

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

**POWER ELECTRONICS**

(EEE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

1 Explain the construction of SCR with neat diagram. Draw its V-I characteristics L4 12M

OR

2 a) Explain V-I Characteristics of Power Diode? L2 6M

b) Necessity of Commutation, What are the Types of Commutation? L2 6M

**UNIT-II**

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

OR

4 Explain the operation of Three phase fully controlled rectifier with R load and also derive the average and RMS load voltage. L2 12M

**UNIT-III**

5 Discuss the principle of operation of DC-DC step down chopper, derive average output voltage and current equations along with suitable waveforms. L2 12M

OR

6 The buck converter has an input voltage of  $E_{dc}=12V$ . the required average output voltage is  $E_0=5V$  At  $R=500\Omega$  and the peak-to-peak output voltage is 20mV, the switching frequency is 25kHz. if the peak-to-peak ripple current of inductor is limited to 0.8A, determine

i) the duty cycle

ii) the filter inductance L and

iii) the filter capacitor C, and

iv) the critical values of L and C.

**UNIT-IV**

7 Explain the operation of single phase to single phase bridge type step-down cycloconverter with R-L Load for continuous conduction mode. L2 12M

OR

8 Explain the principle of operation of single phase to single phase step-up midpoint cycloconverter. L2 12M

**UNIT-V**

9 Draw and Explain the operation of single phase full wave AC voltage controller for R-L load with necessary waveforms. L2 12M

OR

10 Explain the operation of TRIAC with R and R-L loads L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)  
B.Tech III Year I Semester, Regular Examinations Dec 2021/ January 2022  
**ANTENNAS AND WAVE PROPAGATION**  
(ECE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Explain Radiation Intensity and Antenna Gain. L2 6M  
b) A dipole having a length of 3 cm is operated at 1 GHz. The efficiency factor  $K=0.6$ . Calculate the radiation resistance? L3 6M

**OR**

- 2 a) Explain the Directivity and Effective aperture of an Antenna L2 6M  
b) An antenna has a radiation resistance of  $72\Omega$ , and a loss resistance is  $8\Omega$  if the power gain of 16. Calculate the directivity of the antenna. L2 6M

**UNIT-II**

- 3 a) Discuss about the Folded dipole antenna and its input impedance. L2 6M  
b) Explain about the construction and operation of helical antenna. L2 6M

**OR**

- 4 a) Discuss about the helical antenna geometry, Normal mode of radiation and its applications. L2 6M  
b) Calculate the directivity and half power beamwidth. For a 20 turns helical antenna operating at 3GHz with circumference of 10cm and spacing between the turns 0.3 wavelength is operating at 3GHz. L3 6M

**UNIT-III**

- 5 a) A parabolic dish provides a power gain of 50 dB at 10 GHz with 70% efficiency. Find out i)HPBW ii) BWFN iii) Diameter L2 6M  
b) What are the applications of Micro strip antenna? What is reflector antenna and give its significance? L1 6M

**OR**

- 6 a) Explain about the Reciprocity with respect to antenna measurements. L5 6M  
b) Explain the gain measurement using absolute method. L5 6M

**UNIT-IV**

- 7 a) A broad side array operating at 10cm wavelength consists of 4 half wave dipole spaced 50 cm each element carries radio frequency current in the same phase and magnitude 0.25A. Calculate the radiated power, half power beamwidth of major lobe. L5 6M  
b) What is principle of pattern multiplication? List the advantages and disadvantages. L1 6M

**OR**

- 8 a) Compare the Broad side array and End fire array. L5 6M  
b) Write short notes on broad side and end fire arrays. L1 6M

**UNIT-V**

- 9 a) Explain Skip distance and derive its expression. L5 6M  
b) At a particular day time, the critical frequency observed in E and F layers are 2.5 MHz and 8.5 MHz respectively. Calculate the maximum electron density of both the layer in cubic meter? L4 6M

**OR**

- 10 a) Explain the relation between MUF and skip distance? L5 6M  
b) Explain critical frequency and its expression. L5 6M

SIDDARtha INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

DESIGN OF MACHINE ELEMENTS - I

(Mechanical Engg.)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) What is meant by factor of safety? Explain how it can be used in design application L1 6M
- b) Explain the general design procedure while designing a machine element L2 6M

OR

- 2 a) Derive an expression for the impact stress induced due to a falling load. L5 6M
- b) An unknown weight falls through 10 mm on a collar rigidly attached to the lower end of a vertical bar 3 m long and 600 mm<sup>2</sup> in section. If the maximum instantaneous extension is known to be 2 mm, what is the corresponding stress and the value of unknown weight? Take  $E = 200 \text{ kN/mm}^2$  L3 6M

**UNIT-II**

- 3 a) Explain stress concentration in detail and various methods to reduce stress L2 6M
- b) Define the following terms L1 6M
  - i) Theoretical Stress concentration factor
  - ii) Fatigue Stress concentration factor
  - iii) Endurance limit with the effect of size, load and surface factors
  - iv) Fatigue failure

OR

- 4 a) Define the term "stress concentration" with suitable diagram and "stress concentration factor" also. L1 6M
- b) A circular bar of 500 mm length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20 kN and a maximum value of 50 kN. Determine the diameter of bar by taking a factor of safety of 1.5, size effect of 0.85, surface finish factor of 0.9. The material properties of bar are given by: ultimate strength of 650 MPa, yield strength of 500 MPa and endurance strength of 350 MPa L3 6M

**UNIT-III**

- 5 a) Explain Stress in screw fasteners due to Combined Forces? L2 6M
- b) Two machine parts are fastened together tightly by means of a 24 mm tap bolt. If the load tending to separate these parts is neglected, find the stress that is set up in the bolt by the initial tightening. L1 6M

OR

- 6 a) What is an eccentric loaded welded joint? Discuss the procedure for designing such a joint. L2 6M
- b) A plate 100 mm wide and 10 mm thick is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 kN. Find the length of weld if the permissible shear stress in the weld does not exceed 55 MPa. L3 6M

**UNIT-IV**

- 7 a) What are the applications of a cottered joint? L1 6M
- b) A knuckle joint is required to withstand a tensile load of 25 kN. Design the joint if the permissible stresses are:  $\sigma_t = 56 \text{ MPa}$ ;  $\tau = 40 \text{ MPa}$  and  $\sigma_c = 70 \text{ MPa}$ . L2 6M

OR

- 8 A steel solid shaft transmitting 15 kW at 200 r.p.m. is supported on two bearings 750 mm apart and has two gears keyed to it. The pinion having 30 teeth of 5 mm module is located 100 mm to the left of the right hand bearing and delivers power horizontally to the right. The gear having 100 teeth of 5 mm module is located 150 mm to the right of the left hand bearing and receives power in a vertical direction from below. Using an allowable stress of 54 MPa in shear, determine the diameter of the shaft. L3 12M

**UNIT-V**

- 9 a) What is a key? State its function with neat sketch. L2 6M
- b) Design the rectangular key for a shaft of 50 mm diameter. The shearing and crushing stress for the key material are 42 MPa and 70 MPa L1 6M

OR

- 10 Describe, with the help of neat sketches, the types of various shaft couplings mentioning the uses of each type. L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)  
B.Tech III Year I Semester Regular Examinations Dec 2021/ January 2022  
**COMPILER DESIGN**  
(CSE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Define Compiler and Explain the phases of a Compiler L1 6M  
b) Explain about Language Processors L2 6M

**OR**

- 2 a) Explain about Lex tool L2 6M  
b) Explain about specifications of Tokens L2 6M

**UNIT-II**

- 3 a) Define Context Free Grammar and Consider the following grammar- L4 6M  
S → aB / bA  
S → aS / bAA / a  
B → bS / aBB / b

Derive string w = aaabbabbba using Left Most Derivation

- b) Write about Left Recursion and elimination of Left recursion L2 6M

**OR**

- 4 a) Eliminate left recursion for the following grammar: L4 6M

E → E+T | T

T → T\*F | F

F → (E) | id

- b) Explain about Parse trees L2 6M

**UNIT-III**

- 5 a) Construct SLR Parser for the Following Grammar? L4 6M

S → E

E → E + T | T

T → T \* F | F

F → id

- b) Describe in detail about abstract syntax tree L2 6M

**OR**

- 6 a) Explain about specification of a simple type checker L2 6M

- b) Construct CLR Parser for the Following Grammar? L4 6M

E ⇒ BB

B ⇒ cB / d

**UNIT-IV**

- 7 a) Discuss Symbol Table operations L2 6M

- b) Write about operations on symbol table? L2 6M

**OR**

- 8 a) Explain Three address code with an example L2 6M

- b) Write about activation Record L2 6M

**UNIT-V**

- 9 a) Explain Loop optimization techniques with example L2 6M

- b) Write and Explain the Issues in Design of Code Generator L2 6M

**OR**

- 10 a) With suitable example of a basic block, explain the code-improving transformations of a Basic Block L2 6M

- b) Explain copy propagation with an example. L2 6M

Q.P. Code: 19CE0116

R19

SIDDARATHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

HYDRAULIC ENGINEERING  
(CIVIL ENGINEERING)

Time: 3 Hours

Max. Marks: 60

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

- 1 a) Derive an expression for maximum velocity of flow through a circular section. [L1] 6M  
b) Determine the expression for the most economical trapezoidal section in terms of side slope. [L1] 6M

OR

- 2 a) Derive the condition for a trapezoidal channel to be most economical. [L1] 6M  
b) A rectangular channel carries water at a rate of 350 litre/sec when bed slope is 1 in 2500. Find the most economical dimensions of the channel if  $C = 50$ . [L1] 6M

UNIT-II

- 3 a) A sluice gate discharges water into a horizontal rectangular channel with a velocity of 10 m/s and the depth of flow of 1m. Determine the depth of flow after jump and consequent loss in total head. [L3] 6M  
b) Write about the classification of bottom channel slope. [L1] 6M

OR

- 4 a) A hydraulic jump forms at the downstream end of spillway carrying 17.93 m<sup>3</sup>/s discharge. If depth before jump is 0.80 m, determine the depth after the jump and energy loss. [L3] 6M  
b) Derive an expression for loss of energy due to hydraulic jump. [L3] 6M

UNIT-III

- 5 A jet of water of diameter 50mm strikes a fixed plate in such a way that the angle between the plate and the jet is 30°. The force exerted in the direction of jet is 1417.5N. Determine the rate of flow of water. [L3] 12M

OR

- 6 A 7.5 cm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45 degrees to the axis of the jet. Calculate the normal pressure on the plate. [L3] 12M

- (i) When the plate is stationary and  
(ii) When the plate is moving with a velocity of 15 m/s and away from the jet. Also determine the power and efficiency of the jet when the plate is moving.

UNIT-IV

- 7 Explain the different types of hydraulic similarities that must exist between a prototype and its model. [L2] 12M

OR

- 8 a) What are different types of dimensionless numbers? Explain them. [L1] 6M  
b) Define the terms: model, prototype, hydraulic similitude. [L2] 6M

Q.P. Code: 19CE0116

R19

- 9 a) A Pelton wheel is to be designed for a head of 60m when running at 200r.p.m. The pelton wheel develops 95.6475kW shaft power. The velocity of the buckets = 0.45 times the velocity of the jet, overall efficiency = 0.85 and coefficient of the velocity = 0.98. [L3] 6M  
b) A jet strikes the buckets of Pelton wheel, which is having shaft power as 15450kW. The diameter of each jet is given as 200mm. If the net head on the turbine is 400m. Find the overall efficiency of the turbine, take  $C_v = 1.0$ . [L3] 6M

OR

- 10 The following data is given for a Francis turbine. [L3] 12M  
Net head = 60m; Speed = 700r.p.m; shaft power = 294.3KW; Overall efficiency = 84%; Hydraulic efficiency = 93%; flow ratio = 0.20; breadth ratio = 0.1; Outer diameter of the runner = 2x inner diameter of runner. The thickness of vanes occupies 5% of circumferential area of the runner, velocity of flow is constant at inlet and discharge is radial at outlet. Determine: (i) Guide blade angle (ii) Runner vane angles at inlet and outlet (iii) Diameters of runner at inlet and outlet and (iv) Width of wheel at inlet.

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022  
ELECTRICAL POWER GENERATION & TRANSMISSION SYSTEMS  
(EEE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 With the help of block diagram explain the principle of operation of thermal power station (TPS). L1 12M

OR

- 2 a) What are the different types of hydro power plants? L1 3M  
b) With the help of block diagram explain the Hydro electric power generation L2 9M

**UNIT-II**

- 3 Write short note on (i) FBR (ii) BWR (iii) PWR L1 12M

OR

- 4 Discuss the following components in nuclear power station briefly. L2 12M  
(i) Moderator (ii) Control rods (iii) Reflector (iv) Coolant (v) Nuclear reactor.

**UNIT-III**

- 5 a) What is Skin effect? Explain briefly L1 3M  
b) Determine the inductance/phase/km of a 3-phase double circuit line. The radius of each conductor is 20mm and the conductors are placed on the circumference of an imaginary circle at a distance of 7m forming a regular hexagonal figure. L3 9M

OR

- 6 a) Derive the expression for the capacitance of a single phase two wire line. L3 6M  
b) A single phase transmission line has two parallel conductors 3m apart, radius of each conductor being 1cm. Calculate the capacitance of the line per km. L2 6M

**UNIT-IV**

- 7 A 3-phase, 50Hz overhead transmission line 100km long has the following constant: L2 12M  
Resistance/km/phase = 0.1ohm Inductive reactance/km/phase= 0.2 ohm Capacitive susceptance/km/phase =  $0.04 \times 10^{-4}$  siemen Determine (i) sending end current (ii) sending end voltage (iii) Sending end power factor (iv) Transmission efficiency when supplying a balanced load of 10,000kW at 66kV, 0.8 power factor lagging. Use nominal-T method.

OR

- 8 Derive expression for voltage regulation of medium transmission lines using nominal  $\pi$  method with equivalent circuit and necessary phasor diagram L2 12M

**UNIT-V**

- 9 a) A string of six insulator units has a self capacitance is equals to 10 times the pin to earth capacitance. Find (i) Voltage distribution across various units as a percentage of total voltage across the string. (ii) The string efficiency. L3 6M  
b) A certain 3-phase equilaterally spaced transmission line has a total corona loss of 55KW at 110 KV and a loss of 110KW at 120 KV. What is the disruptive critical voltage between lines? What is the corona loss at 125KV? L1 6M

OR

- 10 a) Derive the expression for sag and tension when the supports are at unequal heights. L2 6M  
b) An overhead transmission line at a river crossing is supported from two towers at heights of 40m and 90 m above water level. The horizontal distance between the towers being 400m. If the allowable tension is 2000kg, find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1kg/m L3 6M

**UNIT-I**

- 1 a) Explain the DPCM system with neat diagram. L2 6M  
b) Derive the quantization noise in PCM. L3 6M

OR

- 2 a) Compare PCM, DPCM, and DM. L2 6M  
b) Derive the S/N ratio of PCM. L3 6M

**UNIT-II**

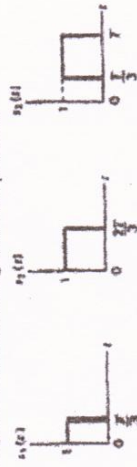
- 3 a) Derive the expression for the Nyquist criterion for distortion less baseband Transmission in the absence of noise in terms of time domain. L3 6M  
b) Explain duo-binary signaling scheme through one example. L2 6M

OR

- 4 a) Derive the expression for impulse response of a matched filter. L3 6M  
b) Describe Eye pattern and construct the diagram. L2 6M

**UNIT-III**

- 5 a) Describe the concept of continuous AWGN channel into a vector channel. L2 6M  
b) Consider the signals  $s_1(t)$ ,  $s_2(t)$ ,  $s_3(t)$ , shown in fig. Find the orthogonal basis function using Gram Schmidt orthogonalization procedure. L3 6M



OR

- 6 a) Explain the concept of Schwarz Inequality. L2 6M  
b) Sketch the signal constellation diagrams for  $N=M=2$ . L3 6M

**UNIT-IV**

- 7 a) Compare all the digital modulation techniques. L2 6M  
b) Derive an expression for probability of error in BFSK. L3 6M

OR

- 8 a) How will you differentiate binary PSK and M-PSK, explain with block diagrams? L2 6M  
b) Derive an expression for probability of error of coherent binary ASK. L3 6M

**UNIT-V**

- 9 a) Explain the concept of matrix representation of Linear block codes. L2 6M  
b) The Generator matrix(G) for a (7, 4) block code is given below. L3 6M

1 0 0 0 1 0 1  
0 1 0 0 1 1 1  
0 0 1 0 1 1 0  
0 0 0 1 0 1 1

Determine the Parity check matrix (G).

OR

- 10 a) Explain the Convolutional Encoding and Decoding methods. L2 6M  
A generator matrix for a (6, 3) block code is given below. L3 6M  
1 0 0 0 1 1  
b) 0 1 0 1 0 1  
0 0 1 1 1 0

Find the all possible code vectors

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) What do you understand by cutting tool nomenclature? Sketch and label the tool angles. L2 6M  
b) Explain the types of chip breakers. L2 6M

**OR**

- 2 a) Derive the equation for chip thickness ratio and shear plane angle. L2 6M  
b) Compare the orthogonal and oblique cutting with neat sketch. L2 6M

**UNIT-II**

- 3 In orthogonal turning of a 70 mm diameter titanium bar on a lathe, the following data were obtained: Rake angle  $6^\circ$ , cutting velocity 120 m/min, feed rate 0.3mm/rev, cutting force 170 kg, feed force 65kg. Calculate the shear plane angle, coefficient of friction, cutting power, chip flow velocity and shear force, if chip thickness is 0.4mm L3 12M

**OR**

- 4 The following equation for tool life is given for a turning operation  $VT^{0.14} f^{0.77} d^{0.37} = C$ . A 60-minute tool life was obtained while cutting at cutting velocity = 35 m/min, feed rate = 0.2 mm/rev and depth of cut = 2 mm. Determine the change in tool life if the cutting speed, feed and depth of cut are increased by 15 % individually and also taken together. L3 12M

**UNIT-III**

- 5 a) What are the different types of taper turning methods? Discuss any one method with suitable diagram. L2 6M  
b) Write any three G codes and three M codes with their function. L1 6M

**OR**

- 6 a) Explain the working principle of Lathe. Name at least five work holding devices in Lathe. L2 6M  
b) Explain the turret indexing mechanism in capstan lathe. L2 6M

**UNIT-IV**

- 7 a) Differentiate the drilling and boring operations. L2 6M  
b) Describe the Whitworth quick return mechanism used in shaper. L2 6M

**OR**

- 8 a) Explain up-milling process and down milling process. L2 6M  
b) Explain briefly plain indexing and differential indexing with suitable example. L2 6M

**UNIT-V**

- 9 a) Compare the differences among grinding, lapping and honing operations. L2 6M  
b) How grinding wheel is specified. Explain with an example. L2 6M

**OR**

- 10 a) Explain the effect of different grinding wheel parameters on grinding performance? L2 6M  
b) What is honing? How and why, it is performed? L2 6M



SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

DESIGN AND ANALYSIS OF ALGORITHMS  
(CSE)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a) What is asymptotic notation? Explain different types of notations with L2 6M  
examples.  
b) Illustrate an algorithm for (i) Finding factorial of n number (ii) Sum of n natural L2 6M  
numbers.

OR

- 2 a) Define disjoint sets? Explain different types of disjoint sets operations with L2 6M  
examples.  
b) Solve the following recurrence: i)  $T(n) = 7T(n/3) + n^2$  ii)  $T(n) = 3T(n/2) + n$  L3 6M

UNIT-II

- 3 What is divide and conquer strategy? Explain the working strategy of Binary L2 12M  
Search and find element 60 from the below set by using the above technique:  
{10, 20, 30, 40, 50, 60, and 70}. Analyze time complexity for binary search

OR

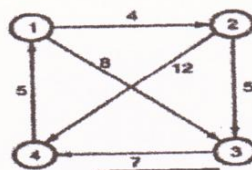
- 4 a) Compare between BFS and DFS techniques L4 6M  
b) Solve an algorithm for techniques of binary trees with examples L3 6M

UNIT-III

- 5 Construct an optimal solution for Knapsack problem, where  $n=7, M=15$  and L3 12M  
 $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 5, 15, 7, 6, 18, 3)$  and  $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 3, 5, 7, 1, 4, 1)$  by using Greedy strategy.

OR

- 6 Construct an algorithm for All pairs of shortest path and calculate shortest path L6 12M  
between all pairs of vertices by using dynamic programming method for the  
following graph.



UNIT-IV

- 7 a) Explain the principles of FIFO branch and bound L2 6M  
b) Recall the graph coloring. Explain in detail graph coloring with an example L5 6M

OR

- 8 Construct the LC branch and bound search. Consider knapsack instance  $n=4$  L6 12M  
with capacity  $M=15$  such that  $p_i = \{10, 10, 12, 18\}$ ,  $w_i = \{2, 4, 6, 9\}$  apply LC branch and  
bound technique.

UNIT-V

- 9 Construct the non-deterministic algorithms with example. L3 12M
- OR
- 10 Illustrate the satisfiability problem and write the algorithm L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
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B.Tech III Year I Semester Regular Examinations January 2022

GEOTECHNICAL ENGINEERING

(Civil Engineering)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Using three phase diagram of soil, develop an expression for Void ratio, water content, specific gravity and degree of saturation L2 6M  
 b) The moist unit weight of soil sample is 19.2 KN/m<sup>3</sup> and has water content of 9.8%. The specific gravity of soil particles is 2.69. Determine dry unit weight, void ratio and porosity and degree of saturation. L3 6M

OR

- 2 a) Explain in detail the Indian Standard classification System and list out group symbols in detail. L2 6M  
 b) Define permeability. Explain various factors affecting permeability L2 6M

**UNIT-II**

- 3 Explain the procedure of Core Cutter method with neat sketch. L2 12M

OR

- 4 a) The Maximum dry density of a sample by the light compaction test is 1.78g/ml at an optimum water content of 15%. Find the air voids and degree of saturation  $G=2.67$ . What would be the corresponding value of dry density on the zero air voids at optimum moisture content. L3 6M  
 b) Explain the procedure of Sand replacement method. L2 6M

**UNIT-III**

- 5 Explain vertical stress under line load, strip load, circular load and rectangular area with neat sketch. L2 12M

OR

- 6 Explain the procedure of unconfined compression test with neat sketch. L2 12M

**UNIT-IV**

- 7 a) Explain factor of safety with respect to shear strength, cohesion and friction L2 6M  
 b) Explain Taylor's stability number. L2 6M

OR

- 8 Analyze the slope, if it is made of clay having  $c' = 30 \text{ kN/m}^2$ ,  $\Phi' = 20^\circ$ ,  $e = 0.65$  and  $G = 2.67$  and under the following conditions: (i) When the soil is dry (ii) When water seeps parallel to the surface of the slope (iii) When the slope is submerged slope angle =  $25^\circ$  L3 12M

**UNIT-V**

- 9 a) Discuss various open excavation methods for conducting soil exploration. L2 6M  
 b) How boring operations are carried out using rotary auger boring and percussion drilling. L2 6M

OR

- 10 Explain in detail how cone penetration test is conducted with neat sketch. L2 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
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B. Tech III Year I Semester Regular Examinations January 2022

**CAD/CAM**  
**(MECHANICAL ENGINEERING)**

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Identify and List the Evaluation criteria CAD standards. L1 6M  
b) Describe briefly about the Co-ordinate systems L6 6M

**OR**

- 2 a) Illustrate detail about 2D and 3D transformations? L2 6M  
b) Briefly explain about homogeneous transformations L1 6M

**UNIT-II**

- 3 a) Describe briefly Parametric and non-Parametric representations L2 6M  
b) Explain detail about solid modeling and their representation. L5 6M

**OR**

- 4 a) Discuss clearly the Constructive Solid Geometry (CSG) method to create models. L2 6M  
b) Describe about boundary representation approach. L2 6M

**UNIT-III**

- 5 a) Differentiate NC and CNC and Basic CNC input data and Explain detail about. L4 6M  
b) What are the advantages and disadvantages of Numerical control? L1 6M

**OR**

- 6 a) Discuss Briefly about various NC procedure and Explain types of Numerical Control. L2 6M  
b) State and draw a neat sketch of the cutter radius compensation. L2 6M

**UNIT-IV**

- 7 a) Briefly explain about the integration of CAQC with CAD/CAM. L2 6M  
b) Determine the components of FMS. L2 6M

**OR**

- 8 a) Illustrate FMS and explain about material handling systems with neat sketch. L2 6M  
b) Define Part families and Write Short notes on Part families. L2 6M

**UNIT-V**

- 9 What is Computer Aided Process Planning (CAPP)? Explain the any one type of CAPP with neat sketches. L2 12M

**OR**

- 10 a) Write Short notes on MRP-II and advantage and dis advantage. L2 6M  
b) Briefly explain about Retrieval type system and Generative type. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations Jan 2022

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 a) What is data cleaning? Describe in detail the different methods for data cleaning L5 6M  
b) Discuss how to classify data mining systems. L1 6M

OR

- 2 Explain in detail about Data Mining Functionalities with example. L5 12M

**UNIT-II**

- 3 Explain about the Three-tier data warehouse architecture with a neat diagram. L5 12M

OR

- 4 a) Explain in detail about Fact constellation schema with an example. L5 6M  
b) Distinguish between OLTP and OLAP. L5 6M

**UNIT-III**

- 5 a) Explain about market basket Association mining L2 6M  
b) Explain support, confidence and lift measure with respect to association rule mining. L2 6M

OR

- 6 Explain about Apriori Algorithm with an example L5 12M

**UNIT-IV**

- 7 Define Neural Network. Explain the Classification by Back Propagation L1 12M

OR

- 8 a) Discuss about Accuracy and Error measures. L6 6M  
b) What is prediction? Explain about Linear regression method. L1 6M

**UNIT-V**

- 9 a) Infer the working of k-means clustering. L4 6M  
b) Compare Agglomerative and Divisive hierarchical clustering. L5 6M

OR

- 10 a) Discuss in detail about the Applications and trends in Data Mining. L6 6M  
b) Describe the working of PAM algorithm. L2 6M

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 per cent, in either case. L3 12M

OR

- 2 A national highway having design speed 80 kmph passing through rolling terrain in heavy rainfall area has a horizontal curve of radius 500 m. Design the length of transition curve assuming suitable data. Pavement is rotated about the center for super elevation. L3 12M

**UNIT-II**

- 3 Explain grade separated intersections, the advantages and limitations L1 12M

OR

- 4 Explain briefly about traffic control devices. L1 12M

**UNIT-III**

- 5 Design a new flexible pavement for a two-lane undivided carriageway using the following data: Design CBR value of sub grade = 8.0%, Initial traffic on completion of construction = 1800 CV per day, Average growth rate = 6.0% per year, Design life = 15 years, VDF value = 2.5. L3 12M

OR

- 6 What are the factors should be considered for the design of flexible and rigid pavements and discuss the significance of each. L1 12M

**UNIT-IV**

- 7 a) What are the requirements of sleepers? L1 6M  
b) Explain causes of creep. L1 6M

OR

- 8 a) What are the different types of rails used? Explain the concept of Adzing of sleepers and Discuss about methods of rectifying creep? L1 6M  
b) What are the functions of sleepers? Bring out the differences between suspended and supported rail joints. L1 6M

**UNIT-V**

- 9 a) Define grade compensation? If the ruling gradient is 1 in 140 on a particular section of MG and at the same time a 3.8 degree curve is situated on this ruling gradient, find out the allowable ruling gradient. L3 6M  
b) What are the operational classifications of stations? Write about requirements of transition curve and the difference between pusher gradient and momentum gradient? L1 6M

OR

- 10 a) Discuss briefly the purpose for which railway stations are provided. L3 6M  
b) Explain briefly about wayside station on a single and double railway lines L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

ELECTRICAL MEASUREMENTS

(EEE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 Design an Aryton shunt to provide an ammeter with the current ranges 1 A, 5 A and 10 A. The basic meter resistance is 50 ohm and full scale deflection current is 1 mA L3 12M

OR

- 2 a) Describe the construction and working of the attraction type MI instrument? L3 6M  
b) A moving coil instrument has a resistance of 10 ohm and gives a full scale deflection When carrying 50mA. Show how it can be adopted to measure voltage up to 750 V and a current of 100 A. L1 6M

**UNIT-II**

- 3 a) Explain the features of De-Sauty's Bridge with a neat sketch. L2 6M  
b) List the advantages and disadvantages of Maxwell's Bridge. L1 6M

OR

- 4 Derive the general balance equation of DC and AC Bridges with suitable diagrams. What are the balance condition equations in polar and Rectangular forms? L4 12M

**UNIT-III**

- 5 a) Explain the friction compensation in single phase induction type Energy Meter. L2 6M  
b) A 50A , 230 V meter on full load test makes 61 revolutions in 37 seconds . If the normal disc speed is 520 revolutions per Kwh , find the percentage error . L4 6M

OR

- 6 With a neat construction diagram, explain the operation of single phase induction type energy Meters L2 12M

**UNIT-IV**

- 7 Draw the phasor diagram of PT. Derive the expression for its transformation ratio and phase angle errors. L3 12M

OR

- 8 a) Discuss in detail about Thermistors. L1 6M  
b) Explain about inductive displacement transducers. L1 6M

**UNIT-V**

- 9 Explain the internal structure of CRT with a neat diagram L2 12M

OR

- 10 a) Explain the functions of the time base generator in a CRO L2 6M  
b) Draw the Lissajous patterns. L4 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

**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 the terms in dynamic characteristics i) Speed of Response ii) Fidelity iii) Lag L1 6M  
b) Explain the static characteristics of measuring instrument L2 6M

OR

- 2 a) Explain thermocouple type RF Ammeter with a neat sketch L2 6M  
b) A shunt type ohmmeter uses a 5 mA basis D'Arsonval movement with an internal resistance of  $50\Omega$ . The battery voltage is 3V. It is desired to modify the circuits by adding appropriate shunt resistance across the movement so that the instrument indicates  $5\Omega$  at the midpoint scale. Calculate: i) The value of shunt resistance. ii) Value of current limiting resistance R1 L3 6M

**UNIT-II**

- 3 a) Explain in detail about the construction and working of a digital storage oscilloscope L2 6M  
b) Explain briefly on dual trace CRO L2 6M

OR

- 4 a) Draw the block diagram of a general-purpose oscilloscope (CRO) and explain the functionality of each block L2 6M  
b) Explain with a block diagram of how the digital frequency and time period can be measured using counter/meter instrument L3 6M

**UNIT-III**

- 5 a) Discuss in detail about pulse generator L2 6M  
b) Explain the method of generate random noise L2 6M

OR

- 6 a) Draw the block diagram of a function generator and explain its operation L1 6M  
b) Compare fixed AF oscillator and variable AF oscillator L3 6M

**UNIT-IV**

- 7 a) Compute the expression for Schering bridge circuit & write its applications L3 6M  
b) An A.C bridge as the following constants Arm AB-capacitor of  $0.1\mu\text{F}$  in parallel with  $2\text{K}\Omega$  resistor, Arm AD-resistance of  $5\text{K}\Omega$ , Arm BC capacitor of  $0.25\mu\text{F}$ , Arm CD-unknown capacitor CX and RX in series f-2KHz. Determine the unknown capacitance L3 6M

OR

- 8 a) Explain in brief on how the Maxwell Bridge can be used for measuring an unknown inductance L2 6M  
b) Discuss the working principle of q-meter L2 6M

**UNIT-V**

- 9 a) Discuss in brief about Velocity transducers L2 6M  
b) With a neat sketch, explain the operation of piezo-electric transducers in detail L1 6M

OR

- 10 a) Explain how to measure the resistance using strain gauge & give its applications L2 6M  
b) Explain the operation of LVDT with a neat sketch, list the advantages & disadvantages L2 6M

Q.P. Code: 19ME0314

**R19**

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

**THERMAL ENGINEERING**  
(Mechanical Engineering)

Time: 3 Hours

Max. Marks: 60

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

- UNIT-I**
- 1 a) Explain the working principle of single stage single acting reciprocating air compressor with neat sketch L2 6M  
b) A single stage reciprocating compressor takes 1 m<sup>3</sup> of air per minute at 1.013 bar and 15° C and delivers it at 7 bar. Assuming that the law of compression is  $pV^{1.35} = \text{constant}$ , and the clearance is negligible, calculate the indicated power L3 6M
- OR**
- 2 a) Explain the working of vane compressor with neat sketch L2 6M  
b) Explain the working of Roots Blower compressor with neat sketch L2 6M
- UNIT-II**
- 3 a) Explain about the open cycle and closed cycle turbines with neat sketches and also draw the P-V & T-S diagrams L2 4M  
b) The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 20° C. The pressure of the air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air-fuel ratio used is 90:1. If flow rate of air is 3 kg/s, find, (i) Thermal efficiency of the cycle L3 8M

- OR**
- 4 a) Brief the various methods to improve the performance of a gas turbine power plant L2 6M  
b) Describe with neat sketches the working of simple constant pressure open cycle gas turbine L2 6M

- UNIT-III**
- 5 a) Define Steam nozzle and also explain about expansion of steam in nozzle with neat sketch L1 6M  
b) Explain what is meant by critical pressure ratio of a nozzle. L2 6M
- OR**
- 6 a) The dry sat steam at a pressure of 5 bar is expanded isentropically in a convergent nozzle to a pressure of 1 bar and  $x=0.94$ . Find the velocity of steam during the nozzle L3 6M  
b) What are types of condensers used in steam power plant? L2 6M

- UNIT-IV**
- 7 a) Distinguish between impulse and reaction turbines. L2 6M  
b) The velocity of steam, leaving the nozzles of an impulse turbine, is 1200 m/s the nozzle angle is 20°. The blade velocity is 375 m/s and the blade velocity coefficient is 0.75. Assuming no loss due to shock at inlet, calculate for a mass flow of 0.5 kg/s and symmetrical blading. L3 6M  
(a) blade inlet angle; (b) driving force on the wheel; (c) axial thrust on the wheel; and (d) power developed by the turbine.

Q.P. Code: 19ME0314

**R19**

**OR**

- 8 a) Explain about the various methods of Governing steam turbines with neat sketches L2 6M  
b) In one stage of a reaction steam turbine, both the fixed and moving blades have inlet and outlet blade tip angles of 350 and 200 respectively. The mean blade speed is 80 m/s and the steam consumption is 22500 kg per hour. Determine the power developed in the pair, if the isentropic heat drop for the pair is 23.5 KJ per kg. L3 6M
- UNIT-V**
- 9 a) What is the difference between IC and EC engines? How the Internal Combustion Engines are classified L2 6M  
b) The following results refer to a test on a petrol engine:  
Indicated power = 30 kW, Brake power = 26 kW, Engine speed = 1000 rpm, fuel per brake power hour = 0.35 kg, calorific value of the fuel used = 43900 kJ/kg. Calculate: i) The indicated thermal efficiency ii) The brake thermal efficiency iii) the mechanical efficiency. L3 6M
- OR**
- 10 a) Explain the working of 4-stroke Diesel engine. L2 6M  
b) Show the theoretical and actual valve-timing diagram for Petrol engine L2 6M



Q.P. Code: 19CS0518

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

R19

B.Tech III Year I Semester Regular Examinations January 2022

SOFTWARE ENGINEERING

(CSE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 Explain how Framework activities helps to solve a problem using umbrella Activities L1 12M

OR

- 2 What is Agile Process? Write a note on Extreme Programming (XP). L3 12M

**UNIT-II**

- 3 Illustrate Eliciting Requirements in software requirements gathering. L2 12M

OR

- 4 Examine Scenario-Based Modeling with suitable examples. L4 12M

**UNIT-III**

- 5 a) What is the Design process? Discuss software quality guidelines and attributes. L6 6M

- b) Explain common characteristics in the evolution of software design. 5 6M

OR

- 6 Explain the following:  
(i) Design process. L3 12M  
(ii) Design model.  
(iii) Design concepts.

**UNIT-IV**

- 7 a) Briefly explain about user interface design L5 6M

- b) Explain interface design workflow for WebApps L5 6M

OR

- 8 Explain the steps involved in WebApp Interface Design. L2 12M

**UNIT-V**

- 9 a) Explain test strategies for WebApps. L5 6M

- b) Elaborate a strategic approach to software testing. L6 6M

OR

- 10 Distinguish between Validation testing and System testing. L4 12M

10/1/22 RW  
Q.P. Code: 19CE0129

R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

**ELEMENTS OF ROAD TRAFFIC SAFETY**

(Common to Mechanical, ECE and CSE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Analyze various road geometric design elements. L4 6M  
b) How results are interpreted on road accidents in various countries. List the fatality rates from different countries? L2 6M

OR

- 2 a) Give the detailed notes on cost of road accidents? L2 6M  
b) Apply your knowledge to suggest the preventive measures of road accidents by cyclist. L3 6M

**UNIT-II**

- 3 a) List out various Traffic Laws as per Indian motor vehicle Act. L3 6M  
b) Discuss about various Speed limits in rural and urban areas. L2 6M

OR

- 4 a) Identify various common methods in design of on-street parking with sketches. L3 6M  
b) Give a brief discussion about different types of Off-street parking facilities. L2 6M

**UNIT-III**

- 5 a) Why traffic signing requires International standardization? L1 6M  
b) Illustrate the various objectives in general principles of traffic signing? L3 6M

OR

- 6 a) Distinguish between Informatory signs & Mandatory signs L4 6M  
b) Where Route marker signs located and give its importance? L1 6M

**UNIT-IV**

- 7 a) What is meant by Signal Face, explain it with neat sketch? L1 6M  
b) Explain the concept of illumination of signals with specifications. L2 6M

OR

- 8 a) What do you meant by Area traffic control and give the objectives of it. L1 6M  
b) Give a brief discussion about Delay at signalized intersections. L2 6M

**UNIT-V**

- 9 a) Describe about Carriageway width reduction transition markings. L1 6M  
b) Discuss about Obstruction approach markings. L2 6M

OR

- 10 a) Explain briefly about tunnel lighting. L2 6M  
b) Write in detail about lighting at bends. L1 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations January 2022

**NON CONVENTIONAL ENERGY RESOURCES**

(Common to CIVIL, ECE and EEE)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Explain briefly any three renewable energies and their applications L2 6M  
b) "Economic growth of a country depends on Energy". Justify L1 6M

OR

- 2 a) What are energy resources available in India? Explain. Suggest suitability. L1 6M  
b) Describe and analyze a report on the usage of energy around the world. L2 6M

**UNIT-II**

- 3 a) Explain solar radiation. And its applications. L2 6M  
b) Explain the working of Sunshine recorder with a neat sketch. L2 6M

OR

- 4 a) Illustrate the working principle of pyranometer with a neat sketch. L3 6M  
b) How do you convert saline water into potable water? Explain L1 6M

**UNIT-III**

- 5 a) List the merits and demerits of wind energy. L1 6M  
b) Describe the working of VAWT with a neat sketch. List applications. L2 6M

OR

- 6 a) Differentiate between HAWT and VAWT. L3 6M  
b) Discuss about Savonius wind turbine with neat sketch. L2 6M

**UNIT-IV**

- 7 a) What are the different forms of bio-energy? Write few applications. L1 6M  
b) Classify the Biomass energy conversion systems. Explain Biomass Power plant with a neat sketch. L1 6M

OR

- 8 a) What are the factors affecting the generation of bio gas? L1 6M  
b) What is meant by fermentation, aerobic, anaerobic digestion? Explain. L1 6M

**UNIT-V**

- 9 a) Explain the working of fuel cell and their applications. L2 6M  
b) What is the nature of tidal power extracted from single basin arrangement and double basin arrangement? L1 6M

OR

- 10 a) What is the basic principle of ocean thermal energy conversion? Distinguish between wave and tidal energy. L1 6M  
b) Explain in detail the hybrid systems. L2 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
 (AUTONOMOUS)  
 B.Tech III Year I Semester Regular Examinations January 2022  
**CONTROL SYSTEMS**  
 (Common to EEE & ECE)

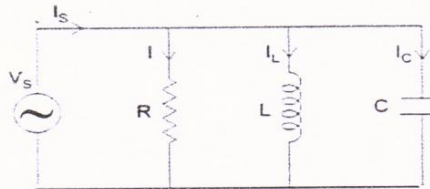
Time: 3 Hours

Max. Marks: 60

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

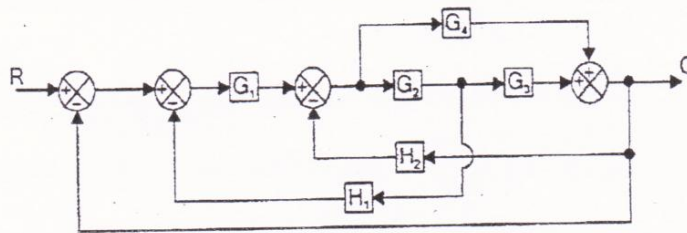
**UNIT-I**

- 1 a) Explain any two examples of closed loop control systems L1 6M  
 b) Determine the transfer function for the given electrical circuit shown below. L3 6M



OR

- 2 Obtain the overall gain  $C(S)/R(S)$  from signal flow graph shown in Figure L1 12M



**UNIT-II**

- 3 List out the time domain specifications and derive the expressions for Rise time, Peak time and Peak overshoot. L1 12M

OR

- 4 For a unity feedback control system the open loop transfer function L3 12M

$$G(s) = \frac{10(s+2)}{s^2(s+1)}$$

- (i) Determine the position, velocity and acceleration error constants.  
 (ii) The steady state error when the input is

$$R(s) = \frac{3}{s} - \frac{2}{s^2} + \frac{1}{3s^3}$$

## UNIT-III

- 5 a) The open loop Transfer function of a unity feedback control system is L3 8M  
 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.
- b) Explain the procedure to calculate the open loop gain at a specific dominant L2 4M  
 pole.

OR

- 6 Sketch the root locus of a unity feedback system whose open loop transfer L3 12M  
 function is given by  $G(s)H(s) = \frac{K(s+9)}{s(s^2+4s+11)}$  and also find the range of K for  
 the system to be stable.

## UNIT-IV

- Draw the nyquist plot for the system whose open loop transfer function L5 12M
- 7  $G(s)H(s) = \frac{K}{s(s+2)(s+10)}$ . Determine range of K for which the closed loop sys L5 12M  
 stable.

OR

- 8 a) Define gain margin, phase margin, gain and phase cross over frequencies. L1 4M  
 b) Sketch the polar plot of a unity feedback system whose open loop transfer L5 8M  
 function  $G(s) = \frac{K}{s^2(s+1)(2s+1)}$ . Determine range of K for which the closed  
 loop system is stable.

## UNIT-V

- 9 Determine the Solution for Homogeneous and Non homogeneous State L5 12M  
 equations

OR

- 10 a) Check the controllability for the system given by  $A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$   $B = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$  L4 7M  
 and  
 comment on stability.
- b) State and explain controllability and observability. L3 5M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR  
(AUTONOMOUS)  
B.Tech III Year I Semester Regular Examinations Dec 2021/January 2022  
ESTIMATION, COSTING AND VALUATION  
(CIVIL ENGINEERING)

Time: 3 Hours

Max. Marks: 60

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

**UNIT-I**

- 1 a) Define Estimation? What are the purpose of Estimation L1 6M  
b) Write a note on i) Lumpsum ii) Contingencies L2 6M

OR

- 2 a) What are different types of Estimates? How do they differ from each other? L2 6M  
b) Prepare an approximate estimate of building project with total plinth area of all building is 800 sqm. and from following data. L3 6M  
i) Plinth area rate Rs. 4500 per sqm  
ii) Cost of water supply @7½% of cost of building.  
iii) Cost of Sanitary and Electrical installations each @ 7½% of cost of building.  
iv) Cost of architectural features @1% of building cost.  
v) Cost of roads and lawns @5% of building cost.  
vi) Cost of P.S. and contingencies @4% of building cost.  
Determine the total cost of building project

**UNIT-II**

- 3 a) What are the methods used for calculating volume of earth works? Write formula for each method with usual notations L2 6M  
b) The following width of road embankment is 10m. The side slopes are 2:1 The depth along the centre line road at 50m intervals are 1.25, 1.10, 1.50, 1.20, 1.0, 1.10, 1.15m calculate the Quantity of earth work by Mid sectional rule b) Trapezoidal rule c) Prismoidal rule. L3 6M

OR

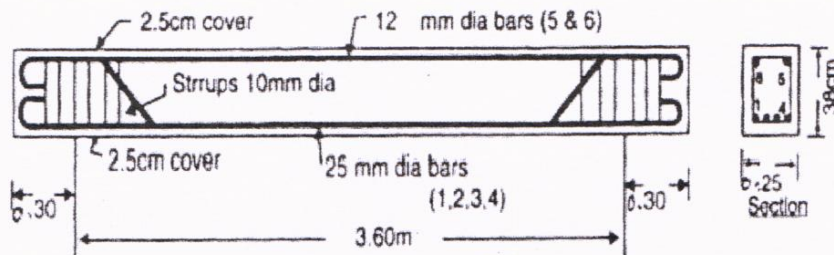
- 4 a) Differentiate between Lead and Lift I.4 4M  
b) The road has the following data L3 8M

Chainage	0	20	40	60	80	100	120
RL of Ground	20.6	21.0	21.5	22.1	22.7	22.9	23.0

The formation level at chainage zero is 22.0 and having a rising gradient of 1 in 100 the top width is 12.0m and side slopes are 1½ :1 Assuming the transverse direction is in level. Calculate the quantity of earth work by a) Trapezoidal formula b) Prismoidal formula.

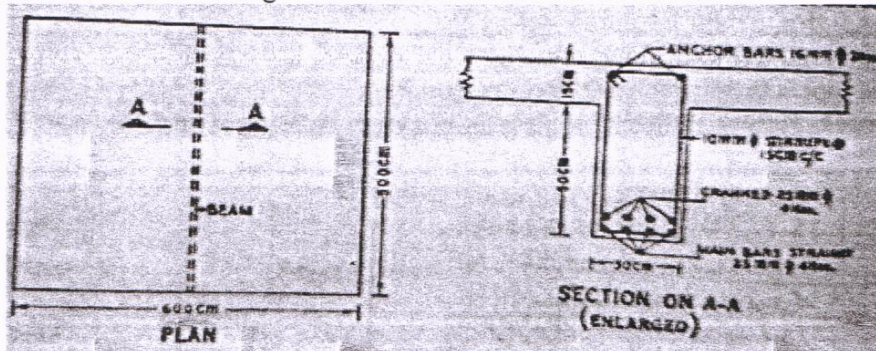
**UNIT-III**

- 5 a) Write a note on Scheduling of Bars L2 4M  
b) Workout the quantity of reinforcement by preparing bar requirement schedule of a beam as per the drawing given below. Side covers 50 mm. L3 8M



OR

- 6 a) What is meant by Bar Bending Schedule (BBS)? L2 4M  
 b) A room 600 cm long x 500 cm wide has a flat roof. There is one T-beam in the centre (cross section below the slab 30 cm x 50 cm) and the slab is 15 cm thick. Estimate the quantity of iron bars required for reinforcement (for the T-beam only) from the data given below :- Main bars – 8 nos. 25 mm dia. in 2 rows of each (all 4 in the bottom being straight and others bent) Strirrups – 10 mm dia. and 15 cm centre to centre throughout Anchor bar – 2 nos. 16 mm dia L3 8M

**UNIT-IV**

- 7 a) What do you mean by Rate Analysis? What are the requirements of rate analysis? L2 6M  
 b) Prepare the rate per cu.m for random rubble stone masonry in superstructure in 1:6 cement sand mortar. L3 6M

OR

- 8 a) Describe factors affecting the rate analysis of an item. L2 6M  
 b) What is the rate per sq.m for constructing 12 mm thick cement plastering in ceiling with 1:3 cement sand mortar? L3 6M

**UNIT-V**

- 9 a) Define Specification? What are the objectives of Specifications L1 6M  
 b) Write detailed specifications for R.C.C L2 6M

OR

- 10 a) Differentiate between i) Salvage Value and Scrap value ii) Market value and Book Value L4 6M  
 b) A plot measures 500 sq.m. The built up area is 300 sq.m. The plinth area rate of this 1st class building is Rs.600/- per sq.metre. This rates includes cost of water supply, sanitary and electric installation. The age of the building is 40 years. The cost of the land is Rs.80/- per sq.m. Find the depreciated value of the property and total value of the property L3 6M