

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations September 2023

ALGEBRA AND CALCULUS

(Common to all branches)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Show that the eigen values of a matrix A and its transpose A^T are the same and hence find the eigen values and the corresponding eigen vectors of the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ L3 12M

OR

- 2 a) Find the rank of the matrix $A = \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$ L3 6M

- b) Solve the system of equations $x + y + z = 4$; $2x - y + 3z = 9$; $3x - y - z = 2$. L3 6M

UNIT-II

- 3 Using Maclaurin's series expand $\tan x$ up to the fifth term of x and hence find the series expansion of $\log(\sec x)$. L3 12M

OR

- 4 a) If $u = f(y - z, z - x, x - y)$, prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$ by using chain rule. L2 6M

- b) Find the minimum value of $x^2 + y^2 + z^2$ given that $x + y + z = 3a$. L3 6M

UNIT-III

- 5 a) Evaluate $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$. L3 6M

- b) Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dx dy$. L5 6M

OR

- 6 a) Evaluate the integral $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dx dy$ by changing the order of integration. L5 6M

- b) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dx dy dz}{\sqrt{1-x^2-y^2-z^2}}$ L3 6M

UNIT-IV

- 7 Find $\text{div} \bar{F}$ and $\text{curl} \bar{F}$ where $\bar{F} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$. L2 12M

OR

- 8 a) Find a, b, c if $\bar{F} = (x + 2y + az)\mathbf{i} + (bx - 3y - z)\mathbf{j} + (4x + cy + 2z)\mathbf{k}$ is irrotational. L3 6M

- b) Compute $\text{curl} \text{curl} \text{curl} \text{curl} \bar{F}$ if \bar{F} is a solenoidal vector. L3 6M

UNIT-V

- 9 Verify Green's theorem in plane for $\oint_C (x^2 - xy^3) dx + (y^2 - 2xy) dy$ where C is a square with vertices $(0,0), (2,0), (2,2), (0,2)$. L3 12M

OR

- 10 Verify Gauss divergence theorem for $\bar{F} = (x^3 - yz)\mathbf{i} - 2x^2 y\mathbf{j} + z\mathbf{k}$ taken over the surface of the cube bounded by the planes $x = y = z = a$ and the coordinate planes. L5 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations September - 2023

APPLIED PHYSICS
(CSE, CAD, CIA & CSM)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) State and explain the principle of superposition. L2 4M
b) Derive the conditions 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 4M
b) Explain Fraunhofer diffraction due to single slit and derive the conditions for principal maxima, secondary maxima and minima. L4 8M

UNIT-II

- 3 a) Derive an expression for electrical conductivity in a metal by using classical free electron theory. L3 6M
b) Explain merits and demerits of classical free electron theory. L2 6M

OR

- 4 a) Classify the solids into conductor, semiconductor and insulators based on band theory of solids. L2 6M
b) State and Explain Gauss's theorem for divergence. L2 6M

UNIT-III

- 5 a) Explain the different pumping mechanisms of a laser. L2 4M
b) Describe the construction and working principle of Nd:YAG Laser with the help of a neat diagram. L2 8M

OR

- 6 a) Define total internal reflection and derive the conditions for total internal reflection. L4 8M
b) An optical fiber has a core and cladding refractive index of 1.44 and 1.40. Find its Numerical Aperture and Acceptance angle. L3 4M

UNIT-IV

- 7 a) Explain about intrinsic and extrinsic semiconductors. L3 6M
b) Explain the expression for Einstein's relation. L2 6M

OR

- 8 a) Describe the Hall effect in semiconductors. L2 8M
b) Write the applications of Hall effect. L1 4M

UNIT-V

- 9 a) Define Superconductivity and write the properties of superconductors. L2 4M
b) Explain BCS theory of superconductors. 8M

OR

- 10 a) Explain Sol-Gel technique for synthesis of nanomaterial's. L2 8M
b) Explain the applications of lasers in different fields. L1 4M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September- 2023

ENGINEERING PHYSICS

(CIVIL)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) State and explain principle of superposition L1 4M
 b) Derive the condition for bright and dark rings interference in the case of thin films by reflected light. L3 8M

OR

- 2 a) Describe the formation of Newton's ring with necessary theory with relevant diagram and derive the expressions for dark and bright fringes. L2 9M
 b) In a Newton's rings experiment, the diameter of the 5th ring is 0.30 cm and the diameter of the 15th ring is 0.62 cm. Calculate the diameter of the 25th ring. L4 3M

UNIT-II

- 3 a) Derive the packing factor of SC. L2 6M
 b) Derive the packing factor of BCC. L2 6M

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 i) Reverberation ii) Reverberation time L3 4M
 iii) Loudness and iv) intensity of sound.
 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/m³. Calculate its fundamental frequency. Give the Young's modulus of crystal is 8.2×10^{10} N/m². L4 4M

OR

- 8 a) Classify different types of beams. L3 8M
 b) Define Young's modulus and bulk modulus. L3 4M

UNIT-V

- 9 a) Explain the Type-I and Type-II superconductors. L2 8M
 b) What are the applications of superconductors. L2 4M

OR

- 10 a) Explain ball milling technique for synthesis of nanomaterial? L3 8M
 b) What are the applications of nanomaterial's in different fields. L3 4M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

APPLIED CHEMISTRY

(EEE & ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Derive the Nernst equation for a single electrode potential and its applications. Define the term Electrode Potential. L3 12M

OR

- 2 a) Discuss the titration curves between Strong Acid Vs Weak Base. L3 6M
b) Write a note on Lithium-Ion rechargeable cell. L2 6M

UNIT-II

- 3 Derive Schrodinger wave equation? Explain the significance of the Ψ and Ψ^2 . L3 12M

OR

- 4 a) Explain Heisenberg Uncertainty principle. L2 6M
b) Write the postulates of molecular orbital theory. L1 6M

UNIT-III

- 5 a) Explain the Free radical addition polymerization for polymer formation. L2 6M
b) Describe the preparation, and uses of Carbon Fibers. L3 6M

OR

- 6 a) Write a note on Thermoplastic and Thermosetting resin. L2 6M
b) Write the preparation, properties and application of Buna-S rubber. L2 6M

UNIT-IV

- 7 Give an account on principle and instrumentation of IR spectroscopy. Explain stretching and bending vibrations. L2 12M

OR

- 8 a) Explain the main components of gas chromatography. L2 6M
b) Explain the distillation and fractional distillation. L2 6M

UNIT-V

- 9 Write a brief note on Fullerenes and Carbon nano tubes. L1 12M

OR

- 10 a) What is basic lock and key principle. L1 6M
b) Draw the band diagrams for conductors, semi-conductors and Insulators. L2 6M

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

ENGINEERING CHEMISTRY

(MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 Describe the estimation of hardness by EDTA method. L3 12M

OR

2 Describe the Zeolite or Permutit process for softening of water. What are the advantages and disadvantages of zeolite process? L3 12M

UNIT-II

3 What is Electrochemical cell? Explain the construction & working principle of Electrochemical cell with neat diagram. L1 12M

OR

4 What are the main factors influencing the rate of corrosion? L3 12M

UNIT-III

5 a) What are the differences between Thermoplastics and thermosetting plastics? L4 6M

b) What is functionality of monomer? L1 6M

OR

6 a) What are the fuels? Give their classification with examples L1 6M

b) Write a note on Octane value and Cetane value L1 6M

UNIT-IV

7 Define Viscosity? Determine the viscosity of lubricating oil by Redwood Viscometer. L2 12M

OR

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

UNIT-V

9 Explain about Colloids, Micelle formation and applications of Colloids? L3 12M

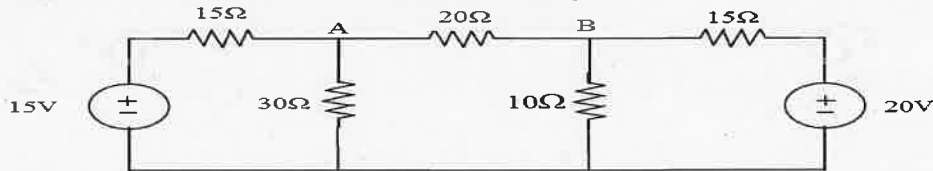
OR

10 Write an account on carbon nano tubes and fullerenes L2 12M

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

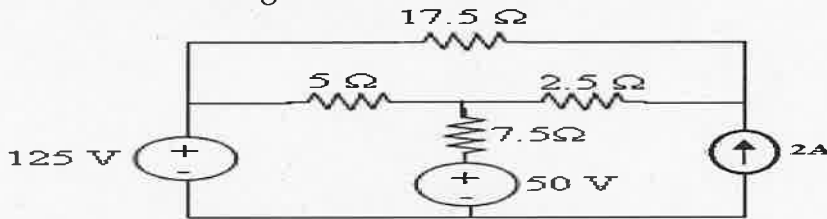
UNIT-I

- 1 a) Explain about Electrical circuit elements. L1 6M
b) Determine the current in branch A-B by using KVL. L4 6M



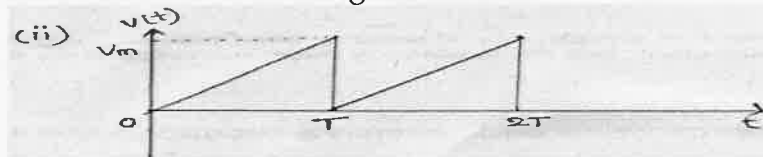
OR

- 2 a) State and explain Kirchoff's laws? L1 6M
b) Use KCL to find node voltages for the circuit shown below. L4 6M



UNIT-II

- 3 a) Derive an expression for RMS value of sine wave form. L2 6M
b) Find the rms value for the following waveform. L3 6M



OR

- 4 a) Discuss about peak value and form factor? L3 6M
b) Explain the phasor relation for R, L & C elements. L1 6M

UNIT-III

- 5 Explain about the Working principle of a DC generator. L1 12M

OR

- 6 a) 4-pole, 500V, Wave wound DC shunt motor has 720 conductors on its armature. The full-load armature current is 60A and the flux per pole is 0.03Wb armature resistance is 1.2Ω and the brush contact drop is 1V/brush. Calculate the full-load speed. L4 6M
b) Derive the EMF equation of a DC generator. L2 6M

UNIT-IV

- 7 Discuss Open Circuit and Short Circuit tests on single phase transformer. L4 12M

OR

- 8 Explain Working Principle of 3-Ø Induction Motor in detail. L2 12M

UNIT-V

- 9 Explain operating principle of Permanent Magnet Moving Coil (PMMC) instruments. L2 12M

OR

- 10 Explain the extension of range of ammeters and derive necessary formula. L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

BASIC ELECTRICAL AND MECHANICAL ENGINEERING

(CIVIL)

Time: 3 Hours

Max. Marks: 60

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

PART- A

Note: First 16 Pages for Part-A & Remaining for Part-B

UNIT-I

- 1 a) State and explain Ohm's law. L1 5M
b) Explain in detail about passive elements. L2 5M

OR

- 2 Explain about the Star-Delta and Delta-Star transformation L2 10M

UNIT-II

- 3 State and prove Reciprocity theorem with suitable example L3 10M

OR

- 4 a) Explain in detail about Impedance parameters L3 5M
b) Briefly discuss about Admittance parameters L1 5M

UNIT-III

- 5 A 220V shunt motor takes a total current of 80A and runs at 800 r.p.m. Shunt field resistance and armature resistance are 50Ω and 0.1Ω , respectively. If iron and friction losses amount to 1600W. Find (i) Copper losses (ii) Armature torque (iii) Shaft torque (iv) Efficiency. L5 10M

OR

- 6 Briefly discuss about various types of DC motors with neat sketches. L1 10M

PART- B

UNIT-IV

- 7 Sketch and explain the Centrifugal casting with advantages, limitations and applications. L3 10M

OR

- 8 Classify the welding types? Explain the working of arc welding with neat sketch and mention the advantages, limitations and applications. L2 10M

UNIT-V

- 9 Illustrate the working principle of slotting machine in detail with neat sketch. L2 10M

OR

- 10 What is CNC? Explain the working of CNC machine with block diagram. L2 10M

UNIT-VI

- 11 What is the need of automobile? Explain the four wheel automobile components with neat sketch. L2 10M

OR

- 12 Elaborate transmission system components of automobile. L2 10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

COMMUNICATIVE ENGLISH

(EEE, ECE, MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Subbaiah was crushed to death under his own rice bag. Write the moral that you have learnt from *Half a Rupee Worth* by R K Narayan. L2 6M
b) List out all the parts of speech with examples. L1 6M

OR

- 2 a) How does Positive Attitude develop one's personality? L2 6M
b) List out all the tenses and explain simple past tense with illustrations. L1 6M

UNIT-II

- 3 a) What is self-motivation and explain the motivating factors for an individual in one's life? L1 6M
b) What are the differences between self-belief and self-learning? L1 6M

OR

- 4 Discuss *The Thakur's Well* as a depiction of gender, caste and class discrimination. L2 12M

UNIT-III

- 5 a) Rewrite the following sentences. L2 8M
i) Paresh said, "I am busy now."
ii) The teacher said, "Water boils at 100."
iii) Nikhil said, "I was watching a movie."
iv) Tom said, "I will attend the program."
v) Amrithananda said, "Gnana constructed a Devi temple."
vi) Kumar said to Kapil, "Why are you crying?"
vii) Sam told to Akhil, "Take your medicines regularly."
viii) John said, "I had missed the train."
b) What is emotional intelligence? L1 4M

OR

- 6 a) How does "*I am not that Woman*" empowers women? L2 6M
b) What are the different ways one can improve the work efficiency? L1 6M

UNIT-IV

- 7 a) Write a paragraph on your daily routines. L2 6M
b) What is the importance of information transfer? L1 6M

OR

- 8 a) Write an essay on "*What is my name?*" by P. Sathyavathi. L2 6M
b) What is Time Management? Explain the quadrants in Time Management. L1 6M

UNIT-V

- 9 a) Write an essay on how The Power of Prayer enlivens transforms, and liberates an individual. L2 6M
b) Abdul Kalam's father was a strict disciplinarian. What kind of life did he lead? L1 6M

OR

- 10 a) Correct the following sentences with suitable verb forms. L1 6M
i) Shiv came late to the class, don't he?
ii) Lalitha returned back from Chennai.
iii) I am living in Tirupati since 2000.
iv) Brucelee practice martial arts every day.
v) The train left the platform before he arrived at the railway Station.
vi) We eat pizza last week.
b) Construct a dialogue between two friends on how to improve the language skills. L1 6M

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SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

C PROGRAMMING AND DATA STRUCTURE

(Common to CE, 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) List out the various operators available in C L1 3M
b) Discuss about following operators. L2 9M
i. Arithmetic Operator. ii. Logical Operator. iii. Conditional Operator.
iv. Increment/Decrement Operator. v. Assignment Operator.

OR

- 2 a) Mention the different looping statements with syntax in C. L2 4M
b) Discuss the below looping statements with example. L2 8M
i. While Loop. ii. For loop.

UNIT-II

- 3 a) Describe the array subscript in C with example. L2 5M
b) Write a C program to perform matrix multiplication. L6 7M

OR

- 4 Define String. Explain the different string handling functions with example. L4 12M

UNIT-III

- 5 a) Define pointer. Write the syntax for declaring pointer with example. L1 6M
b) Distinguish between malloc(), calloc(), realloc() and free(). L4 6M

OR

- 6 a) Define structure within a structure? Explain with an example. L1 6M
b) Illustrate the use of typedef with suitable example. L3 6M

UNIT-IV

- 7 a) Explain briefly about various types of queues with suitable examples. L2 6M
b) Differentiate between stack and queue. L4 6M

OR

- 8 a) Explain the following single linked list operations: L2 5M
a. Insertion of a node. b. Deletion of a node.
b) Explain briefly about various types of linked lists with suitable examples. L2 7M

UNIT-V

- 9 a) Compare binary search and linear search techniques. L4 6M
b) Explain binary search algorithm for finding given element is in the list or not. L2 6M

OR

- 10 Explain the algorithm for merge sort and give a suitable example. L2 12M

Time: 3 Hours

Max. Marks: 60

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

- 1 The vertex of a hyperbola is 60 mm from its focus. Draw the curve, if the eccentricity is $\frac{3}{2}$. Also draw normal and tangent at a point on the curve, 75 mm from the directrix. L3 12M

UNIT-I

- 2 a) Construct a parabola with base 120 and length of the axis 60 by using Rectangle method. L6 6M
b) Develop the involute of a circle of side diameter 50 mm. Draw a tangent and normal to the curve at a distance of 100 mm from the center of the circle. L3 6M

OR

- 3 Draw the projections of the following points, keeping the distance between the projectors as 25mm on the same reference lines. L3 12M

UNIT-II

- A - 20mm above HP and 30mm in front of VP
B - 20mm above HP and 30mm behind VP
C - 20mm below HP and 30mm behind VP
D - 20mm below HP and 30mm in front of VP
E - On HP and 30mm in front of VP
F - On VP and 20mm above HP

OR

- 4 A line AB of 100mm length is inclined at an angle of 30° to HP and 45° to VP. The point A is 15mm above HP and 20mm in front of VP. Draw the projections of the line. L2 12M

UNIT-III

- 5 A square plane ABCD of side 30mm is parallel to HP and 20mm away from it. Draw the projections of the plane, when
(i) two of its sides are parallel to VP and
(ii) one of its side is inclined at 30° to VP. L5 12M

OR

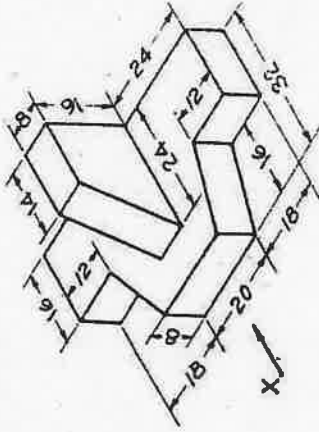
- 6 A cone of diameter 50 mm and axis 60 mm has its generator in the VP and the axis is parallel to the HP. Draw its projections. L6 12M

UNIT-IV

- 7 A pentagonal pyramid with edge of base 25 mm and axis 65 mm long, its base is resting on HP. It is cut by a section plane, inclined at 60° to HP and perpendicular to VP it bisects the axis. Draw the projections and obtain the true shape of the section. L1 12M

OR

- 8 A cone of base 50 mm diameter and height 65 mm rests with its base on HP. A section plane perpendicular to VP and inclined at 30° to HP bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone. L2 12M



OR

- 10 Draw the isometric projection of a pentagonal prism of base side 35 mm and axis 60mm. The prism rests on its base on the HP with an edge of the base parallel to the VP. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

BASIC ELECTRONICS ENGINEERING

(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) Differentiate between the forbidden energy gap and Fermi level in the valence band and conduction band. L2 6M
b) Compare and contrast the electrical properties of Silicon and Germanium. L2 6M

OR

- 2 a) Explain the 2-D representation of the Germanium crystal structure with neat a sketch. L2 4M
b) Describe the energy band diagrams. L2 8M

UNIT-II

- 3 a) Distinguish between PN junction diode and Zener diode. L1 6M
b) The reverse saturation current of a Germanium PN junction diode is $8\mu\text{A}$. Find the diode current for the forward bias voltage of 0.3V at 27°C . L3 6M

OR

- 4 a) Describe Transition and Diffusion capacitances of a PN junction Diode with expressions. L2 6M
b) Discuss about Breakdown mechanisms in PN Junction Diode. L2 6M

UNIT-III

- 5 a) A half wave rectifier, having a resistive load of 1000Ω , rectifies an alternating voltage of 325V peak value and the diode has a forward resistance of 100Ω . Calculate (a) peak, average and rms value of current (b) dc power output (c) ac input power, and (d) efficiency of the rectifier. L4 6M
b) A voltage of $200\cos\omega t$ is applied to Half Wave Rectifier with load resistance of 5 kohm, find the maximum dc current, rms current and ripple factor. L3 6M

OR

- 6 a) Compare the Full wave and Half wave rectifiers. L2 4M
b) In a full wave rectifier, the transformer rms secondary voltage from center tap to each end of the secondary is 50V. The load resistance is 900Ω . If the diode resistance and transformer secondary winding resistance together has a resistance of 100Ω , determine the average load current and rms value of load current. L3 8M

UNIT-IV

- 7 a) Explain the current components of PNP transistor. L2 6M
b) Draw the Input and Output characteristics of a BJT in CB Configuration. L1 6M

OR

- 8 a) Explain the Input and Output characteristics of a BJT in CE Configuration. L2 6M
b) For a transistor, the leakage current is $0.1\mu\text{A}$ in CB configuration, While it is $19\mu\text{A}$ in CE configuration. Calculate α & β of the same transistor? L3 6M

UNIT-V

- 9 a) Discuss the merits of the voltage divider bias. L1 4M
b) Explain voltage divider bias of JFET with neat circuit diagram. L2 8M

OR

- 10 a) List the types of JFET Biasing and Explain Briefly the setting of Operating Point. L1 6M
b) Compare the performance of BJT with JFET. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

ENGINEERING MATERIALS

(CIVIL)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 What is meant by rock cycle? How does it represent the sequence of formation of the three important types of rocks? L1 12M

OR

2 Explain the process involved in the manufacturing of bricks. L3 12M

UNIT-II

3 What is mortar? Briefly describe the various types of mortars. L1 12M

OR

4 Explain briefly the method of preparing lime mortar. Also write about factors influencing on selection mortar type. L3 12M

UNIT-III

5 List the various forms of wood products and there characteristics. L2 12M

OR

6 Explain the damage caused by insects to wood. L3 12M

UNIT-IV

7 Describe in detail testing of steel sections. L3 12M

OR

8 Explain any five rolled steel sections with neat sketches. L2 12M

UNIT-V

9 What are the various types of bitumen and what are their uses. L2 12M

OR

10 Describe the specific gravity test on coarse aggregates. L4 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

THERMAL AND FLUID ENGINEERING

(EEE)

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 a Thermal Power Plant and Explain the each component in the thermal power plant. L3 12M

OR

- 2 a) Write short notes on any two hydroelectric power plants in India. L3 6M
b) Define property? Distinguish between intensive property and extensive property with example? L2 6M

UNIT-II

3 Draw and explain a P.V, P-T and T-S diagram for a pure substance. L3 12M

OR

- 4 a) What is a boiler? How is it classified? L2 6M
b) Differentiate between water tube boilers and fire tube boilers. L2 6M

UNIT-III

5 What is manometer and classify it.? Explain U tube manometer with neat diagram. L2 12M

OR

- 6 a) Derive an expression for capillary rise and fall in a glass tube. L3 6M
b) The capillary rise in the glass tube is not to exceed 0.2mm of water. Determine its minimum size, given that surface tension for water in contact with air = 0.0725 N/m. L4 6M

UNIT-IV

7 Explain about Energy gradient line and Hydraulic gradient line? L2 12M

OR

8 Derive an equation for Darcy Weisbach equation L2 6M

UNIT-V

9 a) A jet of water of diameter 7.5cm moving with a velocity of 25 m/s, strikes a fixed plate in such a way that the angle between the jet and plate is 60°. Find the force extracted by Jet
a) in the direction normal to the plate.

b) in the direction of jet.

b) Derive an expression for the force exerted by a jet of water on an inclined fixed plate in the direction of the jet. L3 6M

OR

10 Draw the neat sketch of Kaplan turbine and explain its working. L3 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
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B.Tech I Year I Semester Supplementary Examinations September 2023

PRINCIPLES OF ELECTRICAL CIRCUITS

(ECE)

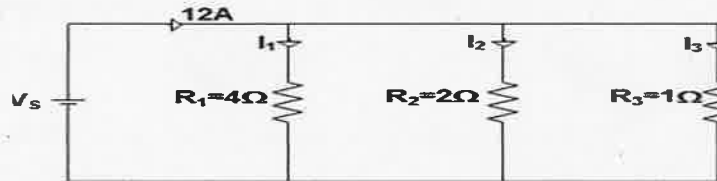
Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Determine Current through each resistor in the circuit? Using Current division method? L3 6M



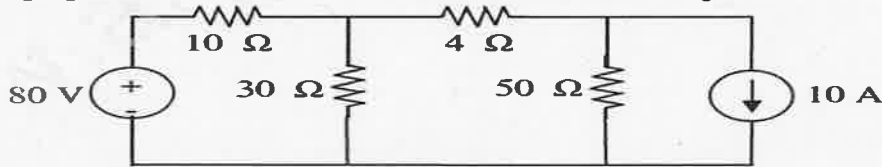
- b) Explain in detail about R, L, and C elements with voltage and current Equation. L2 6M

OR

- 2 a) Explain in detail about star to delta transformation of a resistive network. L3 6M
b) Explain in detail about delta to star transformation of a resistive network. L2 6M

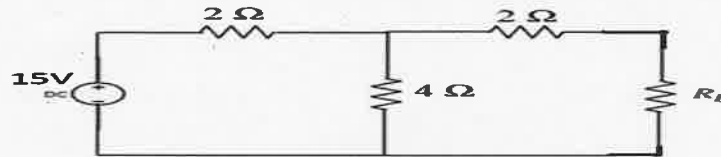
UNIT-II

- 3 Verify Superposition Theorem for 4Ω resistor for the following circuit. L3 12M



OR

- 4 a) State & explain Thevenin's theorem. L1 4M
b) Find load current by using Thevenin's theorem for the following circuit where $R_L = 3\Omega$. L3 8M



UNIT-III

- 5 a) Derive the Transient Response of series RL-circuit with D.C excitation. L2 6M
b) Derive the Transient Response of series RC-circuit with D.C excitation L2 6M

OR

- 6 a) Derive the Laplace Transform of Series RL Circuit. L5 6M
b) Derive the Laplace Transform of Series RC Circuit L2 6M

UNIT-IV

- 7 Derive an expression for the voltage and impedance for a series RLC circuit excited by a Sinusoidally alternating voltage. L1 12M

OR

- 8 a) Define apparent power, active power and reactive power. L2 6M
b) Define Admittance and impedance. L2 6M

UNIT-V

- 9 a) Define Two port network and explain about Impedance parameters. L2 6M
b) Find the Z-parameters of the network shown in below figure. L4 6M



OR

- 10 Explain about Constant-K High-pass filter in detail. L2 12M

Q.P. Code: 20EE0251

R20

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R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations September 2023

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(MECH)

Time: 3 Hours

Max. Marks: 60

PART-A

(Answer all Three units, 3 x 10 = 30 Marks)

UNIT-I

- 1 a) State and explain Ohm's law. L1 5M
- b) For the given circuit as shown in figure find the voltage across 10 ohm resistor and the current passing through it. L1 5M



OR

- 2 Explain principle of AC voltages with neat diagram and waveform L2 10M
- 3 Write the constructional features of a DC machine with neat diagram. L3 10M

OR

- 4 a) Derive the EMF equation of a DC Generator. L2 5M
- b) A 4-pole lap wound dc generator has a useful flux of 0.07wb per pole. Calculate the generated emf when it is rotated at speed of 900rpm with the help of prime mover. Armature consists of 440 number of conductors calculate the generated emf, if lap wound is replaced by wave wound? L4 5M

UNIT-III

- 5 a) Discuss about the principle of operation of DC motors L5 5M
- b) Calculate the value of torque established by the armature of a 4-pole DC motor having 774 conductors, 2 paths in parallel, 24mwb flux per pole when the total armature current is 50A. L5 5M

OR

- 6 a) Derive the condition for maximum efficiency of the transformer. L3 5M
- b) Discuss about the voltage regulation of the transformer. L3 5M

PART- B

(Answer all Three units, 3 x 10 = 30 Marks)

UNIT-I

- 1 a) Distinguish between conductors, semiconductors and insulators. L2 5M
- b) With a neat sketch of atomic structure, discuss why an intrinsic semiconductor is relatively a poor conductor of electricity. L2 5M

OR

- 2 a) Draw and explain the V-I characteristics of Zener diode. L1 5M
- b) Show that the Zener diode can be used as a Voltage regulator with neat diagram. L1 5M

UNIT-II

- 3 a) Explain the construction of an NPN transistor and give the circuit symbols for NPN and PNP transistors. L2 5M
- b) If the base current in a transistor is 20μA when the emitter current is 6.4mA, what are the values of α and β? Also calculate the collector Current. L4 5M

- 4 Explain the Fixed Bias of a BJT with a neat diagram L2 10M

OR

- 5 a) Classify the types of JFET and Draw its symbols. L3 5M
- b) Describe the working principle of N-channel JFET. L3 5M

OR

- 6 a) Compare between BJT and JFET. L4 5M
- b) Explain working principle of EMOSFET with neat diagram. L2 5M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations Sept-2023
MATHEMATICAL AND STATISTICAL METHODS

Time: 3 Hours

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

Max. Marks: 60

UNIT-I

- 1 a) Using the principle of mathematical induction, prove that $1^3 + 2^3 + 3^3 + \dots + n^3 = \frac{n^2(n+1)^2}{4}$ for all +ve integers. L3 6 M
- b) Find the general solution of Linear Diophantine equation $6x + 8y + 12z = 10$. L1 6 M
- 2 a) Add $(ABAB)_{16}$ & $(BABA)_{16}$ and also subtract $(434421)_5$ from $(4434201)_5$. L1 6 M
- b) Applying Euclidean algorithm, express 4076 and 1024 as a linear combination. L3 6 M
- 3 a) Solve the system of linear equations $3x + 13y \equiv 8 \pmod{55}$; $5x + 21y \equiv 34 \pmod{55}$ L3 6 M
- b) Define Fermat's little theorem and find the remainder when 15^{1976} is divided by 23. L1 6 M
- 4 a) Write the statement of Wilson's theorem and show that $18! + 1$ is divisible by 437 L3 6 M
- b) State Euler's theorem and find the value of $(107)^{121} \pmod{100}$. L1 6 M

OR

UNIT-III

- 5 a) Define estimation and statistical inference L3 6 M
- b) The mean & the standard deviation of a population are 11795 & 14054 respectively. If $n = 50$, find 95% confidence interval for the mean. Also find the maximum error we can assert at 95% confidence level. L2 6 M
- 6 a) Let X_1, X_2, \dots, X_n be a random sample from the Poisson population with probability mass function $p(r) = \frac{e^{-\lambda} \lambda^r}{r!}$. Show that \bar{X} is the most efficient estimator of θ L3 6 M
- b) Prove that maximum likelihood estimate of the parameter α of a population having density function $L(\alpha) = f(x, \alpha) = \frac{e^{-\lambda x}}{\alpha^2(\alpha-x)^2}$; $0 < x < \alpha$. L2 6 M

UNIT-IV

- 7 a) Let $P = \begin{bmatrix} 0.75 & 0.25 \\ 0.5 & 0.5 \end{bmatrix}$ be the transition probability matrix of a two state Markov chain, then find the stationary probabilities of the chain. L1 6 M
- b) State Chapman - Kolmogorov equation and steady state condition. L4 6 M
- 8 a) A college student X has the following study habits. If he studies one night, he is 70% sure not to study the next night and if he does not study one night, he is 60% sure not to study the next night. Find the transition probability matrix and in the long run, how often does he study. L4 6 M
- b) Define stochastic process and Markov process. L1 6 M

UNIT-V

- 9 The stenographic is attached to 5 officers or whom she performs stenographic work. She gets call from the officers at the rate of 4 per hour and takes on the average 10 min to attend to each call. If arrival rate is Poisson and service time exponential, then find (i). The average number of waiting calls, (ii) The average waiting time for an arriving call and (iii). The average time an arriving call spends in the system. L5 12 M
- 10 A petrol pump station has 4 pumps. The service times follow the exponential distribution with mean of 4 minutes and car arrive for service in a poisson process at the rate of 30 cars per hour. (i). What is the probability that an arrival would have to wait in line? (ii). Find the average waiting time in the queue, average time spent in the system and the average number of cars in the system. (iii) For what % of time would a pump be idle on an average? L5 12 M

OR

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

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

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(CSE & CIVIL)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 "Managerial economics is the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management". Comment. L4 12M

OR

- 2 a) What do you mean by elasticity of demand? L1 6M
b) State the different types of elasticity of demand. L2 6M

UNIT-II

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

OR

- 4 a) What is least-cost combination of inputs? L2 6M
b) Evaluate the Cobb Douglas production function. L4 6M

UNIT-III

- 5 a) Discuss various characteristics of market. L2 6M
b) State the features of Imperfect competition L1 6M

OR

- 6 a) Define monopoly and state its features. L1 6M
b) Illustrate the price and output determination in case of monopoly L2 6M

UNIT-IV

- 7 Write short notes on NPV and Elucidate the NPV Decision Rule and role of NPV. L3 12M

OR

- 8 a) Explain the types of Capital Budgeting methods. L2 6M
b) Write short notes on Long term capital. L1 6M

UNIT-V

- 9 Define accounting. Explain the concepts and conventions of accounting L2 12M

OR

- 10 a) What is meant by Ratio analysis?. L1 6M
b) Explain briefly about various types of ratios L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Sept- 2023
PROBABILITY, NUMERICAL METHODS AND TRANSFORMS
(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) In a group there are 3 men and 2 women. Three persons are selected at random from this group. Apply the probability that one man and two women or two men and one woman are selected. L2 6M
- b) Five persons in a group 20 are engineers. If three persons are selected at random, determine the probability that all engineers and the probability that at least one being an engineer. L3 6M

OR

- 2 a) State Multiplication theorem. L2 2M
- b) Two dice are thrown. Let A be the event that the sum of the point on the faces is 9. Let B be the event that at least one number is 6. Find
(i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(A^c \cup B^c)$ (iv) $P(A^c \cap B^c)$ (v) $P(A \cap B^c)$ L3 10M

UNIT-II

- 3 Find a positive root of the equation $x^3 - x^2 + x - 1 = 0$ by Bisection method. L3 12M

OR

- 4 a) Write the formula for Newton's forward interpolation. L2 2M
- b) From the following table values of x and $y = \tan x$, find the values of y when $x=0.12$ and $x=0.28$. L2 10M

| | | | | | |
|---|--------|--------|--------|--------|--------|
| x | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| y | 0.1003 | 0.1511 | 0.2027 | 0.2553 | 0.3093 |

UNIT-III

- 5 Tabulate $y(0.1)$ and $y(0.2)$ using Taylor's series method given that $y' = y^2 + x$ and $y(0) = 1$ L3 12M

OR

- 6 a) Evaluate $\int_0^4 e^x dx$ by Simpson's $\frac{3}{8}$ rule with 12 sub divisions. L3 6M
- b) Evaluate $\int_0^{\pi/2} \sin x dx$ using Trapezoidal rule, Simpson's $\frac{1}{3}$ rule L3 6M

UNIT-IV

- 7 a) Find the Laplace transform of $e^{-3t} [\cos(4t) + 3 \sin(4t)]$ L2 6M
- b) Find the Laplace transform of $\int_0^t e^{-t} \cos t dt$ L2 6M

OR

- 8 a) Find $L^{-1} \left\{ \frac{3s-2}{s^2-4s+20} \right\}$ by using first shifting theorem L2 6M
- b) Using Convolution theorem, Find $L^{-1} \left\{ \frac{1}{(s+a)(s+b)} \right\}$ L3 6M

UNIT-V

- 9 Solve $\frac{d^2x}{dt^2} + 2 \frac{dx}{dt} + x = 3te^{-t}$ using Laplace Transform given that $x(0) = 4; \frac{dx}{dt} = 0$ at $t = 0$ L3 12M

OR

- 10 a) Define Z-transform L1 2M
- b) Using Z-transform solve $y_{n+2} + 2y_{n+1} + y_n = n$, if $y_0 = y_1 = 0$ L3 10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations Sept-2023
NUMERICAL METHODS AND TRANSFORMS
(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Describe the formula for square root of a number by Newton - Raphson formula L2 2M
b) Find out the square root of 25 given $x_0=2.0$, $x_1=7.0$ using Bisection method. L3 10M
- OR
- 2 Find the root of the equation $x \log_{10} X = 1.2$ using False position method L3 12M

UNIT-II

- 3 Using R-K method of 4th order, solve $\frac{dy}{dx} = X^2 - Y$, $y(0)=1$. Find $y(0.1)$ and $y(0.2)$ L3 12M
- OR
- 4 Evaluate $\int_0^1 \frac{1}{1+x} dx$ by L5 12M
(i) By Trapezoidal rule and Simpson's $\frac{1}{3}$ rule.
(ii) Using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.

UNIT-III

- 5 a) Find the Laplace transform of $f(t)=\text{Cosh } at \sin bt$ L3 6M
b) Find the Laplace transform of $\frac{1-\cos at}{t}$ L3 6M
- OR
- 6 a) Find the Laplace transform of $t^2 e^{2t} \sin 3t$ L3 6M
b) Show that $\int_0^\infty t^2 e^{-4t} \sin 2t dt = \frac{11}{500}$ Using Laplace transform L1 6M

UNIT-IV

- 7 Find a Fourier series to represent the function $f(x)=e^x$ for $-\pi < x < \pi$ and hence derive a series for $\frac{\pi}{\sinh \pi}$ L1 12M
- OR
- 8 a) Find the Fourier series for the function $f(x)=x$ in $-\pi < x < \pi$. L2 6M
b) Expand $f(x) = |x|$ as a fourier series in the interval $(-2,2)$. L2 6M

UNIT-V

- 9 Find the finite Fourier sine and cosine transform of $f(x)$ defined by $f(x)=2x$ where $0 < x < 2\pi$. L1 12M
- OR
- 10 a) State Fourier integral theorem L1 2M
b) Using Fourier integral theorem, L3 10M
Show that $e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x d\lambda}{(\lambda^2 + a^2)(\lambda^2 + b^2)}$ $a, b > 0$

SIDDARATHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

II B.Tech I SEM (R20) Supplementary Examinations of Sept-2023
NUMERICAL METHODS, PROBABILITY & STATISTICS
(Mechanical Engg.)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Describe the formula for square root of a number by Newton - Raphson formula. L2 2M
- b) Find the root of the equation $x \log_{10} x = 1.2$ using False position method. L3 10M
- 2 a) Apply Newton's forward interpolation formula and the given table of values L3 6M

| | | | | | |
|--------|------|------|------|------|------|
| x | 1.1 | 1.3 | 1.5 | 1.7 | 1.9 |
| $f(x)$ | 0.21 | 0.69 | 1.25 | 1.89 | 2.61 |

Obtain the value of $f(x)$ when $x = 1.4$.

- b) Use Newton's backward interpolation formula to find $f(32)$ given that, L3 6M

$$f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794.$$

UNIT-II

- 3 Tabulate $y(0.1)$ and $y(0.2)$ using Taylor's series method given that L1 12M

$$\frac{dy}{dx} = y^2 + x \text{ and } y(0) = 1.$$

OR

- 4 a) Evaluate $\int_0^{\pi/2} \sin x \, dx$ using Simpson's $\frac{1}{3}$ rule and compare with exact value. L5 6M
- b) Use the trapezoidal rule to evaluate $\int_0^1 x^3 \, dx$ considering five sub-intervals. L5 6M

UNIT-III

- 5 a) Describe arithmetic mean, mode and median. L2 3M
- b) Find the median to the following data L1 5M

| | | | | | |
|-----------------|-------|-------|-------|-------|-------|
| Class intervals | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
| frequency | 5 | 12 | 23 | 8 | 2 |

Find arithmetic mean to the following data

| | | | | | |
|-----|---|---|----|----|---|
| x | 1 | 2 | 3 | 4 | 5 |
| f | 5 | 8 | 10 | 12 | 6 |

OR

- 6 a) State and prove Addition theorem of probability. L1 6M
- b) The probability that students A, B, C, solve the problem are $\frac{1}{3}, \frac{2}{5}, \frac{1}{5}$ and $\frac{1}{4}$ respectively. If all of them try to solve the problem, what is the probability that the problem is solved. L6 6M

UNIT-IV

- 7 For the continuous probability function $f(x) = \begin{cases} kx^2e^{-x}, & x \geq 0 \\ 0, & \text{elsewhere} \end{cases}$ L1 12M

Find i) k ii) Mean iii) Variance.

OR

- 8 a) A random variable x has the following probability distribution function L3 6M

| | | | | | | | | |
|--------|---|----|----|----|----|----|----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| $P(x)$ | k | 2k | 3k | 4k | 5k | 6k | 7k | 8k |

Find i) k ii) $P(X \leq 2)$ iii) $P(2 \leq X \leq 5)$.

- b) A random variable x has the following probability distribution function L3 6M

| | | | | | | | |
|--------|----|-----|----|-----|----|-----|----|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $P(x)$ | k | 0.1 | k | 0.2 | 2k | 0.4 | 2k |

Find i) k ii) Mean iii) Variance.

UNIT-V

- 9 Out of 800 families with 5 children each, how many would you expect to have L2 12M

(i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys. Assume equal probabilities for boys and girls.

OR

- 10 Calculate Correlation coefficient to the following data L3 12M

| | | | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|----|----|
| x | 10 | 15 | 12 | 17 | 13 | 16 | 24 | 14 | 22 | 20 |
| y | 30 | 42 | 45 | 46 | 33 | 34 | 40 | 35 | 39 | 38 |

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

COMPUTER ORGANIZATION & ARCHITECTURE

(CSE, CSM, CIA & CAD)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Assume that R1 = 400, 270 in 400 Address, 600 in 500 Address Location. 890 in 600 Location. What is the Data in the Accumulator after the execution of the Instructions. L4 12M

- (i) MOV A, R1 (Register Addressing Mode)
(ii) MOV A, @ R1 (Register Indirect Addressing Mode)
(iii) MOV A, 500 (Direct Addressing Mode)
(iv) MOV A, @500 (In Direct Addressing Mode)

OR

- 2 a) Sketch the basic functional units of computer L3 6M
b) Explain the functional units in the computer L2 6M

UNIT-II

- 3 Explain the Flow chart for Addition and Subtraction. L2 12M

OR

- 4 a) List different types to represent Signed Numbers L3 6M
b) Subtract 1101 and -1001 using 2's complement subtractions L2 6M

UNIT-III

- 5 a) Construct a 4-line common bus system with a neat diagram. L3 6M
b) Explain Bus line with three state buffers. L3 6M

OR

- 6 a) Discuss the any four Arithmetic Micro Operations. L3 6M
b) Draw and explain four bit parallel adder circuit. L2 6M

UNIT-IV

- 7 Give detailed notes on DMA transfers in computer system with neat sketch. L3 12M

OR

- 8 a) Explain 128*8 RAM with block diagram and function table. L3 6M
b) Discuss briefly about synchronous DRAMs L2 6M

UNIT-V

- 9 Categorize and discuss various forms of parallel processing based on Flynn's Taxonomy with a neat sketch L3 12M

OR

- 10 a) Explain cross bar switch with neat sketch. L2 6M
b) Explain 2D mesh network with neat diagram L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023
ANALOG ELECTRONIC CIRCUITS

(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Summarize the expressions of input and output resistances for a Voltage Series feedback amplifier with necessary derivations. L2 8M
b) A voltage series negative feedback amplifier has a voltage gain without feedback of $A=500$, input resistance $R_i=3\text{ k}\Omega$, output resistance $R_o=20\text{ k}\Omega$ and feedback ratio $\beta=0.01$. Calculate the voltage gain A_f , input resistance and output resistance of the amplifier with feedback. L3 4M

OR

- 2 a) List the characteristics of negative feedback amplifiers. L1 6M
b) Give the classification of basic amplifiers. L2 6M

UNIT-II

- 3 a) Determine the condition for sustained oscillations for an RC phase shift Oscillator with necessary circuit diagrams. L3 8M
b) Determine the frequency of oscillations when an RC phase shift oscillator has $R=100\text{ k}\Omega$, $C=0.01\mu\text{F}$ and $R_c = 2.2\text{ k}\Omega$. L3 4M

OR

- 4 a) Explain Barkhausen criterion for oscillations with suitable diagram. L2 6M
b) In a transistorized Hartley, oscillator the two inductances are 2mH and $20\mu\text{H}$. While the frequency is to be changed from 950 kHz to 2050 kHz . Calculate the range over which the capacitor is to be varied. L4 6M

UNIT-III

- 5 a) Explain the term slew rate and illustrate the importance in op-amp circuits. L2 6M
b) Illustrate the following terms with neat diagram L3 6M
(i) Input offset voltage (ii) Thermal drift.

OR

- 6 a) Derive the expression for gain of inverting amplifier. L3 6M
b) For an inverting amplifier, $R_1=10\text{ k}\Omega$, $R_f=100\text{ k}\Omega$ with input voltage $V_i=1\text{V}$ and a load resistance of $R_L=25\text{ k}\Omega$ is connected to the output terminal. Calculate i) i_1 ii) V_o iii) i_L and iv) load current i_o into the output pin. L3 6M

UNIT-IV

- 7 a) Explain the operation of differentiator using op-amp with a neat circuit diagram. L2 6M
b) Draw the circuit of a subtractor using op-amp and derive the expression for voltage gain. L3 6M

OR

- 8 a) Explain the operation of monostable multivibrator using op-amp, with a neat circuit and its waveforms L2 6M
b) Derive the equation for pulse width of the monostable multivibrator using op-amp. L3 6M

UNIT-V

- 9 Design a high pass filter at a cut-off frequency of 10 kHz with pass band gain 1.5 and draw the frequency response. L3 12M

OR

- 10 a) Define active filter and give its characteristics. L4 6M
b) Explain the first order low pass butter worth filter with a neat circuit diagram. L2 6M

Time: 3 Hours

Max. Marks: 60

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

- UNIT-I**
- a) Define the terms L1 3M

b) Doping b) Depletion region c) Barrier Potential L3 9M

A PN junction germanium diode has a reverse saturation current of $10 \mu\text{A}$ at the room temperature of 27°C . It is observed to be $30 \mu\text{A}$, when the room temperature is increased. Calculate the new room temperature.
 - OR

a) Discuss about the forward and reverse resistances of a PN junction diode. L2 6M

b) Calculate the forward resistance of a PN Junction Diode when the forward current is 5mA at $T = 300\text{K}$. Assume Silicon diode. L4 6M

UNIT-II

- a) Define a Rectifier and list out types of rectifiers. L1 3M

b) Draw the circuit diagram of a Full Wave Rectifier and with the help of waveforms describe its operation. L1 9M
- OR

a) Draw the circuit diagram of a Full Wave Rectifier and with the help of waveforms describe its operation. L2 6M

b) A Full Wave Rectifier circuit is fed from a transformer having a center-tapped secondary winding. The RMS voltage from either end of secondary to center tap is 30V . If the diode forward resistance is 2Ω and that of the half secondary is 8Ω , for a load of $1\text{K}\Omega$. Calculate DC power delivered to the load, efficiency of rectification and Transformer Utilization Factor (TUF) of secondary. L2 6M

UNIT-III

- a) Define a transistor. Draw the circuit symbols of PNP and NPN transistor and label all terminals. L1 3M

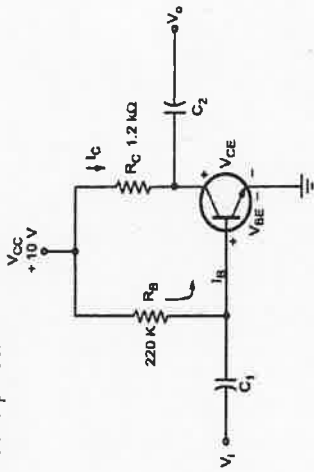
b) With a neat diagram, explain how a transistor acts as an amplifier. L5 9M
- OR

a) With the help of neat diagram, explain the construction and operation of N-channel enhancement type MOSFET. L5 6M

b) Draw the circuit symbols of different JFETs and MOSFETs and list their applications. L2 6M

- UNIT-IV**
- a) Explain the concept of DC and AC Load lines and discuss the criteria for fixing the Q-point. L1 6M

b) For the circuit shown in the Figure, solve I_B , I_C , V_{CE} , V_B , V_C and V_{BC} . Assume that $V_{BE} = 0$ and $\beta = 50$. L3 6M



OR

- a) Define and Explain Thermal Runaway and Thermal Resistance. L2 6M

b) Calculate the values of Resistors in a fixed bias circuit using the following specifications: $I_{CQ}=9.2\text{mA}$, $V_{CEQ}=4.4\text{V}$, $h_{FE}=1115$, $V_{BE}=0.7\text{V}$ & $V_{CC}=9\text{V}$. L3 6M
- UNIT-V**

a) Define h-parameters and draw the generalized h-parameter model of a Transistor. Why hybrid model is used for the analysis of BJT amplifier at low frequencies? L3 6M

b) Draw the hybrid model for a transistor in CE configuration and derive its hybrid parameters. L2 6M
- OR

a) Derive expressions for A_i , R_i , A_v and R_o for a Common Collector Amplifier using simplified hybrid model. L3 6M

b) A voltage source of internal resistance, $R_s = 900\Omega$ drives a CC amplifier using load resistance $R_L = 2000\Omega$. The CE h parameters are $h_{ie}=60$, $h_{re}=12000$, $h_{oe} = 25\mu\text{A/V}$ and $h_{fe} = 2 \times 10^4$. Calculate A_i , R_i , A_v and R_o using approximate analysis. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

FLUID MECHANICS & HYDRAULIC MACHINERY
(MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Define fluid, density and specific gravity of a fluid. L1 6M
b) A plate 0.025mm at a distance from a fixed plate moves at 60 cm/sec and requires a force of 2 N/m². Determine viscosity between the plates. L3 6M

OR

- 2 a) State Pascal's law. What do you understand by the terms Gauge pressure & Vacuum pressure? L1 6M
b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity is 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40cm and the height of fluid in the left from the center of pipe is 15cm below L3 6M

UNIT-II

- 3 Explain different types of fluid flows in detail. L2 12M

OR

- 4 a) Derive an equation for the force exerted by a flowing fluid on Pipe bend. L3 6M
b) Obtain Euler's equation of motion from the fundamentals. L3 6M

UNIT-III

- 5 a) Derive an expression for the rate of flow through a Venturimeter. L2 6M
b) An oil of specific gravity 0.8 is flowing through a Venturi meter having inlet diameter of 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through a horizontal venturimeter. Take $C_d = 0.98$. L3 6M

OR

- 6 Derive an expression for the loss of head in pipes due to friction L3 12M

UNIT-IV

- 7 a) Derive an expression for the force exerted by a jet of water on an inclined fixed plate in the direction of the jet. L3 6M
b) A jet of water of diameter 50 mm moving with a velocity of 40 m/s, strikes a curved fixed symmetrical plate at the center. Find the force extracted by Jet of water in the direction of the jet, if the jet is deflected through an angle of 120° at the outlet of the curved plate. L3 6M

OR

- 8 A jet of water having a velocity of 40 m/s strikes a curved vane, which is moving with a velocity of 20 m/s. The jet makes an angle of 30° with the direction of motion of vane at inlet and leaves at an angle of 90° to the direction of the motion of the vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock. L4 12M

- 9 Explain the working principle of a Pelton wheel with neat sketch and derive the equation for hydraulic efficiency. L2 12M

OR

- 10 Explain the working principle of centrifugal pump and derive an expression for the work done by a centrifugal pump. L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

DATABASE MANAGEMENT SYSTEMS

(CSE, CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Classify database languages with examples. L4 12M
OR
- 2 a) Examine the logical database design with suitable examples L3 6M
b) What is an Attribute? Explain different types of attributes. L2 6M

UNIT-II

- 3 a) Compare Selection and Projection L5 6M
b) Develop the working on union, intersection and minus operations. L6 6M
OR
- 4 a) What are Views in SQL? Give an example L2 6M
b) Define NULL VALUE? Describe the disallowing null values in database. L2 6M

UNIT-III

- 5 a) Compare Trivial and Non - Trivial Functional Dependencies with example. L4 6M
b) Explain the following with suitable example. L2 6M
(i) Full functional dependency. (ii) Partial dependency.

OR

- 6 Explain in detail about 1NF, 2NF, 3NF and BCNF with example. L2 12M

UNIT-IV

- 7 Explain ACID properties and illustrate them through examples L2 12M
OR
- 8 a) Illustrate concurrent execution of transaction with examples L3 6M
b) Discuss various concurrency control protocols L2 6M

UNIT-V

- 9 a) Classify different types of locks. L4 6M
b) Describe the deadlock prevention schemes L2 6M
OR
- 10 a) What are the advantages and disadvantages of RAID system? L1 6M
b) Which level of RAID is best? Why? L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

ELECTRICAL MACHINES-I

(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Distinguish between Lap and Wave windings? L2 6M
 b) A 4 pole generator have a wave-wound armature winding has 51 slots each slots containing 10 conductors. What will be the voltage generated in the machines when driven at 1000 rpm assuming the flux per pole to be 7.0 mWb. L3 6M

OR

- 2 A shunt generator delivers 300A at 230V and the resistance of the shunt field and armature are 40ohm and 0.02 ohm respectively .Calculate the generated e.m.f. L3 12M

UNIT-II

- 3 a) What is the necessity of parallel operation of DC generators? L3 6M
 b) Explain the procedure for parallel operation of DC generators. L3 6M

OR

- 4 a) What is the significance of critical resistance in DC generator? L2 6M
 b) What are the applications of DC generator L2 6M

UNIT-III

- 5 A dc motor takes an armature current of 100A at 420V. The armature circuit resistant is 0.25ohm. The machine has 6 poles and the armature is lap connected with 864 conductors. The flux per pole is 0.06Wb. Calculate the speed and gross torque developed by the armature. L4 12M

OR

- 6 a) Explain the armature voltage control method for the Speed control of a DC Motor. L2 6M
 b) A 200 V dc shunt motor running at 1500 rpm takes an armature current of 15A.it is required to reduce the speed to 500 rpm. What must be the value of resistance to be inserted in the armature circuit fthe original armature resistance is 0.5 ohm. Take armature current to be constant during this process. L3 6M

UNIT-IV

- 7 Explain field's test for DC machine in detail. L4 12M

OR

- 8 Explain 3 point starter in detail. L3 12M

UNIT-V

- 9 a) Explain the method of speed control of universal motor. L4 6M
 b) Mention the applications of universal motors. L2 6M

OR

- 10 Explain construction and working principles of Switched Reluctance Motor (SRM). L4 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

SWITCHING THEORY AND LOGIC DESIGN

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 State and prove the following Boolean laws: L3 12M
i) Commutative ii) Associative iii) Distributive

OR

- 2 a) State and prove Consensus Theorem and Absorption Theorem of Boolean algebra L3 6M
b) Simplify the following Boolean functions to minimum number of literals: L4 6M
i) $F1 = (a + b)' (a' + b)'$ ii) $F2 = y(wz' + wz) + xy$

UNIT-II

- 3 Simplify the following expression using K-Map and realize with NAND and NOR gates. $F = \pi M(1, 2, 3, 8, 9, 10, 11, 14)$. $\pi d(7, 15)$. L4 12M

OR

- 4 a) Develop the logic diagram for the following Boolean function using NAND and NOR gates. $Y = (AB' + A'B)(C + D')$. L3 6M
b) Explain the disadvantage of K-Map method of reducing a Boolean function and how to overcome it. L2 6M

UNIT-III

- 5 a) Construct a BCD Adder-circuit using 4-bit binary adders. L4 6M
b) Design & implement a 4-bit Binary-to-Gray code converter. L4 6M

OR

- 6 Explain Binary Multiplier with an example. L4 12M

UNIT-IV

- 7 Define a synchronous counter? Design a 3-bit synchronous up/down counter. L4 12M

OR

- 8 a) With the help of logic diagram, obtain the characteristic table of D & T FlipFlops. Also draw their graphic symbols. L2 6M
b) Explain the working principle of JK Flip-Flop in detail. Also give its characteristic equation, Graphic symbol and Excitation equation. L3 6M

UNIT-V

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

OR

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

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

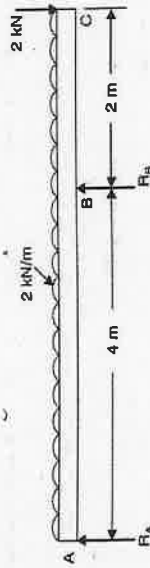
- 1 A body is subjected to direct stresses in two mutually perpendicular directions accompanied by a simple shear stress. Draw the Mohr's circle of stresses and explain how you will obtain the principal stresses and principal planes. L3 12M

OR

- 2 a) Define stress and strain and explain their types. L1 6M
b) Draw and explain Stress-strain curve for a mild steel bar L1 6M

UNIT-II

- 3 Draw the shear force and bending moment diagram for overhanging beam carrying uniformly distributed load of 2 kN/m over the entire length and a point load of 2 kN as shown in figure. Locate the point of contra flexure. L3 12M



OR

- 4 a) State the assumptions made in the theory of simple bending. L2 6M
b) A square beam 20 mm x 20 mm in section and 2 m long is supported at the ends. The beam fails when a point load of 400 N is applied at the centre of the beam. What uniformly distributed load per metre length will break a cantilever of the same material 40 mm wide, 60 mm deep and 3 m long? L2 6M

UNIT-III

- 5 a) Derive shear stress distribution formula for rectangular section with a neat sketch. L5 6M

- b) A timber beam of rectangular section is simply supported at the ends and carries a point load at the centre of the beam. The maximum bending stress is 12 N/mm² and maximum shearing stress is 1 N/mm², find the ratio of the span to the depth. L5 6M

OR

- 6 Derive pure torsion equation for a circular shaft with assumptions. L5 12M

UNIT-IV

- 7 A beam of uniform rectangular section 200 mm wide and 300 mm deep is simply supported at its ends. It carries a uniformly distributed load of 9 kN/m run over the entire span of 5 m. If the value of E for the beam material is 1 x 10⁴ N/mm², find: (i) The slope at the supports and (ii) Maximum deflection. L1 12M

OR

- 8 A column of timber section 15 cm x 20 cm is 6 metre long both ends being fixed. If the Young's modulus for timber = 17.5 kN/mm², determine: (i) Crippling load and (ii) Safe load for the column if factor of safety = 3. L3 12M

UNIT-V

- 9 A copper cylinder, 90 cm long, 40 cm external diameter and wall thickness 6 mm has its both ends closed by rigid blank flanges. It is initially full of oil at atmospheric pressure. Calculate additional volume of oil which must be pumped into it in order to raise the oil pressure to 5 N/mm² above atmospheric pressure. For copper assume $E = 1.0 \times 10^5$ N/mm² and Poisson's ratio $1/3$. Take bulk modulus of oil as $K = 2.6 \times 10^3$ N/mm². L3 12M

OR

- 10 Derive an expression for hoop and radial stresses across thickness of the thick cylinder L3 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

PYTHON PROGRAMMING

(CSM, CAD, CIA)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 What is data type? List out the data types with example. L3 12M

OR

2 a) Explain about the Single-Valued data types in python. L3 6M

b) Discriminate about the Multi-Valued Data types with example. L2 6M

UNIT-II

3 Examine the syntax of the following statements with example program. L3 12M

i) While loop ii) for loop

OR

4 a) Discuss the term: Range Write a for loop that prints numbers from 0 to 20, using range function. L2 6M

b) Create a python program to generate the multiplication table based on user input. L2 6M

UNIT-III

5 a) Describe about default arguments with suitable program. L5 6M

b) Illustrate lambda function with example. L5 6M

OR

6 a) Define Variable-length arguments? Explain with example. L5 6M

b) Explain about Anonymous and fruitful functions with examples. L2 6M

UNIT-IV

7 Explain Python Built-in Exceptions. L1 12M

OR

8 a) How will you handle an exception using try except block? Explain with the help of a program. L2 6M

b) What is Regular expression in python? Illustrate searching with example program. L3 6M

UNIT-V

9 Narrate Python Files, its types, functions and operations that can be performed on files with examples. L3 12M

OR

10 a) Illustrate the Command line arguments. L3 6M

b) Explain the reading and writing files in python. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Explain history and evolution of java? L2 6M
b) Develop a java program to read different data types using scanner. L6 6M

OR

- 2 a) Define data type? Discuss the data types available in java. L3 6M
b) Explain about the Iteration statements. L2 6M

UNIT-II

- 3 a) Define constructor? Classify the types of constructors in Java? L3 6M
b) Differentiate between the usages of static, final keywords with example. L4 6M

OR

- 4 a) Describe about the super keyword in java with example. L2 6M
b) Distinguish method Overriding and method Overloading. L2 6M

UNIT-III

- 5 a) Develop a java program to create own exception for negative value exception if the user enter negative value. L5 6M
b) What is Java's built-in exception? Write the importance of finally block. L1 6M

OR

- 6 a) Define string? Write and explain string handling methods in java. L1 6M
b) Create a java program to check the given string is palindrome or not. L6 6M

UNIT-IV

- 7 a) Illustrate General form of Generic class with an example. L3 6M
b) Demonstrate the implementation of Generics in java with an example program. L2 6M

OR

- 8 a) Write in detail about various stream classes in java. L2 6M
b) Discuss in detail on collection interfaces and their methods. L3 6M

UNIT-V

- 9 a) Develop a java program to design simple registration page window using AWT controls. L6 6M
b) State the importance of Lambda Expression with syntax. L1 6M

OR

- 10 a) Illustrate the steps for creating simple login page using java swing with an example program. L3 6M
b) Develop a java program to pass multiple parameters with Lambda expression. L6 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations September 2023

GENERATION OF ELECTRICAL POWER

(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Explain the function of the following in thermal power plant and explain the principle of operation of each. i) Super heater. ii) Cooling tower. iii) Boilers. L2 12M

OR

- 2 a) State the advantages and disadvantages of hydro power plants. L2 6M
b) What are the factors considered, while selecting the site for a Hydro power station? L1 6M

UNIT-II

- 3 a) Explain about the fast breeder reactor. L2 6M
b) Explain the operating mechanism of control rods in a nuclear powerplants. L2 6M

OR

- 4 Draw the schematic diagram of a nuclear reactor and discuss its operation. L1 12M

UNIT-III

- 5 a) Explain PV cell construction and operation. L2 6M
b) Explain solar pond with neat diagram? L1 6M

OR

- 6 Explain principle of operation and working of Wind Power Plant. L1 12M

UNIT-IV

- 7 Draw schematic diagram of geothermal system and explain the working Principle? L1 12M

OR

- 8 Explain with neat sketch about OTEC system? L1 12M

UNIT-V

- 9 A annual peak load on a 30 MW power station is 25MW. The power station supplies loads having maximum demands of 10MW, 8.5MW, 5MW and 4.5Mw. The annual load factor is 45%.
Find i) Average load. ii) Energy supplied per year. iii) Demand factor. L3 12M

OR

- 10 a) What is Tariff? What are the Desirable Characteristics of a Tariff? L2 6M
b) The maximum demand of a consumer is 20 A at 220 V and his total energyconsumption is 8760 kWh. If the energy is charged at the rate of 20 paise perunit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional units, calculate : (i) annual bill (ii) equivalent flat rate. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September-2023
SIGNALS, SYSTEMS AND RANDOM PROCESSES
(ECE)

Time: 3 Hours

Max. Marks: 60

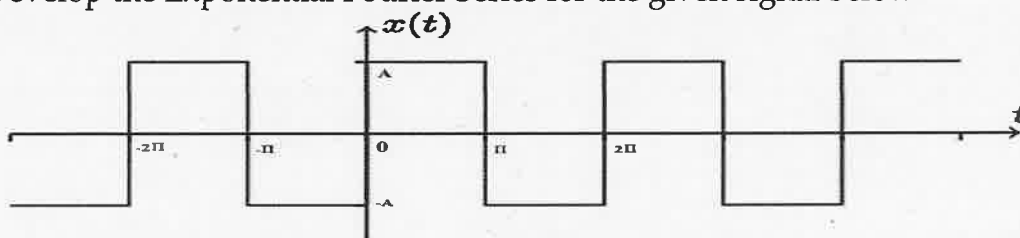
Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 Define a System. Classify the Systems with an example for each. L3 12M
OR
- 2 a) Sketch the following signals. L3 6M
(i) $x(t) = 2u(t+2) - 2u(t-3)$ (ii) $x(t) = r(t) - r(t-1) - r(t-3) + r(t-4)$
b) Define Stable and Unstable systems with an example. L2 6M

UNIT-II

- 3 Develop the Exponential Fourier Series for the given signal below L3 12M



OR

- 4 a) Find the Fourier Transform of the following signals using Properties. L2 6M
(i) $e^{-at}u(t)$ (ii) $\delta(t+2) + \delta(t+1) + \delta(t-1) + \delta(t-2)$
b) Explain about Fourier Transform of Periodic Signals. L2 6M

UNIT-III

- 5 a) State and Prove the Following Properties of LTI System. L5 6M
(i) Distributive Property (ii) Associative Property
b) State and prove the following properties of Auto correlation function. L5 6M
(i) $R_{XX}(-\tau) = R_{XX}(\tau)$ (ii) $R_{XX}(0) = E[X^2(t)]$

OR

- 6 a) Explain the Filter characteristics of linear systems with neat diagrams. L5 6M
b) Demonstrate the Procedure to perform convolution graphically. L2 6M

UNIT-IV

- 7 Illustrate the inverse Laplace transform of the following. L1 12M
(i) $X(s) = 1 / (s(s+1)(s+2)(s+3))$ (ii) $X(s) = s / (s+3)(s^2+6s+5)$

OR

- 8 a) State and prove the Linearity and Time Shifting Properties of Laplace Transform. L2 6M
b) Examine the distribution function $F_{XX}(x,y)$ L3 6M

| | | | | |
|--------|-------|-------|-------|-------|
| (X,Y) | (0,0) | (1,2) | (2,3) | (3,2) |
| P(x,y) | 0.2 | 0.3 | 0.4 | 0.1 |

UNIT-V

- 9 Prove the following properties of Auto Correlation function. L3 12M
(i) $|R_{XX}(\tau)| \leq R_{XX}(0)$ (ii) $R_{XX}(-\tau) = R_{XX}(\tau)$ (iii) $R_{XX}(0) = E[X^2(t)]$

OR

- 10 a) Define and explain Stationary and Statistical Independence of Random process. L3 6M
b) Show that the autocorrelation function of a stationary random process is an even function of τ . L3 6M

Q.P. Code: 20ME0304

R20

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR (AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023
KINEMATICS OF MACHINERY (MECH)

Time: 3 Hours

Max. Marks: 60

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

1 Explain the classification of links and kinematic pairs in detail with neat sketch. L3 12M

UNIT-I

OR

2 a) Explain the working of beam engine with neat sketch. L3 6M

b) Explain the working principle of quick return mechanisms and also describe the working of Oscillating cylinder engine with neat sketch. L2 6M

3 Sketch and Describe the Scott-Russell and Robert's straight-line motion Mechanisms. L3 12M

OR

4 a) What is the condition for correct steering? Write fundamental equation of it. L2 6M

b) List out various applications of single and double Hooke's joint. L2 6M

5 In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. L5 12M

UNIT-III

OR

6 Locate all the instantaneous centres of the slider crank mechanism as shown in Fig. The lengths of crank OB and connecting rod AB are 100 mm and 400 mm respectively. If the crank rotates clockwise with an angular velocity of 10 rad/s, find: 1. Velocity of the slider A, and 2. Angular velocity of the connecting rod AB. L5 12M



UNIT-IV

7 What are the different types of motion with which a follower can move? L1 12M

OR

8 A cam is to be designed for a knife edge follower with the following data: L2 12M

1. Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.
2. Dwell for the next 30°.
3. During the next 60° of cam rotation, the follower returns to its original position with simple harmonic motion.

Q.P. Code: 20ME0304

R20

4. Dwell during the remaining 180°.

Draw the profile of the cam when

(a) The line of stroke of the follower passes through the axis of the cam shaft, and

(b) The line of stroke is offset 20 mm from the axis of the cam shaft.

The radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.

UNIT-V

9 a) Explain the terms relates to spur gear: (i) Module, (ii) Pressure angle, and (iii) Addendum L3 6M

b) State and prove the law of gearing. Show that involute profile satisfies the conditions for correct gearing. L3 6M

OR

10 In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise. L3 12M

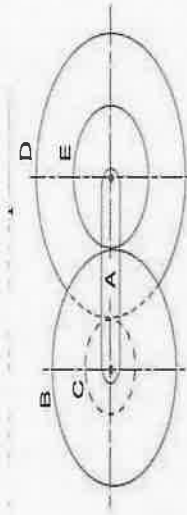


Fig. 13.8

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

OPERATING SYSTEMS

(CSE, CAD, CIA, CSM)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) List and discuss the different functions of an operating system. L1 8M
b) Explain different operations performed by the operating system. L2 4M

OR

- 2 a) Justify layered structure of an OS. L6 8M
b) Differentiate monolithic kernel and microkernel. L4 4M

UNIT-II

- 3 Explain in detail about CPU Scheduling Algorithms? With Examples. L2 12M

OR

- 4 a) Differentiate long term Scheduling and Short Term Scheduling. L2 6M
b) Explain the Structure of user level thread and kernel level thread. L4 6M

UNIT-III

- 5 a) List and explain types of semaphores? L1 6M
b) Compare Starvation versus Deadlock. L6 6M

OR

- 6 a) Describe in detail deadlock prevention. L3 6M
b) Summarize between Deadlock Detection and Recovery. L2 6M

UNIT-IV

- 7 What is disk scheduling? List the different Disk scheduling algorithms with their comparisons. L4 12M

OR

- 8 a) Given the page reference string :1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3 L5 6M
Compare the number of page faults for LRU and Optimal page replacement algorithm.
b) What is Swapping? Explain with structure. L2 6M

UNIT-V

- 9 Justify digital signature in detail. L6 12M

OR

- 10 a) Demonstrate goals of protection in the OS. L2 6M
b) Discuss in detail about intruders? L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

ELECTROMAGNETIC FIELDS

(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Determine the curl of the vector fields: i). $P = x^2yz \mathbf{a}_x + xz \mathbf{a}_z$, ii) $Q = r \sin \phi \mathbf{a}_r + r^2 z \mathbf{a}_\phi + z \cos \phi \mathbf{a}_z$ and iii) $T = (1/r^2) \cos \theta \mathbf{a}_r + r \sin \theta \cos \phi \mathbf{a}_\theta + \cos \theta \mathbf{a}_\phi$. L3 12M

OR

- 2 a) Find the distance from A ($r=4, \theta=20^\circ$ & $\phi=120^\circ$) B ($r=2, \theta=80^\circ$ & $\phi=30^\circ$). L3 6M
b) Express $B = r^2 \mathbf{a}_r + \sin \theta \mathbf{a}_\phi$ in the cartesian co-ordinates. Hence obtain B at P (1,2,3). L3 6M

UNIT-II

- 3 a) State and explain Coulomb's law indicating clearly the units of quantities in the equation of force? L1 6M
b) Two point charges 1.5nC at (0, 0, 0.1) and -1.5nC at (0, 0, -0.1) are in free space. Treat the two charges as a dipole at the origin and find the potential at P(0.3, 0, 0.4). L3 6M

OR

- 4 a) Line charge density $\rho_L = 24 \text{ nC/m}$ is located in free space on the line $y=1$ and $Z=2 \text{ m}$ Find E at the point P(6,-1,3). L3 6M
b) A circular disc of 10 cm radius is charged uniformly with total charge of $100 \mu\text{C}$. Find E at a point 20cm on its axis. L2 6M

UNIT-III

- 5 Explain the phenomenon of polarization when a dielectric slab is subjected to an electric field? L4 12M

OR

- 6 a) Derive the continuity equation. What is its physical significance? L2 6M
b) Find the magnitude of D and P for a dielectric material in which $E=0.15 \text{ mV/m}$ and $\chi=4.25$. L3 6M

UNIT-IV

- 7 a) State and explain ampere's circuital law? L2 6M
b) Calculate the inductance of a solenoid of 200 turns wound tightly on a cylindrical tube of 6 cm diameter. The length of the tube is 60 cm and the solenoid is in air. L3 6M

OR

- 8 a) State and prove Stokes Theorem. L2 6M
b) The point charge $Q = 18 \text{ nC}$ has a velocity of $5 \times 10^6 \text{ m/s}$ in the direction $\mathbf{a}_v = 0.60\mathbf{a}_x + 0.75\mathbf{a}_y + 0.30\mathbf{a}_z$. Calculate the magnitude of the force exerted on the charge by the field $B = -3\mathbf{a}_x + 4\mathbf{a}_y + 6\mathbf{a}_z \text{ m}$. L3 6M

UNIT-V

- 9 Write Maxwell's equation in good conductors for time varying fields and static fields both in differential and integral form? L4 12M

OR

- 10 a) Define displacement current? L1 3M
b) State Faraday's law of electromagnetic induction? L1 3M
c) Write Maxwell equations in time varying fields? L1 3M
d) Define skin depth? L1 3M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

ANALOG COMMUNICATIONS

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Discuss the benefits and applications of Modulation. L2 5M
 b) An AM broadcast radio transmitter radiates 10KW of power if modulation percentage is 60. Calculate the carrier power. L3 4M
 c) Find the height of an antenna that need to transmit a signal with a frequency of 15MHz. L2 3M

OR

- 2 a) Derive an expression for single-tone amplitude-modulated wave. L3 6M
 b) With a neat sketch explain the operation of square law modulator. L2 6M

UNIT-II

- 3 a) Explain how a DSB-SC signal can be generated and demodulated. L2 8M
 b) Calculate the percentage power saving for SSB signal if AM wave is modulated for a depth of 50%. L3 4M

OR

- 4 a) Draw and explain the phase shift method for SSB generation. L2 6M
 b) Why VSB system is widely used for TV broadcasting? Explain. L1 4M
 c) Differentiate between DSBSC and VSB. L4 2M

UNIT-III

- 5 a) Explain the generation of FM waves using indirect method. L2 6M
 b) Draw and explain the block diagram of zero crossing detector. L2 6M

OR

- 6 a) Explain the generalized concept of angle modulation. L2 5M
 b) Explain the need for pre-emphasis and de-emphasis in the case of FM systems. How is it implemented? L2 7M

UNIT-IV

- 7 a) Draw and explain the operation of Super heterodyne AM receiver. L2 7M
 b) Explain the measurement of Noise Figure. L2 5M

OR

- 8 a) Discuss the different sources of noise. L2 5M
 b) Explain about the reasons for the existence of noise in DSB-SC and SSB systems. L2 7M

UNIT-V

- 9 a) Explain the following: L2 8M
 (i) Entropy (ii) Average information (iii) Information rate
 b) Differentiate between TDM and FDM. L4 4M

OR

- 10 a) For a pulse-amplitude modulated (PAM) transmission of voice signal having maximum frequency equal to $f_m = 3$ KHz, calculate the transmission bandwidth. It is given that the sampling frequency $f_s = 8$ KHz and the pulse duration $\tau = 0.1 T_s$. L3 6M
 b) Draw the circuit for PPM demodulator and explain its operation. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

THERMAL ENGINEERING

(MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Consider a single acting two stage reciprocating air compressors running at 300rpm. Air is compressed at a rate of 4.5 kg/min from 1.013 bar and 288K through a pressure ratio of 9 to 1. Both the stages have the same pressure ratio and the index of compression and expansion in both stages is 1.3. Assume a complete intercooling, find the indicated power and the cylinder swept volume required. Assume that the clearance volumes of both stages are 5% of their respective swept volume. L3 12M

OR

- 2 a) Derive the relation for Volumetric efficiency of a single stage reciprocating Compressor. L3 6M
b) Explain the working of roots blower and vane type blower with neat sketches. L2 6M

UNIT-II

- 3 A gas turbine on works air standard Brayton cycle. The initial condition of air is 25 °C and 1 bar the maximum pressure and temperature are limited to 3bar and 650°C. Determine i) Cycle efficiency ii) Heat supplied and rejected per kg of air iii) Work output iv) Exhaust temperature. L3 12M

OR

- 4 a) Describe the working of Closed gas turbine cycle with neat sketches. L2 6M
b) Explain various methods of Improving Brayton Cycle Efficiency. L2 6M

UNIT-III

- 5 a) Describe the Surface condenser with a neat sketch. L2 6M
b) Explain about super saturated flow in nozzles with neat sketch. L2 6M

OR

- 6 In a convergent - divergent nozzle, the steam enters at 15 bar and 300°C and leaves at a pressure of 2 bar. The inlet velocity to the nozzle is 150m/s. Find the required throat and exit areas for mass flow rate of 1 kg/s. Assume nozzle efficiency to be 93 percent and $C_p = 2.4 \text{ kJ/kg. K}$ L3 6M

UNIT-IV

- 7 In a impulse turbine steam issues from the nozzle with a velocity of 1200 m/s. The nozzle angle is 20°, the mean blade velocity is 375 m/s, the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 0.5 kg/s. Calculate (i) Blade angles,(ii)Relative velocity of steam entering the blades, (iii)Tangential force on the blades,(iv) Power developed, (v) Blade efficiency, Take blade velocity co-efficient as 0.8. L3 12M

OR

- 8 a) Develop the combined velocity triangle of an impulse turbine. L2 6M
b) Derive an expression for work done in reaction turbine. L3 6M

UNIT-V

- 9 The following details were noted in test on 4 cylinders 4 stroke engine, diameter =100 mm, stroke = 120 mm ,speed of the engine = 1600 rpm, fuel consumption = 0.2 kg/min, fuel calorific value = 44000 kJ/kg, the difference in tension on either side of the brake pulley = 40 kg brake drum circumference is 300 cm if the mechanical efficiency is 80 % calculate (i) brake thermal efficiency, (ii) indicated thermal efficiency (iii)indicated mean effective pressure (iv) brake specific fuel consumption. L3 12M

OR

- 10 a) Explain the theoretical and actual valve timing diagram for four-stroke diesel engine. L3 6M
b) Explain the working principle of a two-stroke petrol engine. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations September 2023

HUMAN VALUES AND PROFESSIONAL ETHICS

(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Which Human Values are essential in the life of Engineers? L3 12M
- OR**
- 2 a) Elaborate upon the following Human Values: L3 6M
(i) Self-confidence (iii) Co-operation
(ii) Civic Virtues (iv) Integrity
- b) How can stress be relieved through the practice of 'Yoga' and 'Meditation'? L2 6M

UNIT-II

- 3 Explain Kohlberg's Theory and Gilligan's Theory related to Engineering Ethics. L3 12M
- OR**
- 4 a) What are the various kinds of moral issues affecting the Engineers? L2 6M
b) How do Customs and Religion influence Engineering Ethics? L2 6M

UNIT-III

- 5 a) How do Engineers become responsible Experimenters? L5 6M
b) Analyze the Codes of Ethics. L5 6M
- OR**
- 6 a) Why and How is Accountability important in Engineering? L5 6M
b) Compare and contrast Engineering Projects and Standard Experiments? L2 6M

UNIT-IV

- 7 Analyze the Risk Benefits along with the Assessment of Safety and Risk? L1 12M
- OR**
- 8 a) What is Collective Bargaining? L2 6M
b) Discuss the salient features of the Professional Rights? L3 6M

UNIT-V

- 9 What are the global issues pertaining to the Multinational Corporations? L3 12M
- OR**
- 10 a) How are Engineers looked up as Expert Witnesses and Advisors? L3 6M
b) What is Corporate Social Responsibility? L3 6M

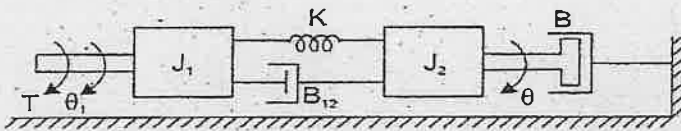
Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Write the differential equations governing the mechanical rotational system shown in the figure and find transfer function. L5 12M



OR

- 2 Find the transfer function of Armature controlled DC Motor. L3 12M

UNIT-II

- 3 a) Define steady state error? Derive the static error components for Type 0, Type 1 & Type 2 systems? L2 6M
 b) A positional control system with velocity feedback shown in Fig.1. What is the response c(t) of the system for unit step input? L5 6M

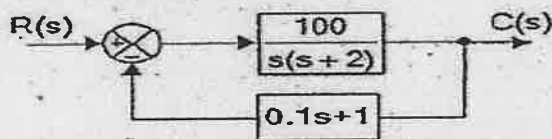


Fig 1 : Positional control system.

OR

- 4 What is the significance of controller? Explain the effect of P, I, and D controllers with block diagrams. L1 12M

UNIT-III

- 5 The open loop Transfer function of a unity feedback control system is given by $G(S) = \frac{K}{(S+2)(S+4)(S^2+6S+25)}$. Determine the value of K which will cause sustained oscillations in the closed loop system and what is the corresponding oscillation Frequency. L5 12M

OR

- 6 Explain the procedure for constructing root locus. L2 6M

UNIT-IV

- 7 Develop the Bode plot for the following transfer function and determine the system gain K for the gain cross over frequency to be 5 rad/sec. L4 12M

$$G(S) = \frac{KS^2}{(1+0.2S)(1+0.02S)}$$

OR

- 8 a) What is the Lead and Lag Compensators? Determine the transfer function of Lag Compensator and draw pole-zero plot. L3 6M
 b) Determine the transfer function of Lead Compensator and draw pole-zero plot. L3 6M

UNIT-V

- 9 Find a state model for the system whose Transfer function is given by L3 12M

$$G(S)H(S) = \frac{7S^2 + 12S + 8}{S^3 + 6S^2 + 11S + 9}$$

OR

- 10 a) Find the state model of the differential equation is $\ddot{y} + 2\dot{y} + 3y + 4y = u$ L1 6M
 b) Define the Controllability and Observability. Explain the testing methods for Controllability and Observability. L1 6M

(ME)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 A hollow shaft of 40 mm outer diameter and 25 mm inner diameter is subjected to a twisting moment of 120 N-m, simultaneously, it is subjected to an axial thrust of 10 kN and a bending moment of 80 N-m. Calculate the maximum compressive and shear stresses. L3 12M

OR

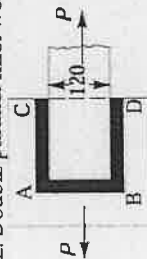
- 2 a) Define preferred numbers and explain its applications. L3 6M
b) What is meant by factor of safety? Explain how it can be used in design applications. L2 6M

UNIT-II

- 3 A hot rolled steel shaft is subjected to a torsional moment that varies from 330 N.m clockwise to 110 N.m counter clockwise and an applied bending moment at a critical section varies from 440N-m to-220 N-m. The shaft is of uniform cross-section and no key way is present at the critical section. Determine the required shaft diameter. The material has an ultimate strength of 550 MN/m² and yield strength of 410 MN/m². Take the endurance limit as half the ultimate strength, factor of safety of 2, size factor of 0.85 and surface finish factor of 0.62. L3 12M

OR

- 4 a) Describe the following theories of failures in detail L2 6M
(i) Rankine's theory (ii) Guest's or Tresca's theory (iii) Saint Venant theory
b) Explain Goodman's and Soderberg's equation for combination stresses L2 6M
- 5 Determine the length of the weld run for a plate of size 120 mm wide and 15 mm thick to be welded to another plate by means of L4 12M
1. A single transverse weld; and
2. Double parallel fillet welds when the joint is subjected to variable loads.



OR

- 6 a) List out the merits and demerits of welded joint over riveted joints L1 6M
b) A lever loaded safety valve has a diameter of 100 mm and the blow off pressure is 1.6 N/mm². The fulcrum of the lever is screwed into the cast iron body of the cover. Find the diameter of the threaded part of the fulcrum if the permissible tensile stress is limited to 50 MPa and the leverage ratio is 8. L3 6M

UNIT-IV

- 7 A shaft is supported by two bearings placed 1 m apart. A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25 kN. Another pulley 400 mm diameter is placed 200 mm to the left of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both the pulleys is 180° and $\mu = 0.24$. Determine the suitable diameter for a solid shaft, allowing working stress of 63 MPa in tension and 42 MPa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley L3 12M

OR

- 8 a) List out the applications of a cotter joint L1 4M
b) A knuckle joint is required to withstand a tensile load of 25 kN. Design the joint if the permissible stresses are: $\sigma_t = 56$ MPa; $\tau = 40$ MPa and $\sigma_c = 70$ MPa. L3 8M
- 9 Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32 kW at 960 r.p.m. The overall torque is 20 percent more than mean torque. The material properties are as follows : L3 12M
(a) The allowable shear and crushing stress for shaft and key material is 40 MPa and 80 MPa respectively.
(b) The allowable shear stress for cast iron is 15 MPa.
(c) The allowable bearing pressure for rubber bush is 0.8 N/mm².
(d) The material of the pin is same as that of shaft and key. Draw neat sketch of the coupling.

OR

- 10 a) Discuss the function of a coupling. Give at least three practical applications L2 6M
b) Design the rectangular key for a shaft of 50 mm diameter. The shearing and crushing stresses for the key material are 42 MPa and 70 MPa. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Define Electric field intensity and write the properties electric flux L1 6M
b) Apply Gauss Law to evaluate the electric flux density at a point P due to the point charge located at the origin L3 6M

OR

- 2 a) What is the capacitance between two concentric spheres? Obtain an expression. L2 6M
b) Find the capacitance per unit length of a coaxial conductor with outer radius of 5 mm and the inner radius of 0.5 mm and has dielectric $\epsilon_r = 5.0$. L3 6M

UNIT-II

- 3 a) Explain about Magnetic Flux Density L2 6M
b) In free space, $\mathbf{A} = 10 \sin \pi y \mathbf{a}_x + (4 + \cos \pi x) \mathbf{a}_z$ Wb/m. Find \mathbf{H} and \mathbf{J} . L3 6M

OR

- 4 a) Prove that the energy stored in an inductor is given by $W_L = (\frac{1}{2}) L I^2$. L2 6M
b) Obtain an expression for differential magnetic field strength $d\mathbf{H}$ due to differential current element $I d\mathbf{l}$ at the origin in the positive Z- direction. L2 6M

UNIT-III

- 5 a) Derive the expression for Moving Loop in Static B field L3 6M
b) In free space, $\mathbf{H} = 10 \sin(\omega t - 100x) \mathbf{a}_y$ A/m. Calculate \mathbf{E} L3 6M

OR

- 6 Why ampere's Law is In-consistent? Determine the Expressions for inconsistency of Ampere's law. L4 12M

UNIT-IV

- 7 a) Evaluate the wave characteristics of plane wave in lossless dielectric medium. L4 6M
b) Derive the characteristics of plane wave in free space. L3 6M

OR

- 8 Derive the expressions for reflection coefficient and transmission coefficient for reflection of plane wave at oblique in parallel polarization L4 12M

UNIT-V

- 9 a) What is VSWR? Derive an expression for SWR in terms of reflection coefficient. L3 6M
b) Find the characteristic impedance of a line at 1600Hz if the following measurements have been made on the line at 1600Hz, $Z_{OC} = 750\Omega$ and $Z_{SC} = 500\Omega$. L3 6M

OR

- 10 Deduce the equation for voltage and current at any point in a transmission line. L4 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023
COMPILER DESIGN

(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) What are the differences between a pass and phase of a compiler? L3 4M
b) Consider the following fragment of 'C' code: float i, j; i = i * 70 + j + 2; Write the output at all phases of the compiler for the above C code. L5 8M

OR

- 2 a) What is Bootstrapping? Explain with suitable example? L1,L2 6M
b) What is meant by Input buffering? Explain the use of sentinels in recognizing tokens with example. L1,L2 6M

UNIT-II

- 3 a) What are the problems in Top-down Parsing? L1 4M
b) What do you mean by ambiguity in Context Free Grammars (CFG)? Give an example for ambiguous grammar. Show that the grammar in your example is ambiguous. L1 8M
L5

OR

- 4 Construct the Predictive parsing table for the following grammar: L5 12M
 $S \rightarrow L = R / R$; $L \rightarrow *R / id$ $R \rightarrow L$

UNIT-III

- 5 Design CLR parser for the following grammar. L6 12M
 $E \rightarrow E + T$, $E \rightarrow T$, $T \rightarrow T * F$, $T \rightarrow F$, $F \rightarrow (E)$, $F \rightarrow id$

OR

- 6 a) Construct an annotated parse tree for the expression: $2 * 3 + 5n$. L5 6M
b) Write Syntax Directed Translation for converting infix expression to post fix form. L5 6M

UNIT-IV

- 7 a) Explain the various fields in the activation record. L2 4M
b) Write quadruple, triples and indirect triples for the following expression L5 8M
 $(x + y) * (y + z) + (x + y + z)$

OR

- 8 a) Discuss about the data structures used for the Symbol table. L2 4M
b) Explain about the stack storage allocation strategy with example and discuss its limitations. L2 8M

UNIT-V

- 9 a) What is a Basic block? With a suitable example explain procedure for identifying basic blocks. L3 6M
b) Write briefly about various Loop optimization techniques. L5 6M

OR

- 10 a) List and explain about object code forms. L1 6M
b) Explain code generation algorithm with an example. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

ELECTRIC MACHINES -III

(EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Explain the difference between the stationary armature and the rotating armature. What are the advantages of rotating armature over stationary armature? L2 6M
b) Compare the difference between salient pole and non-salient rotor. L3 6M

OR

- 2 a) Define harmonics and what are the various causes of producing harmonics in induced EMF? L3 6M
b) What are the effect of harmonics on induced EMF and winding factors and how they are suppressed? L4 6M

UNIT-II

- 3 Define a) Armature resistance b) Leakage reactance L4 12M
c) synchronous reactance e) Synchronous impedance

OR

- 4 Explain the terms direct axis and quadrature axis synchronous reactance of a salient pole alternator using two reaction analysis? L2 12M

UNIT-III

- 5 a) Explain the effect of change in excitation and mechanical power input of an alternator. L2 6M
b) Derive the expression for synchronizing current, synchronizing power and synchronizing torque. L2 6M

OR

- 6 a) Explain synchronizing alternator with infinite bus bar. L2 6M
b) Determine Sub transient, Transient and steady state reactance of synchronous machine experimentally. L3 6M

UNIT-IV

- 7 a) Explain the power flow equation of synchronous motor L2 6M
b) A three-phase 500V star-connected synchronous motor gives a net output of 17 kW on full load operating at 0.9 lagging power factor. Its armature resistance is 0.8Ω per phase. The mechanical losses are 1300 W. Estimate the current drawn by the motor and full load efficiency. L4 6M

OR

- 8 a) A 3-phase 11000V, the star-connected synchronous motor takes a load current of 100A. The effective synchronous reactance and resistance per phase are 30Ω and 0.8Ω respectively. Find the power supplied to the motor and induced EMF for 1) 0.8 p.f lag 2) 0.8 p.f lead. L4 6M
b) What is a synchronous condenser? What is the use of a synchronous condenser with a neat phasor diagram? L1 6M

UNIT-V

- 9 a) Explain the applications of synchronous motors. L2 6M
b) State the methods of starting the synchronous motor. Explain any two detail. L1 6M
- OR
- 10 a) Estimate the procedure for estimation of load current in a synchronous induction motor. L2 6M
b) Explain the comparison of synchronous and induction motors. L2 6M

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

B.Tech III Year I Semester Supplementary Examinations September 2023

HEAT AND MASS TRANSFER

(MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 Derive Fourier law of heat conduction. Describe the mechanism of heat conduction L3 12M

OR

2 a) An insulated pipe of 50mm outside diameter ($\epsilon = 0.8$) is laid in a room at 30°C . L3 6M

If the surface temperature is 250°C and the convective heat transfer coefficient is $10\text{W/m}^2\text{K}$. Calculate the heat loss per unit length of pipe.

b) A metallic plate 3cm thick is maintained at 400°C on one side and 100°C on the other. How much heat is transferred through the plate? L3 6M

UNIT-II

3 A hollow cylinder 5 cm inner diameter and 10 cm outer diameter has an inner surface temperature of 200°C and an outer surface temperature of 100°C . Determine the temperature of the point half way between the inner and the outer surfaces. If the thermal conductivity of the cylinder material of 70W/mK determine the heat flow through the cylinder per linear meter. L3 12M

OR

4 Calculate the rate of heat loss for a red brick wall of length 4m. Height 5m and thickness 0.2m. The temperature of the inner surface is 30°C . The thermal conductivity of red brick, $k=0.75\text{W/mK}$. Calculate also the temperature at an interior point of the wall, 20 cm diameter from the inner wall. L3 12M

UNIT-III

5 Air at 20°C is flowing along a heated flat plate at 134°C at a velocity of 3 m/s. The plate is 2 m long and 1.5 m wide. Calculate the thickness of the hydrodynamic boundary layer and the skin friction coefficient at 40 cm from the leading edge of the plate. The kinematic viscosity of air at 20°C may be taken at $15.06 \times 10^{-6}\text{m}^2/\text{s}$. L3 12M

OR

6 a) Describe the equation used for calculating heat transfer for flow over cylinders and spheres. L2 6M

b) Distinguish between natural and forced convection heat transfer L2 6M

UNIT-IV

7 Draw and explain various regimes in flow boiling inside a tube L2 12M

OR

8 It is observed that the intensity of the radiation emitted by the sun is maximum at a wavelength of $0.5\ \mu$. Assuming the sun to be a black body, estimate its surface temperature and emissive power. L3 12M

UNIT-V

9 Saturated steam at 120°C is condensing on the outer tube surface of a single pass heat exchanger. The heat transfer coefficient is $U_o = 1800\text{W/m}^2\text{K}$. Determine the surface area of a heat exchanger capable of heating 1000kg/h of water from 20°C to 90°C . Also compute the rate of condensation of steam. L3 12M

OR

10 Describe the counter flow heat exchanger. Draw a neat sketch of temperature distribution. Demonstrate the effectiveness of the counter flow heat exchanger using LMTD method. L3 12M

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

B.Tech III Year I Semester Supplementary Examinations September 2023

MICROPROCESSORS AND MICROCONTROLLER

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Draw a block diagram of Microprocessor based system and explain the functions of each component: Microprocessor, Memory and I/O and their line communication. L4 12M

OR

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

UNIT-II

- 3 a) With a neat sketch and explain, the De-multiplexing of the Bus AD7- AD0 in 8085. L3 6M
b) Discuss CMA, RAR, RAL, RLC and RRC instructions with suitable example. L2 6M

OR

- 4 a) Draw the pin diagram of the 8085 microprocessor and categorize the pins based on function. L4 8M
b) Outline the role of the following pins in the 8085 microprocessor. L2 4M
i) RESET OUT ii) ALE iii) HOLD & HLDA iv) TRAP

UNIT-III

- 5 a) List and explain the timers and counters operation in 8051 microcontrollers. L2 6M
b) Explain the different types of interrupts in the 8051 microcontroller. L2 6M

OR

- 6 a) Analyze the functionality of I/O ports circuits in 8051 microcontroller. L4 8M
b) List the features of 8051 microcontroller. L1 4M

UNIT-IV

- 7 a) Discuss the logical operations Instructions of 8051 microcontroller with an example. L2 6M
b) List various arithmetic operations performed in 8051 microcontroller. L1 6M

OR

- 8 a) Describe the different types of addressing mode supported by 8051 with suitable examples. L2 6M
b) Write and explain an ALP program of four time rotate right and rotate left carry operation in 8051. L2 6M

UNIT-V

- 9 a) Illustrate the seven-segment numeric led Display and explain the operation seven segment. L3 6M
b) List out types of 16 key layout and draw the diagram of the lead per key keyboard configuration. L4 6M

OR

- 10 a) Draw the pin diagram and explain the intelligent LCD display. L1 6M
b) Illustrate the multiple source interrupt circuit used in Lopri and Hipri program. L3 6M

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

B.Tech III Year I Semester Supplementary Examinations September 2023

DATA WAREHOUSING AND DATA MINING

(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 Discuss about Data Mining Task primitives with examples. L2 12M

OR

2 a) Explain about Dimensionality reduction methods? L2 6M

b) Classify different data pre-processing techniques used to improve the Overall quality of the mined data. L2 6M

UNIT-II

3 Explain about the Three-tier data warehouse architecture with a neat Diagram. L2 12M

OR

4 a) Classify a Star Query Model how will involve Multidimensional Databases. L2 6M

b) Elaborate about Attribute Oriented Induction with example. L5 6M

UNIT-III

5 a) Explain support, confidence and lift measure with respect to Association Mining. L2 6M

b) How will measure from Association Analysis to Correlation Analysis. L2 6M

OR

6 Describe the steps involved in improving the efficiency of the Apriori algorithm. L2 12M

UNIT-IV

7 a) What are the Issues regarding Classification and Prediction? Explain. L1 6M

b) Distinguish between supervised and unsupervised learning. L2 6M

OR

8 a) Define Decision Tree. Why are decision tree classifiers so popular? L2 6M

b) Evaluate the accuracy of a classifier in data mining. L5 6M

UNIT-V

9 a) What is clustering analysis? Explain different types of data in clustering with an example. L1 6M

b) How clusters are identified using DBSCAN algorithm? L1 6M

OR

10 a) Discuss in detail about Partitioning methods in clustering with Examples L2 6M

b) What are the basic approaches for generating an agglomerative hierarchical clustering? Explain the algorithm. L1 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023
METAL CUTTING AND MACHINE TOOLS

(MECH)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Explain briefly the orthogonal and oblique cutting with neat sketches. L2 6M
b) Define the elements of single point cutting tool. L2 6M

OR

- 2 a) Explain the basic elements in metal cutting with a neat sketch. L2 6M
b) In an orthogonal cutting operation on a lathe, the cutting tool used had the tool designation of 0-10-8-8-6-70-1mm. Calculate the values of (i) Back rake angle and (ii) side rake angle. L3 6M

UNIT-II

- 3 Describe the factors affecting the tool life and give Taylor' tool life equation. L2 12M

OR

- 4 a) Give the broad classification of cutting fluids used and explain them briefly. L2 6M
b) In an orthogonal turning operation, cutting speed is 8 m/min, cutting force 25kg, feed force 9kg, rake angle 10°, feed 0.3mm/rev and chip thickness 0.3mm. Determine the shear angle and chip thickness ratio. L3 6M

UNIT-III

- 5 a) Name the different types of lathe operations? Explain about facing and knurling with neat sketches. L1 6M
b) What are the different types of taper turning methods? Discuss any one method with suitable diagram. L2 6M

OR

- 6 a) What are the differences between a Turret and a Capstan lathe? L5 6M
b) Enumerate the advantages and disadvantages of a turret lathe. L2 6M

UNIT-IV

- 7 a) Name the types of cutters, work holding and tool holding devices used in used in drilling machine. L1 6M
b) Discuss briefly with neat sketch, a horizontal boring machine. L2 6M

OR

- 8 a) Explain briefly about the Up milling and Down milling processes. L2 6M
b) Explain briefly the plain indexing and differential indexing with suitable examples. L2 6M

UNIT-V

- 9 With a neat sketch, explain the construction and working of tool and cutter grinding machine. L3 12M

OR

- 10 a) How are broaching machines classified? L2 6M
b) What are the advantages, limitations and applications of broaching? L1 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

DIGITAL SIGNAL PROCESSING

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Evaluate the output $y(n)$ of a filter whose impulse response is $h(n)=\{1,2\}$ and input signal $x(n)=\{1,2,-1,2,3,-2,-3, -1,1,1,2,-1\}$ using overlap save method and overlap add method. L3 12M

OR

- 2 a) Write the significance of DFT in linear filtering. L3 4M
b) Find the linear convolution of the sequences $x(n)$ and $h(n)$ using DFT. L2 8M
 $x(n) = \{1,0,2\}$, $h(n) = \{1,1\}$.

UNIT-II

- 3 Design a digital Chebyshev IIR filter satisfying the following constraints. Let $T=1s$, apply Bilinear transformation. L3 12M
 $0.707 \leq |H(w)| \leq 1 ; 0 \leq w \leq 0.2\pi$
 $|H(w)| \leq 0.1 ; 0.5\pi \leq w \leq \pi$

OR

- 4 a) Explain the frequency transformation technique in analog domain for converting low pass to low pass filter and low pass to high pass filter with frequency response. L2 6M
b) Construct the parallel form structure of the system with difference equation. L2 6M
 $y(n)=-0.1y(n-1)+0.72y(n-2)+0.7x(n)-0.252x(n-2)$

UNIT-III

- 5 a) Write the design steps of FIR filter using Frequency sampling technique. L5 6M
b) Construct the cascade realization of the system function. L5 6M
 $H(Z) = 1 + (5/2)Z^{-1} + 2Z^{-2} + 2Z^{-3}$

OR

- 6 a) Explain the steps to be followed in designing FIR Filters using Fourier Series method. L5 6M
b) Realize the second order FIR system given below by using transposed form structure. $y(n)=2x(n)+4x(n-1)-3x(n-2)$ L2 6M

UNIT-IV

- 7 Find the steady state variance of the noise in the output due to quantization of input for the first order filter. $y(n)=ay(n-1)+x(n)$. L1 12M

OR

- 8 a) Find the characteristics of a limit cycle oscillation with respect to the system described by the difference equation $y(n)=0.97y(n-1)+x(n)$, Determine the dead band of the filter. L2 6M
b) Explain Signal scaling for second order IIR filter with necessary mathematical expressions. L3 6M

UNIT-V

- 9 Explain different applications of PDSPs in detail. L3 12M

OR

- 10 a) What are the advantages of the DSP processors over conventional microprocessors? L3 6M
b) What are the different buses of TMS320C54x and their functions? L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

SOFTWARE ENGINEERING

(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 What is Agile Process? How Extreme Programming (XP) is an effective agile Model? Explain with neat sketch? L2 12M

OR

2 a) What is Software Process? Distinguish any two Process Models? L4 6M

b) Define the term Software Engineering - A Layered Technology? L1 6M

UNIT-II

3 Define Requirement Engineering. Examine the steps involved in RE Process? L4 12M

OR

4 a) Discuss Domain analysis in detail with a neat sketch? L3 6M

b) What are all the UML Models that supplement the Use-case diagram Explain? L2 6M

UNIT-III

5 a) Explain common characteristics in the evolution of software design? L2 6M

b) Describe a Design model with various kinds of elements? L2 6M

OR

6 a) Distinguish between Analysis Model and Design Model? L5 6M

b) What is UI Design? Why it is so important? L4 6M

UNIT-IV

7 Examine the elements of interface analysis with examples? L3 12M

OR

8 a) Design the swim-lane diagram for ATM system? L6 6M

b) Define five quality attributes of WebApp Design? L1 6M

UNIT-V

9 Explain in detail about Black box testing with its types ? L2 12M

OR

10 a) Explain in brief about the levels/steps in Software Testing? L2 6M

b) Write down the Differences between Alpha and Beta testing? L4 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

FOUNDATION ENGINEERING

(CIVIL)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 A cantilever retaining wall of 7mts height retains sand. The properties of sand are $e=0.5$, $\phi=30^\circ$ and $G=2.7$. Using Rankines theory Determine the active earth pressure at the base when the backfill is (i) dry (ii) saturated (iii) submerged and also the resultant active force in each case. L3 12M

OR

- 2 a) Define earth pressure theory and various types of lateral earth pressure with neat sketch. L3 6M
b) Explain any two types of retaining walls with neat sketch. L2 6M

UNIT-II

- 3 A strip footing of 2m width is founded at a depth of 4m below the ground surface. Determine the net ultimate bearing capacity, using a) Terzaghi's equation ($N_c=5.7$, $N_\gamma=1.0$, $N_q=0.0$), b) Skempton's equation c) IS Code ($N_c=5.14$). The soil is clay ($\phi=0^\circ$, $C=10\text{kN/m}^2$). The unit weight of soil is 20kN/m^3 . L3 12M

OR

- 4 a) List the various parameters for choice of type of foundation. L2 6M
b) Explain the different types of shallow foundations with the help of neat sketches. L2 6M

UNIT-III

- 5 a) A 30cm diameter concrete pile is driven into a homogeneous consolidated clay deposit ($c_u=40\text{kN/m}^2$, $\alpha=0.7$). If the embedded length is 10m, estimate the safe load (F.S. =2.5). L3 6M
b) A square concrete pile (30cm side) 10 m long is driven into coarse sand ($\gamma=18.5\text{kN/m}^3$, $N=2.0$). Determine the allowable load (F.S. =3.0). L2 6M

OR

- 6 a) Explain the In-situ penetration tests for pile capacity. L1 6M
b) Explain settlement of pile groups in (a) cohesion less soils (b) cohesive soils. L2 6M

UNIT-IV

- 7 Explain different shapes of wells with neat sketch. L1 12M

OR

- 8 a) Explain the construction of open caisson with the help of neat sketch. L2 6M
b) Explain the construction of Floating caisson with the help of neat sketch. L2 6M

UNIT-V

- 9 What are different types of sheet pile walls? Explain any one with neat sketch. L1 12M

OR

- 10 a) Explain the pressure distribution and stability of free cantilever sheet pile. L3 6M
b) Explain in detail Rowe's moment reduction curves. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) Define (i) Accuracy (ii) Precision (iii) Resolution L2 6M
b) Describe in brief about the Dynamic characteristics of an instrument. L2 6M
- OR
- 2 With the help of circuit diagram, describe the construction & working of a Series type Ohmmeter. L3 12M

UNIT-II

- 3 a) Draw and explain the block diagram of CRO Probe. L1 4M
b) Write short notes on CRO Probes. L1 8M
- OR
- 4 a) Describe in detail the construction and working of a Digital Storage Oscilloscope. L2 8M
b) Explain in detail the important features of CRT. L2 4M

UNIT-III

- 5 a) Define Oscillator. L1 2M
b) Using a neat block diagram explain the operation of a function generator. L1 10M
- OR
- 6 a) Draw the block diagram of logic analyzer and explain its working. L1 8M
b) Write the applications of logic analyzer L1 4M

UNIT-IV

- 7 Derive the expression for current when the bridge is unbalanced Wheatstone. L3 12M
- OR
- 8 a) Derive an expression of frequency measurement using Wein's Bridge. L3 6M
b) A Wein bridge circuit consists of the following: $R_1=4.7K\Omega$, $C_1=5nf$, $R_2=20K\Omega$, $C_3=10nf$, $R_3=10K\Omega$, $R_4=100K\Omega$. Determine the frequency of the circuit. L3 6M

UNIT-V

- 9 Draw and Explain about the Operation of LVDT. L2 12M
- OR
- 10 a) Discuss in brief about Moving Coil type Velocity transducers. L2 6M
b) Discuss in brief about Moving Magnetic type Velocity transducers. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

NON- CONVENTIONAL ENERGY RESOURCES

(CE,EEE,MECH & CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 Discuss briefly about various forms of renewable energy? Enlist the future aspects of non conventional sources of energy in global scenario? L3 12M

OR

- 2 a) State the impact of solar power on environment? L3 6M
b) Briefly explain Direct & Diffuse Radiation. L2 6M

UNIT-II

- 3 What are the main components of a flat - plate solar collector, explain the function of each. L3 12M

OR

- 4 a) What are solar cells? Explain the functioning of solar cells? L2 6M
b) Make a brief note on solar PV applications? L2 6M

UNIT-III

- 5 a) Explain the basic principle of wind energy conversion. L5 6M
b) Explain horizontal axis type aero-generators. L5 6M

OR

- 6 a) Compare the effective performance characteristics of vertical versus horizontal axis wind turbine systems. L5 6M
b) What are power curves? Discuss about the relationship between wind speed and power output? L2 6M

UNIT-IV

- 7 How biomass conversion takes place? How are Gasifiers classified? What is Pyrolysis? L1 12M

OR

- 8 a) Classify Geothermal Sources? L2 6M
b) Explain the main types of turbines, which may be used for Geothermal energy conversion. L3 6M

UNIT-V

- 9 Explain the closed cycle OTEC System, with its advantages over open cycle system? L3 12M

OR

- 10 Make a short note on L3 6M
i. Hydrogen cells.
ii. Tidal energy.
iii. OTEC cycles.

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

INTRODUCTION TO COMMUNICATION SYSTEMS

(CE, EEE, MECH, ECE & CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 (i) Define Communication and draw the basic block diagram of communication system. L3 12M
(ii) A modulating signal $10 \cos(2\pi \times 10^3 t)$ is used to modulate a carrier signal $20 \cos(2\pi \times 10^4 t)$. Compute the modulation index, % of modulation index, frequency of sideband components and their amplitudes. What will be the bandwidth of modulated signal?

OR

- 2 a) List the advantages and disadvantages of Double side-band Full carrier. L3 6M
b) Explain shortly about i) Sidebands ii) Justify the reason for selecting the DSB-SC over DSB FC. L2 6M

UNIT-II

- 3 Derive the expression of modulation index of Phase modulation and compare frequency modulation with phase modulation. L3 12M

OR

- 4 a) Classify Frequency modulation techniques. L2 6M
b) What are the advantages, disadvantages, and applications of FM. L2 6M

UNIT-III

- 5 a) Define pulse modulation and different types of pulse modulation in analog and digital communication. L5 6M
b) Compare PAM, PWM and PPM techniques. L5 6M

OR

- 6 a) Explain noise figure and derive its expression. L5 6M
b) A mixer stage has a noise figure of 20 dB and it is preceded by another amplifier with a noise figure of 9 dB and an available power gain of 15 dB. Calculate the overall noise figure referred to the input. L2 6M

UNIT-IV

- 7 Discuss in brief about ASK coherent Modulator and Demodulator using a neat block diagram. L1 12M

OR

- 8 a) State sampling theorem. What is Nyquist rate and Nyquist interval? L2 6M
b) Explain the Process of Quantization with suitable example. L3 6M

UNIT-V

- 9 A spectrum of 30 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (i) four-cell reuse, (ii) seven-cell reuse, and (iii) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems. L3 12M

OR

- 10 a) Illustrate with a timing diagram how call initiated by a mobile user is established. L3 6M
b) Explain second generation (2G) wireless networks. L3 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

GENERATION OF ENERGY FROM WASTE

(CE, EEE, MECH, ECE & CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 Explain biogas digester for waste management briefly L2 12M
OR

2 a) What is Forest residue? L1 2M
b) What are the Sources and Types of Solid Wastes? L3 10M

UNIT-II

3 What are the different types of pyrolysis process? Compare the different types of pyrolysis process. L3 12M

OR

4 a) Define Syngas? How syngas is produced. L1 6M
b) Mention primary applications of Syngas in various engineering fields. L3 6M

UNIT-III

5 Explain the design, construction and operation of Downdraft gasifier. L3 12M
OR

6 Explain the design, construction and operation of fixed bed system. L3 12M

UNIT-IV

7 What is meant by exotic design of Biomass Stove? Explain in detail. L2 12M
OR

8 Write down the Fundamentals of Biomass Combustion. L2 12M

UNIT-V

9 Explain the following in detail with respect to biomass plants. L2 12M
(i) Bio-Chemical Conversion. (ii) Anaerobic digestion.

OR

10 a) Write short notes on Thermo Chemical Conversion. L2 6M
b) Write short notes on Direct combustion of Biomass. L2 6M

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SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations September 2023

MANAGEMENT SCIENCE
(CE, EEE, MECH, ECE & CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

1 Explain Taylor's scientific theory and Henry Fayol's principles of Management. L2 12M

OR

- 2 a) Interpret the different forms of Organizations? L6 6M
b) List out the social responsibilities of management. L1 6M

UNIT-II

3 Describe the Nature and Functions of Marketing Management. L2 12M

OR

- 4 a) Distinguish between job and mass productions. L4 6M
b) Comment on Deming's contribution to quality. L2 6M

UNIT-III

- 5 a) Discuss the concept of Human Resource Planning. L2 6M
b) Explain different Methods of Performance Appraisal. L2 6M

OR

- 6 a) Restate the important steps involved in grievance handling procedure. L1 6M
b) What are the factors affecting wage and salary administration? L1 6M

UNIT-IV

7 Evaluate the best uses of Program Evaluation Review Technique? L5 12M

OR

- 8 a) List the problems faced while implementing a corporate plan. L1 6M
b) How to Determine the Critical Path in Project Management. L1 6M

UNIT-V

9 Explain the advantages and disadvantages of ERP system. L2 12M

OR

- 10 a) Highlight the main objectives of TQM? L1 6M
b) Tell the effective steps for success in business process outsourcing? L1 6M