AR20

CODE: 20CET101 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

SURVEYING AND GEOMATICS

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Discuss in brief the principles of surveying. (5M)
   b) Differentiate clearly between plane and geodetic surveying. (5M)

(OR)

2. a) What are the instruments used in chain surveying? How is a chain survey executed in the field? (5M)
   b) What is a well conditional triangle? Why is it necessary to use well-conditioned triangles? (5M)

UNIT-II

3. a) What is local attraction? How is it detected and eliminated? (3M)
   b) Determine the values of included angles in the closed compass traverse ABCD conducted in the clockwise direction, given the following fore bearings of their respective lines. Apply the check. (7M)

line	F.B.
AB	40°
BC	70°
CD	210°
DA	280°

(OR)

4. a) Define the terms: True and magnetic bearing, local attraction, back bearings and magnetic declination. (3M)
   b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected (7M)

Line	Fore Bearing	Back Bearing
AB	139° 25′	319° 45′
BC	154° 45′	334° 45′
CD	295° 40′	115° 20′
DA	353° 30′	175° 00′

Calculate the included angles of the closed traverse and find corrected angles.

UNIT-III

5. a) Describe the 'height of instrument' and 'rise and fall' methods of computing the levels. Discuss the merits and demerits of each. (3M)
   b) The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings: (7M)
   0.815, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.815, 2.030, 3.765.
   The first reading was Ween with the staff held upon a benchmark of elevation 132.135. Enter the readings in level book-form· and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.

(OR)

6. a) Describe various methods of contouring. Discuss the merits and demerits of each. (3M)
   b) Describe with the help of sketches the characteristics of contours. (7M)

UNIT-IV

7. a) Define the terms: face right and face left observations: swinging the telescope; transiting the telescope; telescope normal. (5M)
   b) Discuss the principle of theodolite survey and principle of tachometry. (5M)

(OR)

8. a) Discuss the fundamentals of total station and GPS. (5M)
   b) Explain the methods of setting out a simple curve. (5M)

UNIT-V

9. a) Discuss the perspective geometry of aerial photograph (5M)
   b) Write short on flight planning and Stereoscopy (5M)

(OR)

10. a) Explain the terrestrial photogrammetric surveying? (5M)
    b) Fundamental principle of Photogrammetric and how it is used in the field of mapping surveying. (5M)

UNIT-VI

11. a) Describe remote sensing data acquisition? (5M)
    b) Describe about electromagnetic spectrum with neat sketch. (5M)

(OR)

12. a) Explain the interaction of electromagnetic radiation with the atmosphere and earth surface. (5M)
    b) Write a short note on GIS. (5M)

AR20

CODE: 20MET101 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

THERMODYNAMICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place
Steam Tables are allowed

UNIT-I

1. a) Explain isolated system with examples 4M
   b) A gas expands from an initial state where the pressure is 340 kPa and the volume is 0.0425 m^3 final pressure is 136 kPa. The relationship between the pressure and volume of the gas is PV^2 = constant. Determine the work for the process. 6M

(OR)

2. a) Define thermodynamic equilibrium. List the different types of thermodynamic equilibrium and explain. 4M
   b) A mass of gas is compressed in a quasi-static process from 75 kPa, 0.15 m^3 to 0.35 MPa, 0.04m^3. Assuming that the pressure and volume are related by PV^n = constant, find the work done by the gas system. 6M

UNIT-II

3. a) What is a steady flow device, give any three examples 4M
   b) A gas undergoes a thermodynamic cycle consisting of three processes beginning at an initial state where p_1 = 1 bar, V_1 = 1.5 m^3 and U_1 = 512 kJ. The processes are as follows: 6M

   (i) Process 1-2 : Compression with pV = constant to p_2 = 2 bar, U_2 = 690 kJ
   (ii) Process 2-3 : W_{23} = 0, Q_{23} = -150 kJ, and
   (iii) Process 3-1: W_{31} = + 50kJ. Neglecting KE and PE changes,

   Determine the heat interactions Q_{12} and Q_{31}.

(OR)

4. a) Explain with sketch application of steady flow energy equation for Turbine and Nozzle. 4M
   b) At the inlet to a certain nozzle the enthalpy of fluid passing is 2800 kJ/kg and the velocity is 50 m/s. At the discharge end the enthalpy is 2600 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it. (i) Find the velocity at exit of the nozzle. (ii) If the inlet area is 900 cm^2 and the specific volume at inlet is 0.187 m3/kg, find the mass flow rate. (iii)If the specific volume at the nozzle exit is 0.498 m3/kg, find the exit area of nozzle. 6M

UNIT-III

5. a) Prove that violation of Kelvin-Planck statement leads to violation of Clausius statement 5M
   b) An air conditioner removes heat steadily from a house at a rate of 750 kJ/min while drawing electric power at a rate of 6 kW. Determine (i) the COP of this air conditioner (ii) the rate of heat transfer to the outside air. 5M

(OR)

6. a) Derive the relation between the COP of heat pump and the COP of the refrigerator 4M

b) Two reversible heat engines 1 and 2 are connected in series such that 1 is rejecting heat directly to 2. Engine 1 receives 200 kJ at a temperature of 421ºC from a hot source, while Engine 2 is in communication with a cold sink at a temperature of 4.4ºC. The work output of 1 is two times that of 2. Calculate (i) the intermediate temperature between 1 and 2, (ii) the efficiency of each engine, and (iii) the heat rejected to the cold sink. 6M

UNIT-IV

7. a) Show that heat transfer through a finite temperature difference is irreversible? 4M

b) Calculate the decrease in exergy when 25 kg of water at 95ºC mix with 35 kg of water at 35ºC, the pressure being taken as constant and the temperature of the surroundings being 15ºC. Take specific heat of water as 4.2 kJ/kg K. 6M

(OR)

8. a) What is available energy? Write down the expression for specific flow availability for open system. 4M

b) A container contains compressed air at 620 kPa, 27°C. If atmospheric conditions are 103 kPa and 27°C calculate the work potential per kg of air. 6M

UNIT-V

9. a) Draw the phase equilibrium diagram for a pure substance on T-s and h-s plots with relevant constant property lines 4M

b) A vessel of volume $0.04m^3$ contains a mixture of saturated water and saturated steam at a temperature of 250^0C. The mass of the liquid present is 9 kg. find the pressure, mass, specific volume, enthalpy, entropy and internal energy. 6M

(OR)

10. a) Define and explain about critical point and triple point. 4M

b) One kg of dry saturated steam is at 0.8 MPa or 8 bar. 6M
Find the following properties:
(i) temperature, (ii) volume, (iii) enthalpy, (iv) entropy and
(v) internal energy

UNIT-VI

11. a) Explain the working of Spark ignition engine? 4M

b) An engine working on the Otto cycle is supplied with air at 1 bar, 300K. The compression ratio is 8. Heat supplied is 1500 kJ/kg. Calculate the maximum pressure and temperature of the cycle, the cycle efficiency, and the mean effective pressure (for air Cp = 1.005, Cv =0.718 and R =0.287 kJ/kgK) 6M

(OR)

12. a) Write about compression ratio, pressure ratio, percentage clearance and Cut-off ratio. 4M

b) The stroke and cylinder diameter of a compression ignition engine are 250 mm and 120 mm respectively. If the clearance volume is 0.0004 m 3 and fuel injection takes place at constant pressure for 5 per cent of the stroke determine the efficiency of the engine. Assume the engine working on the diesel cycle. 6M

***

AR20

CODE: 20CST101 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

DATA STRUCTURES AND ALGORITHMS

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Calculate the time complexity of recursive Factorial number program	5 M
	b)	Explain the different Asymptotic notations with definition and example.	5 M
		(OR)	
2.		Define data structure and explain types of data structures with example	10 M

UNIT-II

3.	a)	Define Hashing ,Hash function, Hash Table .	3 M
	b)	How Binary search overcomes the drawback in linear search .Explain with an example .	7 M
		(OR)	
4.	a)	Write the algorithm for Merge sort and calculate its time complexity	5 M
	b)	Explain the reason for Occurring Collision. Explain any ONE method to resolve the Collision	5 M

UNIT-III

5.	a)	Explain the difference between Single linked list & Circular linked list .	3 M
	b)	Demonstrate the following Deletion operations on Circular linked list with example. a) Delete before the element b) Delete at the ending	7 M
		(OR)	
6.		Demonstrate the following Insertion operations on Double linked list with example. a) Insert at the ending b) Insert before the element c) Insert after the element.	10 M

UNIT-IV

7.		Explain the implementation of Stacks using Linked lists.	10 M
		(OR)	
8.		Write the algorithms for circular queue insertion and deletion operations	10 M

UNIT-V

9.	a)	Explain rotations of AVL tree.	4 M
	b)	Construct the AVL Tree in step by step for the below given nodes . 10, 14, 16, 8, 17, 6, 23, 60, 78, 20, 5 , 35 .	6 M
		(OR)	
10.	a)	Explain a Binary Search Tree(BST) with an example of 15 elements.	7 M
	b)	Define Binary tree , B-Tree.	3 M

UNIT-VI

11.		What is a Graph? How graphs can be represented? Discuss.	10 M
		(OR)	
12.		Explain in brief how shortest path is calculated using Dijkstra's algorithm with an example.	10 M

***