M

OR

- 8 a) Discuss the mechanism of ductile fracture with neat sketch. L2 6M
b) Explain about various Hardening process use for alloys L2 6M

UNIT-V

- 9 a) Explain the open mold processes for production of Fiber reinforced plastics. L2 6M
b) Distinguish between Thermoplastics and Thermosetting plastics and list out its applications. L2 6M

OR

- 10 a) Classify composite material and explain them briefly. L2 6M
b) Discuss the applications, advantages and limitations of Metal Matrix composites. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
DIGITAL COMMUNICATIONS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Draw the block diagram of digital communication system and Explain each block. L2 6M
 b) With a neat block diagram explain PCM transmitter and receiver. L2 6M
- OR**
- 2 a) Discuss the Noise considerations in PCM systems. L2 6M
 b) what are the advantages & disadvantages of PCM? L1 6M

UNIT-II

- 3 a) Derive the expression for impulse response of a matched filter. L3 6M
 b) What are the remedies to reduce ISI? L1 6M
- OR**
- 4 A polar NRZ waveform has to be received into the help of a matched filter. L3 12M
 Here binary '1' is represented as a rectangular positive pulse. Also, binary '0' is represented by a rectangular negative pulse. Determine the impulse response of the matched filter. Also sketch it.

UNIT-III

- 5 a) Explain the Schwarz Inequality. L2 6M
 b) Explain the concept of orthogonality basis function. L2 6M
- OR**
- 6 a) Explain the concept of AWGN channel. L2 6M
 b) With a neat sketch explain the working of correlation receiver. L2 6M

UNIT-IV

- 7 a) Draw the block diagram of ASK transmitter and receiver and explain the operation. L1 6M
 b) What is Bandwidth of BPSK, BFSK? L1 6M
- OR**
- 8 a) Derive an expression for probability of error of coherent binary ASKS. L3 6M
 b) A binary data stream 101101100 is to be transmitted using DPSK. L4 6M
 Determine the encoded and decoded output.

UNIT-V

- 9 a) What are the types of parity check codes explain with neat diagrams? L1 6M
 b) Explain the concept of Parity check matrix for linear block codes. L2 6M
- OR**
- 10 a) Explain the concept of Parity check matrix for linear block codes. L2 6M
 b) Compare FEC and ARQ System. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
 B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
COMPUTER NETWORKS
 (CSE, CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 Explain in detail about OSI reference mode. L2 12M

OR

- 2 a) Discuss about responsibilities of physical layer in detail. L2 6M
 b) Classify performance of the networks. L4 6M

UNIT-II

- 3 a) What is framing? Explain with frame architecture. L2 6M
 b) Explain Cyclic Redundancy check method used for error detection. L2 6M

OR

4 Write about Point to Point (PPP) protocol in detail. L4 12M

UNIT-III

5 Explain about Static Routing algorithms. L2 12M

OR

- 6 a) Discuss about Multicast routing algorithm. L2 6M
 b) Sketch and explain in detail about IPV6 protocol. L3 6M

UNIT-IV

- 7 a) List and define the elements of transport layer. L1 6M
 b) Write in detail about Remote Procedure Call. L4 6M

OR

- 8 a) Explain the three way handshake protocols with suitable diagram. L2 6M
 b) Describe about TCP connection Establishment. L2 6M

UNIT-V

- 9 a) Write short notes on application layer. L4 6M
 b) Explain about dynamic webpages. L2 6M

OR

- 10 a) Summarize in detail about cookies. L6 6M
 b) Describe SMTP protocol. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year II Semester Regular & Supplementary Examinations August-2023
STRUCTURAL ANALYSIS
(CE)

Time: 3 Hours

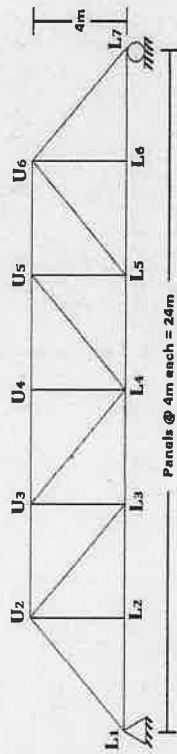
Max. Marks: 60
Answer one question from each unit (5 x 12 = 60 Marks)

- 1 Two point loads of 100kN and 200kN spaced 3m apart cross a girder of 15m from left to right with the 100kN leading first. Draw the influence line for shear force and bending moment and find the value of maximum shear force and bending moment at a section D, 6m from the left hand support. Also, find the absolute maximum bending moment due to the given load system. L3 12M

UNIT-I

OR

- 2 Draw the influence line diagrams for the forces in top chord, bottom chord & vertical members of the through type truss bridge as shown in the figure. L3 12M

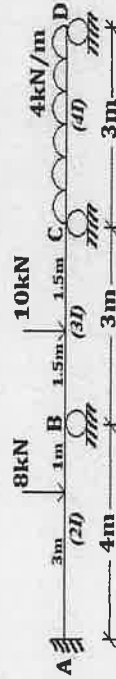


UNIT-II

- 3 State and derive Castigliano's first theorem L2 12M
- OR
- 4 A simply supported beam of span 6m is subjected to a concentrated load of 45kN at 2m from the left support. Calculate the deflection under the load point. Take $E = 200 \times 10^6 \text{ KN/m}^2$ and $I = 14.0 \times 10^{-6} \text{ m}^4$ using method of virtual work. L3 12M

UNIT-III

- 5 Determine the support moments for the continuous beam as shown in the figure and draw the bending moment diagram using slope deflection method. L3 12M



OR

- 6 Analyze the continuous beam using slope-deflection method if the support B sinks by 10mm. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 16 \times 10^7 \text{ mm}^4$ and sketch the bending moment diagram. L3 12M



UNIT-IV

- 7 Determine the support moments at A, B, C and D for the continuous girder shown in the figure using moment distribution method. L3 12M



OR

- 8 Analyze the portal frame shown in the figure using moment distribution method. L3 12M



UNIT-V

- 9 Analyze the fixed beam shown below using flexibility matrix method. L3 12M



OR

- 10 Analyze the fixed continuous beam shown in the figure by stiffness method and draw the bending moment diagrams. L3 12M



**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
ELECTRICAL MACHINES II

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is an ideal transformer? Also, Explain the operation of single-phase transformer on load with a phasor diagram. L4 6M
- b) Explain the term voltage regulation in a transformer. L3 6M
- OR**
- 2 In a transformer, derive the condition for maximum efficiency and thus find the load current at which the efficiency is maximum. L2 12M

UNIT-II

- 3 Draw and explain the Connection diagram of the Y- Y & Δ - Δ connected three-phase transformer. L3 12M
- OR**
- 4 Obtain the approximate equivalent circuit of a given 200/2000V, single phase 25KVA transformer having the following test results. L4 12M
OC test: 200V, 6A, 350W on LV side
SC test: 70 V, 15A, 600W on HV side

UNIT-III

- 5 a) Explain how a rotating magnetic field of constant amplitude is produced. L2 6M
- b) Explain the term slip of the induction machine L1 6M
- OR**
- 6 A three-phase induction motor is wound for 4 poles and is supplied from 50 HZ System. Calculate (i) synchronous speed (ii) speed of the motor when slip is 4% and (iii) Rotor current frequency when the motor runs at 600 RPM. L3 12M

UNIT-IV

- 7 a) Explain the procedure to draw the circle diagram L4 6M
- b) Explain the rotor rheostat speed control of 3- ϕ induction motor in detail. L3 6M
- OR**
- 8 Explain no Load and blocked rotor tests of 3- ϕ induction machine L4 12M

UNIT-V

- 9 Explain the construction and operating principle of split phase induction motor. L4 12M
- OR**
- 10 a) Explain the operating principle of 1 ϕ induction motor L3 6M
- b) Draw the equivalent circuit of a single-phase Induction motor L1 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
MANUFACTURING PROCESSES

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Define pattern. Name the different types of patterns and pattern materials. L1 6M
b) What are the properties required for good moulding sand? L3 6M

OR

- 2 a) With neat sketch explain stir casting process. L2 6M
b) With neat sketch explain the construction and working of cupola furnace. L2 6M

UNIT-II

- 3 a) Distinguish three types of welding flames and for what applications these are used? L4 6M
b) Identify the common welding troubles; causes and remedies in welding Process. L3 6M

OR

- 4 Explain the working of Electron Beam Welding with a neat sketch along its advantages and disadvantages. L2 12M

UNIT-III

- 5 a) What is open, impression die forging? Give its processes. L1 6M
b) List out the applications of hot rolling and cold rolling process. L3 6M

OR

- 6 a) What is bulk deformation process. L2 6M
b) What are the characteristics of forging processes? Write Processes Used. L2 6M

UNIT-IV

- 7 Write a short note on 1) sintering 2) compacting. L2 12M

OR

- 8 a) Explain bending operations with suitable sketches. L2 6M
b) Sketch & explain the Drawing operation L2 6M

UNIT-V

- 9 a) State how joining and machining of plastics are carried out? L3 6M
b) Explain the polymerization briefly. L2 6M

OR

- 10 Explain the working principles and application of Blow Moulding. L2 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
LINEAR AND DIGITAL IC APPLICATIONS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Draw the Op-Amp Symbol & Mention the terminals. L1 4M
 b) With neat sketch explain the operation of an Instrumentation amplifier. L3 8M
- OR**
- 2 a) Explain any two DC characteristics of Op-Amp with relevant expressions. L2 6M
 b) Discuss about AC characteristics of an Op-Amp with relevant expressions. L2 6M

UNIT-II

- 3 a) List the types of Filters. L1 2M
 b) Derive the gain of a 1st order high pass Butterworth filter. L3 10M
- OR**
- 4 a) Define Oscillator. List the types of oscillators. L1 6M
 b) Derive the frequency of RC phase shift oscillator using Op-Amp. L3 6M

UNIT-III

- 5 a) Draw the pin diagram of 555 timer. L2 2M
 b) With the help of schematic diagram explain how 555 timer can be used as Monostable multivibrator. L4 10M
- OR**
- 6 a) Draw the circuit diagram of basic CMOS NOT gate and explain its operation. L2 6M
 b) Draw the circuit diagram of basic CMOS NAND gate and explain its operation. L2 6M

UNIT-IV

- 7 a) Explain the HDL Digital design flow. L2 6M
 Write a VHDL entity and Architecture for the following function. $F(x) = (a + b)(c+d)$ L4 6M
 b) Also draw the relevant logic diagram.
- OR**
- 8 Design the logic circuit and write VHDL program for the following function $(Y) = \Sigma A, B, C, D (1, 4, 5, 7, 9, 11, 12, 13, 15)$. L4 12M

UNIT-V

- 9 Draw the logic symbol of 74 x 85, 4-bit comparator and write a VHDL code for it. L1 12M
- OR**
- 10 a) Design a Full adder with Half adder's logic circuit. L3 6M
 b) Write VHDL code for the above design in structural model. L4 6M

Q.P. Code: 20CS0512

R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023
FORMAL LANGUAGES AND AUTOMATA THEORY

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

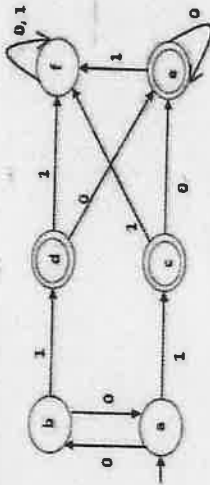
- 1 a) Analyze and explain with example Chomsky Hierarchy. L4 6M
- b) Consider the below finite automata and check whether the strings are accepted or not. L1 6M

States (Q)	0	1
→q0	q1	q3
q1	q0	q2
(q2)	q3	q1
q3	q2	q0

- (i) 0001 (ii) 1010 (iii) 1001 (iv) 0101

OR

- 2 Minimize the following automata L3 12M



UNIT-II

- 3 a) Convert the given RG to FA L3 6M
 $S \rightarrow aA/bB/a/b$
 $A \rightarrow aS/bB/b$
 $B \rightarrow aA/bS$
- b) Construct a regular grammar for the given regular expression $ab(a+b)^*$ L6 6M

OR

- 4 a) Give the Closure properties of Regular Sets L1 6M
- b) Prove that the language $L = \{a^n b^n \mid n \geq 1\}$ is not regular using pumping lemma. L3 6M

UNIT-III

- 5 a) Write the process adapted to convert the grammar into CNF? L2 6M
- b) Convert the following grammar into CNF. L3 6M
 $S \rightarrow bA/aB$
 $A \rightarrow bAA/aS/a$
 $B \rightarrow aBB/bS/a$

OR

- 6 a) Explain Left recursion and Left factoring. L2 6M
- b) Perform left factor for the grammar $A \rightarrow abB/aB/cdg/cdeB/cdfB$ L3 6M

Q.P. Code: 20CS0512

UNIT-IV

- 7 a) State the formal of PDA. L1 4M
- b) Construct a PDA which recognizes all strings that contain equal number of 0's and 1's. L5 8M

OR

- 8 Write the process adapted and convert the given PDA into an equivalent CFG. L5 12M

$$\delta(q_0, a_0, z_0) \rightarrow (q_1, z_1, z_0)$$

$$\delta(q_0, b, z_0) \rightarrow (q_1, z_2, z_0)$$

$$\delta(q_1, a, z_1) \rightarrow (q_1, z_1 z_1)$$

$$\delta(q_1, b, z_1) \rightarrow (q_1, \lambda)$$

$$\delta(q_1, b, z_2) \rightarrow (q_1, z_2 z_2)$$

$$\delta(q_1, a, z_2) \rightarrow (q_1, \lambda)$$

$$\delta(q_1, \lambda, z_2) \rightarrow (q_1, \lambda) // \text{ accepted by the empty stack.}$$

UNIT-V

- 9 a) Discriminate Universal Turing machine. L5 6M
- b) Construct a TM for regular Expression $01(00+11)(0+1)^*1$. L5 6M

OR

- 10 Construct a Turing machine which multiplies two unary numbers. L5 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech II Year II Semester Regular & Supplementary Examinations August- 2023
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is Managerial Economics? Briefly explain the role of managerial economics in business decision making. L2 6M
b) Define Elasticity of demand? Explain various measures of Elasticity of Demand? L2 6M

OR

- 2 Evaluate various methods of demand forecasting techniques. L5 12M

UNIT-II

- 3 State the Break-even point with graph. Illustrate the BEP assumptions L3 12M

OR

- 4 a) Explain the Iso-quants or Iso-Product curve with diagram. L3 6M
b) In decision making, costs need to be analyzed and understood in a wider perspective - justify L5 6M

UNIT-III

- 5 Write short notes on new economic environment and Evaluate LPG L6 12M

OR

- 6 a) Define monopoly and state its features. L1 6M
b) Illustrate the price and output determination in case of monopoly L3 6M

UNIT-IV

- 7 a) Explain the types of Capital Budgeting methods. L2 6M
b) Write short notes on Long term capital. L3 6M

OR

- 8 Write short notes on NPV and Elucidate the NPV Decision Rule and role of NPV L6 12M

UNIT-V

- 9 a) Elucidate the importance of accounting. L2 6M
b) State the concept of double entry book keeping. L1 6M

OR

- 10 a) Define accounting. Explain the concepts of accounting L2 6M
b) What are the emerging needs of accounting? L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B. Tech III Year II Semester Regular Examinations August- 2023

ENVIRONMENTAL ENGINEERING

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What are the factors to be taken in consideration for the selection of source of water? Brief it. L1 6M
b) With neat sketch, explain the infiltration gallery in detail. L2 6M

OR

- 2 The populations of 5 decades from 1960 to 2000 are given below in table. Find out the population 2010, 2020 & 2030 beyond the last known decade. by L4 12M

a) Arithmetic increase method b) Geometrical method

Year	1960	1970	1980	1990	2000
Population	25000	28000	34000	42000	47000

UNIT-II

- 3 a) What are the physical characteristics of water? L1 3M
b) Explain any three physical characteristics of water. L2 9M

OR

- 4 a) Design a rapid sand filter to treat a city of population 100000 with an average per capita demand of 160 lpcd. L4 5M
b) Compare slow sand filter with rapid sand filter. L2 7M

UNIT-III

- 5 a) Briefly explain about grid iron and radial system of water distribution system with neat sketch. L2 6M
b) Briefly explain the various methods of waste water detection? L2 6M

OR

- 6 A certain district of a city has a projected population of 80000 residing over an area of 70 hectares. Find the design discharge for the sewer line for the following data: L3 12M
(i) Rate of water supply = 200 LPCD
(ii) Average impermeability coefficient for the entire area = 0.3
(iii) Time of concentration = 50 minutes.

UNIT-IV

- 7 a) Make a note on decomposition of sewage L1 5M
b) Define BOD and mention the importance of BOD L1 7M

OR

- 8 Compare between the conventional rate trickling filter and high-rate trickling filter. L2 12M

UNIT-V

- 9 a) Why dewatering of sludge is necessary? L1 4M
b) Explain the methods of dewatering the sludge on sludge drying beds. L2 8M

OR

- 10 Explain, with the help of a flow chart, various processes involved in sludge treatment and disposal. L2 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

MICROPROCESSORS AND MICROCONTROLLERS

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Differentiate low-level language and high-level language. L1 6M
b) How computers are classified? Explain in brief. L3 6M

OR

- 2 a) Describe the memory model of a typical memory chip. L2 6M
b) Explain how memory addresses are assigned to a memory chip of size 1K(1024X8)? L2 6M

UNIT-II

- 3 a) Outline the role of the following pins in the 8085 microprocessor L1 4M
i) RESET OUT ii) ALE iii) HOLD iv) HLDA v) TRAP
b) Sketch neat the block diagram of 8085 Architecture and explain L2 8M
the function of each block.

OR

- 4 a) Explain the Data transfer instructions of the 8085 microprocessor L2 6M
with Example.
b) Discuss the data format and storage with an example L2 6M

UNIT-III

- 5 a) List out the special function registers in 8051 MC L1 6M
b) Describe the internal RAM structure in the 8051 microcontroller. L2 6M

OR

- 6 a) Compare serial communication and parallel communication. L3 6M
b) Explain the different types of interrupts in the 8051 microcontroller. L2 6M

UNIT-IV

- 7 a) Draw and explain the external addressing using mov x and mov c L2 6M
b) List out the any five instructions for immediate addressing L1 6M
modes and indirect addressing modes with suitable example.

OR

- 8 a) Write and explain an ALP program of four time rotate right and L2 6M
rotate left carry operation in 8051.
b) Develop and write an assembly program of 8051 microcontroller L3 6M
to unsigned addition and subtraction two 8-bit numbers and
store the result in a 2055&2057 memory location.

UNIT-V

- 9 a) List out types of 16 key layout and draw the diagram of the lead L4 6M
per key keyboard configuration.
b) Design and explain the large matrix keyboard. L2 6M

OR

- 10 a) Define the D/A and A/D conversions and write any five L2 6M
advantages.
b) Draw diagram and explain the D/A converter circuit. L4 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR

(AUTONOMOUS)

B.Tech III Year II Semester Regular Examinations August-2023

DESIGN OF MACHINE ELEMENTS-II

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 A bumper consisting of two helical steel springs of circular section brings to rest, a railway wagon of mass 1500 kg and moving at 1.2 m/s. While doing so, the springs are compressed by 150 mm. The mean diameter of the coils is 6 times the wire diameter. The permissible shear stress is 400 MPa. Determine:

- Maximum force on each spring.
- Wire diameter of the spring.
- Mean diameter of the coils and
- Number of active coils. Take $G = 0.84 \times 10^5 \text{ MPa}$.

OR

- 2 A compression spring made of alloy steel of coil diameter 75 mm and spring index 6.0, number of active coil 20 is subjected to a load of 1.2 kN. Calculate: (i) The maximum stress developed in the coil. (ii) The deflection produced. (iii) The spring rate.

UNIT-II

- 3 A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm^2 . The speed of the journal is 900 rpm and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s . The room temperature is 35°C . Find:

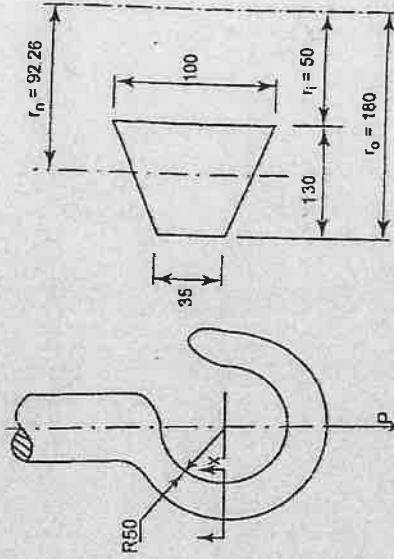
- The amount of artificial cooling required. (ii) The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C . Take specific heat of the oil as $1850 \text{ J/kg}^\circ\text{C}$.

OR

- 4 The radial load on a roller bearing varies as follows a load of 50 kN is acting 20% of time at 500 rpm and a load of 40 kN is acting 50% of the time at 600 rpm. In the remaining time the load varies from 40 kN to 10 kN linearly at 700 rpm. Select a roller bearing from NU22 series for a life of atleast 4000 hours. The operating temperature is 175°C .

UNIT-III

- Differentiate the straight and curved beams?
- A crane hook has a section, which for the purpose of analysis is considered trapezoidal as shown in fig. it is made of plain carbon steel with an yield strength of 350 MPa in tension. Determine the load capacity of the hook for a factor of safety 3.



OR

- 6 A rope drive is to transmit 250 kW from a pulley of 1.2 m diameter, running at a speed of 300 r.p.m. The angle of lap may be taken as π radians. The groove half angle is 22.5° . The ropes to be used are 50 mm in diameter. The mass of the rope is 1.3 kg per metre length and each rope has a maximum pull of 2.2 kN, the coefficient of friction between rope and pulley is 0.3. Determine the number of ropes required. If the overhang of the pulley is 0.5 m, suggest suitable size for the pulley shaft if it is made of steel with a shear stress of 40 MPa.

UNIT-IV

- 7 A compressor running at 300 rpm is driven by 15 kW, 1200 rpm motor through 20° full depth involute gears. The centre distance is 375 mm. choose the suitable materials for the pinion and gear, design the drive.

OR

- 8 A compressor running at 350 rpm is driven by 5 kW, 1400 rpm motor through 200 full depth spur gears. The motor pinion is to be of C30 forged steel hardened and tempered, and the driven gear is to be of cast iron grade 35. Assuming medium shock condition, design the gear drive completely. Take minimum number of teeth is 18 for the pinion. The gears are working for one shift per day in an industrial atmosphere and to work for two years before their replacement.

UNIT-V

- 9 A triple threaded worm has teeth of 6 mm module and pitch circle diameter of 50mm. If the worm gear has 30 teeth of $14\frac{1}{2}$ degrees and the coefficient of friction of the worm gearing is 0.05, find 1. the Lead angle of the worm, 2. Velocity ratio, 3. Centre distance, 4. Efficiency of the worm gearing.

OR

- 10 A four stroke diesel engine has the following specifications:
 Brake power = 5 kW; Speed = 1200 r.p.m; Indicated mean effective pressure = 0.35 N/mm^2 ; Mechanical efficiency = 80%.
 Determine:

- Bore and length of the cylinder;
- Thickness of the cylinder head &
- Size of studs for the cylinder head.

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August-2023

ANTENNAS AND WAVE PROPAGATION

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|--|----|----|
| 1 | a) What is Front to Back ratio of an antenna. | L1 | 4M |
| | b) A dipole having a length of 2 cm is operated at 2 GHz. The efficiency factor $K=0.6$. Calculate the radiation resistance and antenna gain. | L2 | 8M |

OR

- | | | | |
|---|--|----|----|
| 2 | a) Define and derive an expression for effective aperture of an antenna. | L2 | 8M |
| | b) Calculate radiation resistance of a dipole antenna of length $\lambda/2$ m. | L2 | 4M |

UNIT-II

- | | | | |
|---|---|----|----|
| 3 | a) Discuss the folded dipole antenna and its input impedance. | L2 | 6M |
| | b) Discuss about calculations of Yagi- Uda Array elements. | L2 | 6M |

OR

- | | | | |
|---|---|----|----|
| 4 | a) Explain the working principle of helical antenna in normal mode. | L2 | 6M |
| | b) Discuss the design considerations of pyramidal horn antenna. | L2 | 6M |

UNIT-III

- | | | | |
|---|--|----|----|
| 5 | a) Write short notes on flat sheet & corner reflector. | L1 | 6M |
| | b) Explain near and far fields with respect to antenna measurements. | L5 | 6M |

OR

- | | | | |
|---|--|----|----|
| 6 | a) Explain sources of Error in Antenna measurement. | L2 | 6M |
| | b) With a neat sketch explain the absolute method of measuring the gain of an antenna. | L5 | 6M |

UNIT-IV

- | | | | |
|---|--|----|----|
| 7 | a) Derive the expression for the far field pattern of an array of 2 - isotropic point sources of equal amplitude and opposite phase. | L3 | 6M |
| | b) Compare the Broad side array and End fire array. | L2 | 6M |

OR

- | | | | |
|---|---|----|----|
| 8 | a) By using pattern multiplication technique, Estimate the radiation pattern of $N=3$ element, $d=\lambda/2$ of binomial array Antenna? | L3 | 8M |
| | b) What is End fire array and its radiation pattern? | L2 | 4M |

UNIT-V

- | | | | |
|---|---|----|----|
| 9 | a) Explain Wave Tilt effect in ground wave propagation? | L1 | 6M |
| | b) Define and explain Skip Distance and Virtual height. | L2 | 6M |

OR

- | | | | |
|----|--|----|----|
| 10 | a) Explain critical frequency and its expression. | L2 | 6M |
| | b) Derive the relationship between MUF and critical frequency. | L2 | 6M |

ARTIFICIAL INTELLIGENCE

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Predict the foundations of Artificial Intelligence? L3 6M
b) Describe the history of artificial intelligence from the year 1943. L2 6M

OR

- 2 a) What are the various learning AI Learning methods? L1 6M
b) Explain various AI Methods to Perform Decision Making under Uncertainty L2 6M

UNIT-II

- 3 Evaluate a problem as a state space search with an example? L5 12M
OR
4 Illustrate in detail about the constraint satisfaction procedure with example? L4 12M

UNIT-III

- 5 a) Explain resolution in predicate logic with suitable example L2 6M
b) Give a detail note on a generic knowledge-based agent L2 6M
OR
6 Explain the method of performing exact inference in Bayesian networks briefly. L3 12M

UNIT-IV

- 7 a) what are the various of feedback analysis in learning L1 6M
b) Analyze the linear regression in supervised learning. L4 6M
OR
8 a) Briefly explain about Broadening the applicability of decision trees. L2 6M
b) What is Active Reinforcement Learning? L2 6M

UNIT-V

- 9 a) Discuss about Characteristics and Capabilities of Expert Systems L2 6M
b) Explain Expert Systems Limitations in detail L2 6M
OR
10 a) Explain the expert System life Cycle. L1 6M
b) Design an expert system for travel recommendation and discuss its roles L4 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023
HYDROLOGY AND WATER RESOURCES ENGINEERING
(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Draw a hydrological cycle and explain all the processes of precipitation. L1 6M
b) Explain briefly various factors affecting the evaporation. L2 6M

OR

- 2 a) What is run off? How it is affected? L2 6M
b) Define unit hydrograph and how it is used in hydrographic analysis. L2 6M

UNIT-II

- 3 a) Define the following; L1 6M
i. Aquifer ii. Aquiclude iii. Aquifuge.
b) Outline necessity and importance of irrigation. L2 6M

OR

- 4 a) Define the following parameters of an aquifer; L1 6M
i. Porosity ii. Specific Yield iii. Specific Retention.
b) Explain the relationship between duty and delta. L2 6M

UNIT-III

- 5 a) Define various irrigation indices. L1 6M
b) How irrigations requirements for a particular crop can be determined? L3 6M

OR

- 6 a) Explain the following; L2 6M
i. Types and classification of falls. ii. Roughening devices.
b) Explain design procedure of Sarada type fall. L2 6M

UNIT-IV

- 7 a) Summarize types of cross drainage works and how a suitable cross drainage work is selected for a particular situation is selected. L2 6M
b) Define the following L1 6M
i. Mass inflow curve ii. Demand curve.

OR

- 8 a) How aqueducts and Syphon aqueducts can be classified? Explain. L2 6M
b) Explain selection procedure for a reservoir site : L2 6M

UNIT-V

- 9 a) Explain the classification of dams based on different parameters. L2 6M
b) How different physical factors govern the selection of a type of dam? L2 6M

OR

- 10 a) Draw a neat sketch of practical profile of a gravity dam and explain all the forces acting on it. L2 6M
b) Explain the stability analysis of a gravity dam. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

POWER SYSTEM ANALYSIS

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|---|----|----|
| 1 | a) What are the different power system elements in the power system network? | L2 | 6M |
| | b) Derive the expression for the Direct inspection method for a 3 Bus power system network. | L3 | 6M |

OR

- | | | | |
|---|--|----|----|
| 2 | a) Derive the necessary expressions for building up of Z-bus when New element is added to Reference. | L2 | 6M |
| | b) Derive the necessary expressions for building up of Z-bus when New element is added between New bus to old bus. | L2 | 6M |

UNIT-II

- | | | | |
|---|---|----|----|
| 3 | a) Derive an expression for the fault current for the LG fault.
i) With impedance ii) Without impedance. | L3 | 6M |
| | b) Derive an expression for the fault current for the LLG fault. | L2 | 6M |

OR

- | | | | |
|---|---|----|----|
| 4 | a) Define positive, negative, and zero sequences components in 3 phase systems. | L3 | 6M |
| | b) Explain about sequential components for star connected load. | L3 | 6M |

UNIT-III

- | | | | |
|---|---|----|----|
| 5 | a) What is load flow analysis? What is the necessity for load flow studies? | L2 | 6M |
| | b) Explain the data for Load flow studies. | L1 | 6M |

OR

- | | | | |
|---|--|----|----|
| 6 | a) Write step by step algorithm for Gauss-seidel method with PV buses. | L3 | 6M |
| | b) State limitations of Gauss-Seidel method. | L1 | 6M |

UNIT-IV

- | | | | |
|---|---|----|----|
| 7 | a) Draw a Flow Chart for N-R Rectangular Coordinate Method when PV Bus is absent. | L3 | 6M |
| | b) Write the Comparison of Gauss-Seidel & Newton Rapson Method. | L4 | 6M |

OR

- | | | | |
|---|---|----|----|
| 8 | a) Explain about Fast Decoupled Load Flow Method. | L4 | 6M |
| | b) What are the Comparisons of Decoupled & Fast Decoupled Methods | L1 | 6M |

UNIT-V

- | | | | |
|---|-------------------------------------|----|----|
| 9 | a) State and derive swing equation. | L2 | 6M |
| | b) Explain about power angle curve. | L4 | 6M |

OR

- | | | | |
|----|--|----|----|
| 10 | a) What is critical clearing angle? Explain by using Swing curves. | L2 | 6M |
| | b) Derive an expression for critical clearing angle. | L2 | 6M |

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

METROLOGY AND MEASUREMENTS

(ME)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 What do you mean by fit? With a neat sketch elaborate various types of fits. L1 12M

OR

2 State the different types of limit gauges? Explain any two limit gauges. L2 12M

UNIT-II

3 List out the various linear measuring instruments. Elaborate the construction and working of Vernier caliper with neat sketches. L2 12M

OR

4 a) Explain the measurement of angle using sine bar with the help of a neat sketch. L2 6M

b) Give a brief outline on wringing process in slip gauges. L2 6M

UNIT-III

5 Briefly illustrate the following methods of quantifying surface roughness: L2 12M
(i) Ra value. (ii) RMS value. (iii) Rz value.

OR

6 Elaborate the method of measuring the gear tooth thickness by Constant Chord method. L3 12M

UNIT-IV

7 State the various types of Displacement transducers? Explain Linear Variable Differential transducer with a suitable sketch. L2 12M

OR

8 Give a brief outline on Photoelectric tachometer with neat sketch. L2 12M

UNIT-V

9 Discuss in detail about the principle used and working mechanism of thermocouple with neat sketch. L1 12M

OR

10 a) What do you mean by manometer? Give a brief outline on various types of manometers. L1 8M

b) Explain the U- tube Manometer in detail with a neat sketch. L2 4M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

EMBEDDED SYSTEMS AND IOT

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the different classifications of embedded systems. Give an example for each. L1 6M
 b) Outline the role of following in embedded system L3 6M
 i) Oscillator ii) Real Time Clock.

OR

- 2 a) Distinguish between Von-Neumann and Harvard architecture. L3 6M
 b) With a neat Sketch, explain the design process of an embedded system. L2 6M

UNIT-II

- 3 a) Illustrate the physical design with a generic block diagram of an IoT device and explain it briefly. L2 6M
 b) How the IoT technology can be implemented in Home automation such as smart lighting and intrusion detection systems? L3 6M

OR

- 4 a) With the help of neat diagrams, describe the level-1 to level-3 of IoT and deployment templates with an example. L3 6M
 b) Describe the implementation of IoT technology in Health and life style as health and fitness monitoring. L3 6M

UNIT-III

- 5 a) Sketch the structure of software defined networking for IoT & Explain it. L2 6M
 b) Illustrate a suitable program to interface Stepper motor with Arduino. L2 6M

OR

- 6 Develop a program to interface I²C with DAC programming for Arduino. L4 12M

UNIT-IV

- 7 a) Outline the characteristics of python programming language. L2 6M
 b) Compare procedure-oriented programming and object-oriented programming. L3 6M

OR

- 8 a) List out the various steps involved in IoT system design methodology. L2 6M
 b) Recall the following data types and data structures of python with an example. (i) Numbers (ii) Strings (iii) Tuples L2 6M

UNIT-V

- 9 a) With the help of neat diagram explain the basic building blocks of IoT device. L2 6M
 b) Describe the various features of a Raspberry Pi board. L2 6M

OR

- 10 a) Explain the GPIO pins of Raspberry Pi device with neat diagram. L2 6M
 b) Judge how Raspberry Pi is different from a desktop computer. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
 (AUTONOMOUS)
 B.Tech III Year II Semester Regular Examinations August-2023
DESIGN AND ANALYSIS OF ALGORITHMS
 (CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What do you mean by algorithm? List and explain some of the properties of algorithms? L1 6M
- b) Apply the Master's theorem to solve the following Recurrence relations L3 6M
 i) $T(n) = 4T(n/2) + n$ ii) $T(n) = 2T(n/2) + n \log n$

OR

- 2 a) Explain the collapsing rule for find algorithm with an example? L2 6M
- b) Determine steps of Union and Find algorithms with example. L5 6M

UNIT-II

- 3 a) Explain techniques of binary trees with suitable example? L1 6M
- b) Compare between BFS and DFS techniques? L4 6M

OR

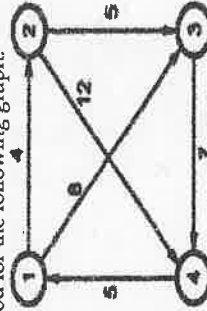
- 4 a) Explain the working strategy of Binary Search? L2 4M
- b) Analyze the working strategy of merge sort and illustrate the process of merge sort for the given data: 43, 32, 22, 78, 63, 57, 91 and 13. L4 8M

UNIT-III

- 5 a) Simplify the algorithm for Knapsack problem and analyze time complexity. L4 6M
- b) What is minimum cost spanning tree and write the algorithm of pseudo code for kruskal's algorithm L3 6M

OR

- 6 a) Explain about general method of dynamic programming. L3 4M
- b) Construct an algorithm for All pairs of shortest path and calculate shortest path between all pairs of vertices by using dynamic programming method for the following graph. L6 8M



UNIT-IV

- 7 a) Discuss about general method of backtracking L3 6M
- b) Explain the 8-queens problem using backtracking with state space tree. L2 6M

OR

- 8 a) Give brief description about the general method of branch and bound. L2 4M

- b) Find the LC branch and bound solution for the traveling sale person problem whose cost matrix is as follows: L4 8M

	1	2	3	4	5
1	∞	20	30	10	11
2	15	∞	16	4	2
3	3	5	∞	2	4
4	19	6	18	∞	3
5	16	4	7	16	∞

UNIT-V

- 9 a) Construct the non-deterministic algorithm with an example? L3 6M
- b) Determine the classes NP-hard and NP-complete problem with examples? L5 6M

OR

- 10 a) State and explain cook's theorem. L2 6M
- b) Write and explain the non-deterministic sorting algorithm? L6 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR (AUTONOMOUS)
 B. Tech III Year II Semester Regular Examinations August-2023
CONSTRUCTION PROJECT MANAGEMENT
 (CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Define construction project? What are the unique features of construction project? L1 6M
- b) What are the types of project plans? Explain briefly. L2 6M

OR

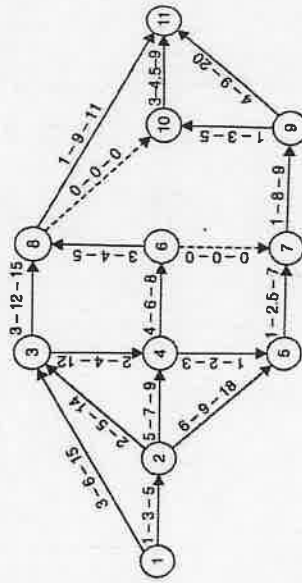
- 2 Draw a network diagram for the project having 7 activities with the L3 12M following inter relationships.

- i. C follows D but precedes F.
- ii. C follows B but precedes H.
- iii. G follows F but precedes I.
- iv. E follows A but precedes I.
- v. D follows A.
- vi. H and I terminate at the same time.
- vii. A and B starts at the same time.

UNIT-II

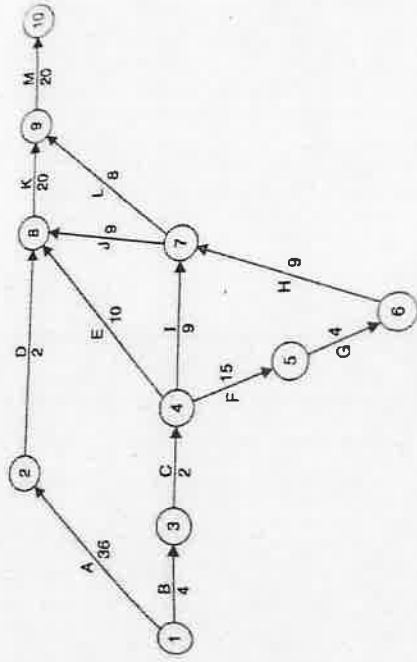
- 3 A construction company has an opportunity to submit a bid for the L3 12M construction of a new apartment building. From the specifications provided by the developer, the PERT method along with the three-time estimates (in Weeks) for each activity is shown in figure. Determine

- a) Critical path and its standard deviation.
- b) Probability of completing the work in 38 weeks
- c) Completion time duration for which the company should bid to provide 95 % probability of completing the project in time.



OR

- 4 The network for a certain project is shown in figure along with the estimated L3 12M time of completion of each activity marked. Compute the activity times, total float, free float, and independent float for each activity. Locate the critical path on the network.



UNIT-III

- 5 a) Explain about Indirect project cost and Direct project cost. L2 6M
- b) Explain slope of direct cost curve. L2 6M

OR

- 6 Differentiate between project cost and optimum duration in detail with neat sketch. L3 12M

UNIT-IV

- 7 Explain the following. L2 12M

- a) Inspection
- b) Quality control
- c) Quality assurance in projects

OR

- 8 Discuss the Material Procurement process in construction organization. L2 12M

UNIT-V

- 9 What are the safety measures to be adopted in work sites and explain L2 12M principles ofsafety?

OR

- 10 What is the cost of accidents? Explain briefly about direct and indirect L2 12M expense.

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year II Semester Regular Examinations August-2023

POWER SYSTEM OPERATION AND CONTROL

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1. Derive the expression for general transmission loss formula in Optimal operation of Thermal Power Station. L3 12M

OR

2. A system consists of two generators with the following characteristics L3 12M

$F_1 = (7P_1 + 0.03P_1^2 + 70)10^6$; $F_2 = (5P_2 + 0.05P_2^2 + 100)10^6$. Where F and P are fuel input in K-cal/hr and unit output in MW respectively. The daily load cycle is given as follows,

Time	Load
12 midnight to 6 am	50 MW
6 am to 6 pm	150 MW
6 pm to 12 midnight	50 MW

Give the economic schedule for the three periods of the day.

UNIT-II

3. a) What is the necessity of connecting two different plants on same load? L1 4M
b) Explain the hydro-thermal co-ordination and its importance. L2 8M

OR

4. A two-plant system having a steam plant near the load center and a L3 12M

hydro-plant at a remote location is shown in Fig. The load is 500 MW for 16 hr. a day and 350 MW, for 8 hr a day. The characteristics of the units are

$$C_1 = 120 + 45 P_{GT} + 0.075 P_{GT}^2 ; W_2 = 0.6 P_{GH} + 0.00283 P_{GH}^2$$

$$m^3/s \text{ Loss coefficient, } B_{22} = 0.001 MW^{-1}$$



Find the generation schedule, daily water used by the hydro-plant, and daily operating cost of the thermal plant for $\gamma_1 = 85.5 \text{ Rs. / } m^3\text{-hr}$.

UNIT-III

5. Explain turbine models for steam power plants with neat diagram. L2 12M

OR

6. Two generating stations A and B have full load capacities of 200 MW and L3 12M

75 MW respectively. The inter connector connecting the two stations has an induction motor / synchronous generator (plant C) of full load capacity 25 MW near station. A percentage changes of speed of A, B and C are 5, 4 and 3 respectively. The loads on bus bars A and B are 75 MW and 30 MW respectively. Determine the load taken by the set C and indicate the direction of power flow.

UNIT-IV

7. a) Why frequency of the power system should be kept constant? L4 6M
b) Discuss in detail the importance of load frequency control. L2 6M

OR

8. a) Derive the expression for dynamic response of isolated power system under uncontrolled case. L3 6M

b) A 500 MW generator has a speed regulation of 4%. If the frequency drops by 0.12 Hz with an unchanged reference, determine the increase in turbine power. And also find by how much the reference power setting should be changed if the turbine power remain unchanged. L3 6M

UNIT-V

9. a) Distinguish shunt and series compensations. L2 6M
b) List the specifications of load compensation. L1 6M

OR

10. A load of (15 + j10) MVA is supplied with power from a generating station from a line at 110 KV, 3 phase 50 Hz. The line is 100 km length. The line is represented by model with the parameters, $R = 26.4 \Omega$, $X = 33.9 \Omega$, $B = 219 \times 10^{-6}$, voltage at the generated in 116 KV. Determine the power supplied by the generating station. L3 12M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

NON CONVENTIONAL ENERGY RESOURCES

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Assess the need of renewable energy resources. L1 6M
b) Describe the impact of Energy Utilization on environment. L3 6M

OR

- 2 a) Define Conventional and Non-Conventional energy with examples. L2 6M
b) Outline the merits and demerits of Conventional energy sources? L4 6M

UNIT-II

- 3 a) List out the major functions of solar thermal conversion systems L2 6M
b) Classify the solar collectors and explain them. L2 6M

OR

- 4 Explain the process of generation of power in solar pond with a neat sketch and also mention its merits and demerits. L3 12M

UNIT-III

- 5 a) Discuss the importance of measuring wind speed and name its measuring instruments. L4 6M
b) List out the uses and working of wind sock in aviation industry. L2 6M

OR

- 6 Elaborate the factors to be considered in the selection of site for wind energy. L4 12M

UNIT-IV

- 7 Evaluate the need of Fluidized Bed Combustion and explain it with a neat diagram. L5 12M

OR

- 8 a) List out the characteristics of biodiesel. L3 6M
b) Explicate various steps involved in the production of Ethanol. L4 6M

UNIT-V

- 9 Explain in detail the wave energy conversion by floats. L3 12M

OR

- 10 a) List out the merits and demerits of hydrogen energy L2 6M
b) Distinguish between wave and tidal energy. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

MICROWAVE THEORY & TECHNIQUES

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What are the applications of microwave frequencies? Discuss in detail L1 6M
b) Derive the expressions for phase velocity in a rectangle waveguide L1 6M

OR

- 2 a) The dimensions of a guide are 3x2cms. The frequency is 9.5 GHz. Find the cutoff L1 6M
frequencies for TE₁₀ and TE₀₁ mode.
b) Define Wave Impedance. Express the equation for wave impedance in TE waves. L2 6M

UNIT-II

- 3 a) Derive the equation for the propagation of TE waves in rectangular waveguide. L3 6M
b) List out the types and applications of cavity resonator. L1 6M

OR

- 4 a) Explain the working of principle Circulator with a neat sketch. L2 6M
b) Deduce the S-matrix for Circulator. L4 6M

UNIT-III

- 5 a) Mention the different types of wave guide discontinuities and explain anyone L2 6M
with a neat sketch.
b) Interpret the mechanism of coupling in a waveguide. L3 6M

OR

- 6 a) Derive the S-matrix for E-Plane Tee. L2 6M
b) Mention the different types of wave guide attenuators and explain any one with a L2 6M
neat sketch.

UNIT-IV

- 7 a) Discuss in detail about the working of Reflex Klystron. with mechanism and L2 6M
modes of oscillation.
b) Derive the expression for output power for Reflex Klystron. L3 6M

OR

- 8 a) Explain the cavity magnetron for a static case in the absence of the RF field L2 6M
with a neat diagram.
b) A normal circular magnetron has the following parameters inner Radius $R_a=0.15$ L3 6M
m, Outer Radius $R_0=0.45$ m, Magnetic flux density $\beta_0 = 1.2$ m Wb/m². Determine
the Hull cut-off Voltage and the cyclotron frequency in GHz.

UNIT-V

- 9 a) With the help of a neat sketch, briefly explain the functions of different blocks of a L2 6M
microwave bench.
b) Mention the different methods used for impedance measurements and explain L2 6M
any one method with a neat diagram.

OR

- 10 a) List out the methods used for measurement of attenuation and explain any one L2 6M
method with a neat sketch.
b) With a neat block diagram, explain the measurement of Cavity Q by transmission L2 6M
method.

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

WEB TECHNOLOGIES

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is HTML? Briefly explain the tags in HTML? L1 6M
b) Illustrate XHTML and specify some new tags in XHTML? L4 6M

OR

- 2 a) Determine the features of cascading style sheets. L6 4M
b) Discuss in detail about background in CSS. L6 8M

UNIT-II

- 3 a) Discuss JavaScript arrays in detail. L5 6M
b) Explain the primitive data types in JavaScript? L6 6M

OR

- 4 a) Develop a program using onclick Event in JavaScript. L6 6M
b) Write a JavaScript code for Fibonacci series. L6 6M

UNIT-III

- 5 a) Discuss the differences between Generic Servlet and HTTPServlet. L4 6M
b) Elaborate DOM Event handling. L2 6M

OR

- 6 a) Illustrate in detail about working of Cookies with few example. L2 8M
b) Explain intrinsic event handling. L1 4M

UNIT-IV

- 7 a) Discuss Regular expressions in PHP with an example. L3 6M
b) Elaborate XML Namespaces. L6 6M

OR

- 8 a) Illustrate DOM based XML processing. L3 8M
b) What do you mean by PHP? L1 4M

UNIT-V

- 9 a) Discuss in detail about MIME? L2 6M
b) Explain in detail about UDDI? L2 6M

OR

- 10 a) Discuss the difference between XML HTTP Request and AJAX? L1 6M
b) Explain briefly about the security issues of AJAX? L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

CONCRETE TECHNOLOGY

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) What is heat of hydration in cement? And explain in detail of hydration in cement. L2 6M
 b) Define the term "Bulking of aggregates". Explain its significance with reference to concrete making. Explain the simple field test to determine the bulking of aggregates. L1 6M

OR

- 2 a) What is alkali-aggregate reaction? And how will it affect the concrete properties. L1 6M
 b) Explain setting time of cement and factors effecting setting time of cement. L2 6M

UNIT-II

- 3 a) Elucidate about Gel space ratio. L2 6M
 b) Calculate the gel /space ratio and the theoretical strength of a sample of concrete made with 600 gm of cement with 0.45 water/cement ratio, on full hydration and 70 percent hydration. L2 6M

OR

- 4 Describe the step by step procedure for compression test of hardened concrete L2 12M

UNIT-III

- 5 Give details about Creep of concrete and relation between creep and time. L2 12M

OR

- 6 a) What is shrinkage of concreté? L1 6M
 b) Explain the various factors affecting shrinkage of concrete. L2 6M

UNIT-IV

- 7 Do you think the marine environment affect the strength of concrete? If yes, explain how? L2 12M

OR

- 8 How would you improve the quality of concrete by doing surface treatment? Explain with appropriate examples. L2 12M

UNIT-V

- 9 a) Define the term "Mix Design of Concrete" and explain its significance. L1 6M
 b) Briefly discuss various methods of the mix design available in literature. L2 6M

OR

- 10 Design a M40 concrete mix using IS method of Mix Design for the following data: L3 12M
 Maximum size of aggregate - 20mm (Angular).
 Degree of workability - 0.85 compaction factor.
 Quality control - Very good
 Type of exposure - Moderate
 Specific Gravity: A. Cement - 3.15 B. Sand - 2.7
 C. Coarse aggregate - 2.65
 Water absorption: A. Coarse aggregate -1.0% B. Fine aggregate - 2.0%
 Free surface moisture: A. Coarse aggregate- Nil B. Fine aggregate-2.0%
 Sand confirms to zone III grading.
 Assume any other data required suitably.

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

POWER SEMICONDUCTOR DRIVES

(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Draw and explain the operation of 1- ϕ semi controlled converter fed by separately excited dc motor. L1 12M

OR

- 2 The speed of a 20HP, 210V, 1000rpm series dc motor is controlled by a 1- ϕ fully controlled converter. The combined field and armature circuit resistance is 0.25Ω , $K_{af}=0.03\text{N-m/A}^2$ and $K_{res}=0.075\text{ V-S/rad}$. The supply voltage is 230V. Assuming continuous and ripple free motor current, determine the following for a firing angle $\alpha=30^\circ$ and speed $N=1000\text{ rpm}$. (i) The motor torque (ii) The motor current (iii) The supply power-factor L3 12M

UNIT-II

- 3 a) Compare practical non circulating and circulating type dual converter. L4 6M
b) Compare Ideal and practical dual converter based on various aspects. L4 6M

OR

- 4 a) A 230V, 870rpm, 100A separately excited DC motor has an armature resistance of 0.02Ω . It is coupled to an over hauling with a torque of 400N-m. Determine the speed at which motor can hold the Load by regenerative braking. L3 6M
b) Explain the operation of closed loop speed control of dc drive. L2 6M

UNIT-III

- 5 Discuss the operation of motoring & regenerative braking of series excited DC motor? L2 12M

OR

- 6 Explain the operation of first quadrant chopper fed by separately excited DC motor with necessary waveforms. L2 12M

UNIT-IV

- 7 Explain the operation of static rotor resistance control with waveforms L2 12M

OR

- 8 a) Explain stator- frequency control method? L2 6M
b) A 3- ϕ , 400V, 50Hz, 6 pole star connected induction motor has the following parameters (referred to stator): $R_1=R_2=0.15\Omega$, $X_1=X_2=0.8\Omega$. Determine the initial braking torque if the motor is braked by plugging the full load the slip is 0.04. L4 6M

UNIT-V

- 9 Discuss about the operation of a cycloconverter fed synchronous motor using suitable diagram. L3 12M

OR

- 10 a) Explain the operation of self - control of synchronous motor. L2 6M
b) Discuss the operation of separate -control of synchronous motor. L3 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

AUTOMOBILE ENGINEERING

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|---|----|----|
| 1 | a) Differentiate between S I engines and CI engines | L2 | 6M |
| | b) List out the components of I.C engine and their function | L1 | 6M |

OR

- | | | | |
|---|---|----|----|
| 2 | a) Write the characteristics of good chassis and frame | L2 | 6M |
| | b) Explicate front and rear wheel drive layout in detail with relevant sketch | L2 | 6M |

UNIT-II

- | | | | |
|---|--|----|----|
| 3 | a) Elucidate the working of a turbocharger with neat sketch | L2 | 6M |
| | b) List out the advantages and disadvantages of turbocharger | L1 | 6M |

OR

- | | | | |
|---|---|----|----|
| 4 | a) State the necessity of Engine cooling system? | L1 | 6M |
| | b) Describe the working of Thermo-syphon cooling system with a neat sketch. | L2 | 6M |

UNIT-III

- | | | | |
|---|--|----|-----|
| 5 | Discuss briefly about battery coil ignition system with a suitable sketch and mention its merits and demerits. | L2 | 12M |
|---|--|----|-----|

OR

- | | | | |
|---|---|----|----|
| 6 | a) Discuss in detail about following systems used in Automobiles i) Wiper System ii) Fuel gauge (iii) Solenoid switch . | L2 | 6M |
| | b) Illustrate the working of speedometer of an automobile with a neat sketch. | L2 | 6M |

UNIT-IV

- | | | | |
|---|--|----|----|
| 7 | a) What is the purpose of a clutch? List out its requirements. | L1 | 6M |
| | b) Discuss in detail about the fluid coupling. | L2 | 6M |

OR

- | | | | |
|---|--|----|----|
| 8 | a) List out various types of Gear boxes used in Automobiles. | L1 | 6M |
| | b) Explain the working of sliding mesh gear box with a neat diagram. | L1 | 6M |

UNIT-V

- | | | | |
|---|--|----|-----|
| 9 | Discuss in detail with a neat sketch the working of an Ackermann's steering mechanism. | L2 | 12M |
|---|--|----|-----|

OR

- | | | | |
|----|--|----|----|
| 10 | a) What is Castor, Camber and King pin inclination with respect to wheel geometry? | L1 | 6M |
| | b) Explain the method of wheel balancing. | L2 | 6M |

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

FIBER OPTIC COMMUNICATIONS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the Elements of Optical Communication System with neat sketch. L2 7M
b) What is meant by optical communication system and Discuss the evolution of fiber optic communication system? L1 5M

OR

- 2 a) What is meant by dispersion in optical fiber? List the various types of dispersion. L1 6M
b) Discuss in detail the chromatic and intermodal dispersion with relevant expressions and diagrams. L2 6M

UNIT-II

- 3 a) Explain about planar LED and dome LED with neat diagrams? L2 6M
b) A planar LED is fabricated from GaAs which has a refractive index of 3.6.(i) Calculate the optical power emitted into air as a percentage of the internal optical power for the device when the transmission factor at the crystal-air interface is 0.68.(ii) When the optical power generated internally is 60% of the electric power supplied, determine the external power efficiency. L3 6M

OR

- 4 a) Explain about resonant frequencies of LASER Diode L2 6M
b) Describe about Temperature effects of Laser characteristics. L1 6M

UNIT-III

- 5 a) Illustrate about Photo detector noise and Deduce the equation for S/N ratio of an optical fiber. L2 6M
b) Compute the expression for Response time of a Photodiode. L4 6M

OR

- 6 a) What are the general applications of Optical Amplifiers. L2 6M
b) Explain in detail about any one type of front end amplifier in detail. L3 6M

UNIT-IV

- 7 a) Explain Optical Fiber System Design Specification. L2 6M
b) Explain the significance of system consideration in point-to-point fiber links. L2 6M

OR

- 8 a) Explain the optical multiplexing and de-multiplexing techniques L2 12M

UNIT-V

- 9 a) Illustrate about basic optical networks L2 5M
b) Discuss about WDM Networks and its Advantages L2 7M

OR

- 10 a) Why we need optical networks? L3 6M
b) Describe about the optical CDMA network using coded sequence pulse. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

MACHINE LEARNING

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the various types of Machine Learning techniques with neat diagrams. L2 8M
b) Describe the applications of supervised learning. L1 4M

OR

- 2 a) Establish the Association rules in unsupervised learning. L3 6M
b) Analyze the real-world applications of ML. L4 6M

UNIT-II

- 3 a) Compare Univariate and Multivariate Decision Trees. L5 6M
b) Explain about Pruning in supervised learning. L2 6M

OR

- 4 Discuss Back Propagation Algorithm in supervised learning. L2 12M

UNIT-III

- 5 a) Explain the various Clustering algorithms. L2 6M
b) List out the various applications of clustering. L1 6M

OR

- 6 a) Generalize K-Means Clustering algorithm in Unsupervised Learning. L6 6M
b) Estimate the problems associated with clustering large data. L5 6M

UNIT-IV

- 7 a) Analyze the K-Nearest Neighbor Estimator. L4 6M
b) Express the Non-Parametric classification with example. L6 6M

OR

- 8 a) Compare Multidimensionality scaling and Metric dimensionality Scaling. L5 6M
b) List out the applications of MDS. L1 6M

UNIT-V

- 9 a) Explain about the Reinforcement learning Techniques and its elements. L2 6M
b) Compare unsupervised learning and Reinforcement learning. L4 6M

OR

- 10 a) Explain the Nonparametric rewards and actions in temporal difference learning. L2 6M
b) Assess in detail about partially observables states in learning. L5 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

GENERAL MECHANICAL ENGINEERING

(CE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) List out classification of materials. L1 6M
b) Biomaterials play a vital role in human life and Justify. L4 6M

OR

- 2 List out various Mechanical Handling Equipment used in power plants and explain anyone in detail. L2 12M

UNIT-II

- 3 a) What is the Role of computers in manufacturing? L2 6M
b) Explain the components of CIM with neat block diagram. L3 6M

OR

- 4 a) Explain briefly about various Levels of Automation. L3 6M
b) Describe various functions of Advanced Automation Systems. L3 6M

UNIT-III

- 5 a) Discuss about the following (i) Degrees of freedom (ii) Joints. L2 6M
b) What is the need of Robots in Industry? L1 6M

OR

- 6 a) Explain the following machines. L2 6M
i) NC machines.
ii) CNC machines.
iii) DNC machines.
b) Write the Industrial Robotics advantages and application. L1 6M

UNIT-IV

- 7 a) Differentiate between External Combustion Engine and Internal Combustion Engine. L3 6M
b) Describe the Working Principle of 4-Stroke diesel Engine. L3 6M

OR

- 8 a) Identify some important components an automobile and also mention its functions. L2 6M
b) Judge the factors to be considered while purchasing an automobile. L2 6M

UNIT-V

- 9 a) Differentiate between Vapour Absorption system and Vapour Compression system. L3 6M
b) Elucidate the working of Split Air conditioning system with a neat sketch. L2 6M

OR

- 10 a) Define the following terms relates to Refrigeration L1 6M
(i) Refrigeration Effect (ii) COP (iii) Unit of refrigeration
b) How central Air conditioning is different from Unitary Air conditioning system. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

FUNDAMENTALS OF URBAN PLANNING

(EEE, MECH, CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Draw a neat sketch of Nandyavarta and Prastara type of town planning by mentioning the location of various places on it. L1 12M

OR

- 2 Discuss the growth of towns according to origin with the help of neat sketches. L2 12M

UNIT-II

- 3 a) What are the various advantages of zoning? L1 6M
b) What are the maps required for zoning? L1 6M

OR

- 4 a) What is a National survey? L1 4M
b) List out the data collected in national survey and explain in detail. L1 8M

UNIT-III

- 5 a) Explain the need for investment in housing and also mention its advantages. L1 8M
b) What are the various housing problems in India? L2 4M

OR

- 6 a) Write a detailed account on Low cost Housing. L1 6M
b) Explain in detail about National Housing Policy (NHP). L2 6M

UNIT-IV

- 7 What is the importance of bye-laws? Mention the grounds on which the consultation by local authority is desired. L1 12M

OR

- 8 Explain the principles of design of public buildings. L2 12M

UNIT-V

- 9 a) List the causes for road accidents. L1 6M
b) State the measures to be taken for the safety of pedestrians on roads. L1 6M

OR

- 10 a) What are the various classifications of urban roads? L1 6M
b) What are the chief uses of the traffic surveys? L1 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)**

B.Tech III Year II Semester Regular Examinations August- 2023

INTELLECTUAL PROPERTY RIGHTS

(ECE, CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- | | | | |
|---|--|----|----|
| 1 | a) What is Intellectual Property Rights (IPR)? | L1 | 3M |
| | b) What are the different types of IPR, explain who is benefitted from each type of IPR and how? | L2 | 9M |

OR

- | | | | |
|---|--|----|-----|
| 2 | Describe the functions and Role of UNO in development of WIPO? | L2 | 12M |
|---|--|----|-----|

UNIT-II

- | | | | |
|---|--|----|----|
| 3 | a) What is Trademark? Differentiate between Trademark and design registration. | L2 | 6M |
| | b) Explain the different types of trademarks with examples. | L2 | 6M |

OR

- | | | | |
|---|---|----|-----|
| 4 | Explain the reasons for protecting trademarks in the system of acquisition? | L2 | 12M |
|---|---|----|-----|

UNIT-III

- | | | | |
|---|--|----|----|
| 5 | a) Describe Copyright and the works protected under copyright act. | L2 | 6M |
| | b) Briefly explain the process of obtaining copyright. | L2 | 6M |

OR

- | | | | |
|---|---|----|-----|
| 6 | Comment on the Patent Act 1970 and its amendment. Explain in brief the Patent filing procedure. | L2 | 12M |
|---|---|----|-----|

UNIT-IV

- | | | | |
|---|---|----|-----|
| 7 | Why are trade secrets so significant and what is the negative aspect of trade secret? | L1 | 12M |
|---|---|----|-----|

OR

- | | | | |
|---|---|----|----|
| 8 | a) Explain briefly about trade secret litigation. | L2 | 6M |
| | b) What are the outputs of trademark secrets? | L1 | 6M |

UNIT-V

- | | | | |
|---|---|----|-----|
| 9 | Explain new developments in the copyright protection for following:
a) Computer programs.
b) Video games.
c) Piracy of software. | L2 | 12M |
|---|---|----|-----|

OR

- | | | | |
|----|---|----|-----|
| 10 | Discuss new developments in international patent law? How can you analyze them? | L2 | 12M |
|----|---|----|-----|