AR18

CODE: 18CET203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

MECHANICS OF SOLIDS-I

(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

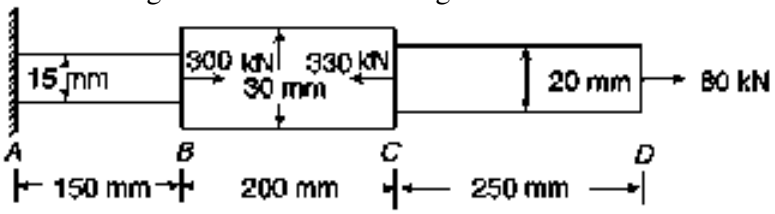
1. a) Develop the relationship between the three elastic constants E,G & K 6M
   b) A bar 24mm in diameter and 400mm in length, is acted upon by an axial tensile load of 38kN. The elongation of the bar and the change in diameter are measured as 0.165mm and 0.0031mm respectively. Determine 6M

   i) Poisson's ratio ii) The value of the three moduli.

(OR)

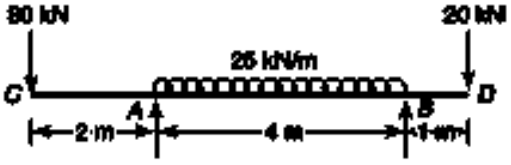
2. a) Calculate the modulus of rigidity, Poisson's ratio and bulk modulus of a cylindrical bar of diameter 25mm and of length 1.2m if the longitudinal strain in a bar during a tensile test is four times the lateral strain. Take E is 1.2X10 5 N/mm 2. 6M

   b) A steel circular rod has three segments as shown in below figure. If the modulus of elasticity of the material of the rod is 205 GPa. Determine the total elongation of the bar, length of the middle segment to have zero elongation of the bar and diameter of the last segment to have zero elongation of the bar. 6M



UNIT-II

3. A simply supported beam of 7 m span with overhangs rests on supports which are 4 m apart. The left end overhanging is 2 m. The beam carries load of 30 kN and 20 kN on the left and the right ends respectively apart from a uniformly distributed load of 25 kN/m between the supporting points. Draw the shear force and bending moment diagrams. 12M



(OR)

4. a) A beam 5m long, supported @ the ends carried point loads of 140kN, 60kN and 80kN at distances 0.5m, 2.5m and 3.5m respectively from the left end. Find the maximum shear force and bending moment. Draw shear force and bending moment diagrams — 6M

b) A horizontal beam is simply supported at the ends and carries a uniform distributed load of 10kN/m between the supports placed 10m apart. Anticlockwise moments of 150kN-m and 100kN-m are applied to the left and right ends of the beam at the supports. Determine the position and magnitude of the maximum bending moment and draw shear force and bending moment diagrams — 6M

UNIT-III

5. a) A rectangular strut is 150mm and 120mm thick. It carries a load of 180KN at an eccentricity of 10mm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in the section — 6M

b) Compare the moment of resistance of a beam of square section when it is placed — 6M
   i) With two sides horizontal
   ii) With the diagonal horizontal

(OR)

6. Prove the relation $\frac{\sigma}{y} = \frac{M}{I} = \frac{E}{R}$ for simple bending and clearly stating the assumptions made. — 12M

UNIT-IV

7. a) A beam of square section is used as a beam with one diagonal horizontal. Find the maximum shear stress in the cross section of the beam. Also sketch the shear stress distribution across the depth of the cross section — 6M

b) A T section with a flange of 300 x 20 mm and a web of 380 x 20 mm is resisting a flexural Shear force of 60kN.Sketch the variation in shear stress across depth. — 6M

(OR)

8. a) Show that ratio of maximum shear stress to mean shear stress is 4/3 for a circular cross section. — 6M

b) Determine the position of the shear centre for an 80 mm by 40 mm outside by 5 mm thick channel section — 6M

UNIT-V

9. a) A hollow shaft of diameter ratio 3/8 is to transmit 550kW at 150rpm.the maximum torque being 30% greater than the mean. The shear stress is not to exceed 80MPa and the twist in a length of 5m is not to exceed 2^o. Calculate its external and internal diameters which would satisfy both the above conditions. Take G= 8.5 x 10^4 N/mm^2 — 6M

b) What do you mean by close coiled helical springs? Deduce an expression for its deflection under the action of an axial load — 6M

(OR)

10. a) State the assumptions made in the torsion equation of circular shafts. — 4M

b) A solid steel shaft transmits 100 kW at 150 rpm. Determine the suitable diameter of the shaft if the maximum torque transmitted exceeds the mean by 20% in each revolution. The shear stress is not to exceed 60 MPa. Also find the maximum angle of twist in a length of 4 m of the shaft. G = 80 GPa. — 8M

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AR18

CODE: 18EET204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

NETWORK ANALYSIS AND SYNTHESIS

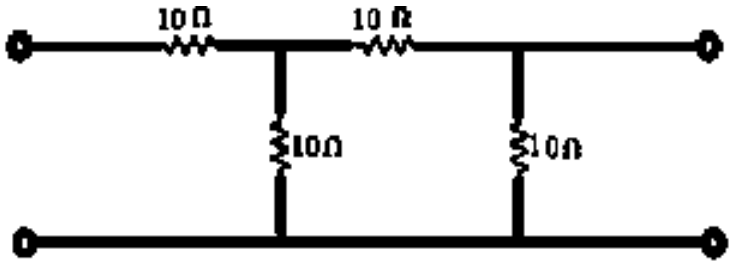
(Electrical and Electronics Engineering)

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

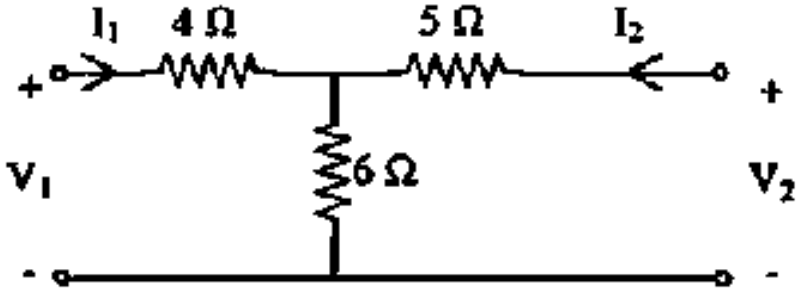
UNIT-I

1. a) Derive Y parameters in terms of Z parameters of a two port network? 6M
   b) Determine h-parameters of the network shown in the figure shown below. 6M



(OR)

2. a) Explain Z and Y parameters. 6M
   b) Obtain Y parameters for the network shown in Figure. 6M



UNIT-II

3. a) Derive an expression for current in a series R-L-C circuit excited by a d.c. voltage. Assume zero initial conditions and the circuit is operating under critical damping condition. 6M
   b) A d.c. voltage of 100 V is applied to a coil having R=10 Ω and L=10H. What is the value of the current 0.1 sec later the switching on? What is the time taken by the current to reach half of its final value? 6M

(OR)

4. Derive the current response of a series R-C circuit excited by a DC voltage source. 12M

UNIT-III

5. A series RLC circuit with R=15 Ω, L= 0.2H and C=3 μF has sinusoidal voltage source $v\,(t) = 400\ COS\ (500t\ +\ \frac{\pi}{4})$V. If the switch is closed at t=0, find the resulting current. 12M

(OR)

6. Derive an expression for current in a series R-L circuit supplied with an A.C supply. 12M

UNIT-IV

7. a) Test whether the polynomial $P(s) = s^5 + 3s^3 + 2s$ is Hurwitz. 6M
   b) Test whether $Z(s) = \frac{(S+3)}{(S+1)}$ is positive real function. 6M

(OR)

8. a) State and explain the properties of positive real function. 6M
   b) Test whether the polynomial $P(s) = s^4 + 11s^3 + 39s^2 + 51s + 20$ is Hurwitz. 6M

UNIT-V

9. Find the two Foster realizations of $Z(s) = \frac{4(s^2+1)(s^2+16)}{S(s^2+4)}$ 12M

(OR)

10. Find the Cauer I and II forms of the function $Z(s) = \frac{(s+3)(s+7)}{(s+2)(s+4)}$ 12M

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AR18

CODE: 18MET201 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

THERMODYNAMICS

(Mechanical Engineering)

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

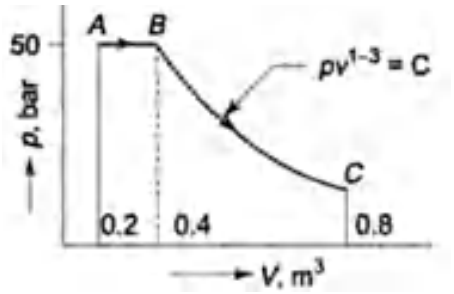
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place
Students are permitted to use Steam Table and Mollier Charts

UNIT-I

1. a) Distinguish the intensive and extensive properties with example. [4]
   b) What is thermodynamic system? Write the difference between a closed system and an open system? [8]

(OR)

2. a) Define thermodynamic system, property, state, cycle with neat sketch. [4]
   b) Determine the total work done by the gas system following an expansion process as shown in Figure. [8]



UNIT-II

3. a) State the limitations of first law of thermodynamics. [4]
   b) At the inlet to a nozzle, the enthalpy of the fluid passing is 3000 kJ/kg and the velocity is 60 m/s. At the discharge end, the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it. [8]
   (i) Find the velocity at exit from the nozzle
   (ii) If the inlet area is 0.1 m^2 and the specific volume at inlet is 0.187 m^3/kg, find the mass flow rate.

(OR)

4. a) What do you mean by perpetual motion machine of first and second kind? [4]
   b) Three identical finite bodies of constant heat capacity are at temperatures 300, 300 and 100 K. If no work or heat is supplied from outside, what is the highest temperature to which any one the bodies can be raised by the operation of heat engines or refrigerators? [8]

UNIT-III

5. a) Ten kg of water at 45°C is heated at a constant pressure of 10 bar until it becomes superheated vapour at 300°C. Find the change in volume, enthalpy, internal energy and entropy. [6]

   b) Define availability and write the expression for AE (W_{max}) and UE [6]

(OR)

6. a) What is critical state? Write the values of critical temperature and pressure for water. [4]

   b) Calculate the decrease in available energy when 25 kg of water at 95°C mix with 35 kg of water at 35°C, the pressure being taken as constant and the temperature of the surrounding being 15°C (c_p of water = 4.2 kJ/kg K). [8]

UNIT-IV

7. a) Write down the Van der Walls equation of state? How does it differ from the ideal gas equation of state? [6]

   b) Consider a gas mixture that consists of 3 kg of O_2, 5 kg of N_2, and 12 kg of CH_4. Determine: [6]
   (i) The mass fraction of each component
   (ii) The mole fraction of each component.

(OR)

8. A mass of 0.25 kg of an ideal gas has a pressure of 300 kPa, a temperature of 80°C, and a volume of 0.07 m^3. The gas undergoes an irreversible adiabatic process to a final pressure of 300 kPa and final volume of 0.1 m^3, during which the work done on the gas is 25 kJ. Evaluate the Cp and Cv of the gas and the increase in entropy of the gas. [12]

UNIT-V

9. a) Sketch Ericson cycle on p-v and T-s plane and name the processes. [4]

   b) An air standard limited pressure cycle (Duel Cycle) has a compression ratio of 15 and compression begins at 0.1 MPa, 40°C. The maximum pressure is limited to 6 MPa and the heat added is 1.675 MJ/kg. Compute (a) the heat supplied at constant volume per kg of air, (b) the heat supplied at constant pressure per kg of air, (c) the work done per kg of air, (d) the cycle efficiency. [8]

(OR)

10. a) Write the difference between SI and CI engines [4]

    b) In air standard Diesel cycle, the compression ratio is 16, and at the beginning of isentropic compression, the temperature is 15°C and the pressure is 0.1 MPa. Heat added until the end of the constant pressure process is 1480°C. Calculate (a) Cut-off ration (b) Heat supplied per kg of air (c) Cycle efficiency. [8]

AR18

CODE: 18EST202 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

PROGRAMMING FOR PROBLEM SOLVING

(Electronics and Communication 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)	What are the steps involved in program development process? Explain.	6M
	b)	Draw flow chart for finding facts for a given number.	6M
		(OR)	
2.	a)	Discuss about the relational and logical operators.	6M
	b)	What is meant by type casting? Explain.	6M

UNIT-II

3.	a)	Differentiate between else-if and switch? Explain with an example.	6M
	b)	Differentiate between do-while and while-do.	6M
		(OR)	
4.	a)	Explain any two iterative statements with examples.	6M
	b)	Write a program to check whether the given string is palindrome or not.	6M

UNIT-III

5.	a)	What is Array? Discuss about the initialization and accessing of array elements for 1D arrays.	6M
	b)	Write a program to check whether the given number is prime or not.	6M
		(OR)	
6.	a)	What is recursion? How it is implemented? Explain with example.	6M
	b)	Write short notes on storage classes.	6M

UNIT-IV

7.	a)	Write a program to display student details using pointers to structure.	6M
	b)	How pointers can be used for declaring of multi dimensional arrays? Discuss.	6M
		(OR)	
8.	a)	What is dynamic memory allocation? Explain.	6M
	b)	What is pointer? Discuss about pointers to pointers with examples.	6M

UNIT-V

9.	a)	How to define and initialize structures? How to access structure elements?	6M
	b)	Difference between structure and union.	6M
		(OR)	
10.	a)	Differentiate between binary and text file?	6M
	b)	Discuss about file I/O operations.	6M

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AR18

CODE: 18CST203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

OBJECT ORIENTED PROGRAMMING

(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)	Discuss about features of java.	7
	b)	What is an array? explain with an example.	5
		(OR)	
2.	a)	Develop a java program to read a number and check if the number is positive or zero or a negative, use if-else-if structure and print the suitable output.	5
	b)	Write short notes on type conversion in java with examples.	7

UNIT-II

3.	a)	What is a constructor? Explain the usage of constructor with example.	6
	b)	Explain in detail about method overloading and illustrate with an example	6
		(OR)	
4.	a)	Develop a java program calculating area of the rectangle with following specifications. class name :Rectangle instance variables : length, breadth, area (double data type) ,methods : void input(double, double)-for inputting dimensions ,void areaCalc()-for area computation and to display result.	6
	b)	Describe the usage of 'this' keyword with suitable example.	6

UNIT-III

5.	a)	What is inheritance? Demonstrate with an example java program	6
	b)	What is an abstract class? Demonstrate with an example java program.	6
		(OR)	
6.	a)	How multiple inheritance is implemented in java? Demonstrate with a interface and two classes.	6
	b)	Develop a java program for final keyword concept in inheritance	6

UNIT-IV

7.	a)	Write a java program using try and catch block.	6
	b)	What is package? Write a java program to create package.	6
		(OR)	
8.	a)	Explain the significance finally block with example.	5
	b)	Write short notes on Access Protection.	7

UNIT-V

9.	a)	What is thread? Explain the life cycle of the thread?	6
	b)	How to Use the Runnable Interface in Java to Create and Start a Thread.	6
		(OR)	
10.	a)	Write short notes on Applet Life Cycle	6
	b)	Write a java program for simple applet named HelloWorldApplet.java that prints "Hello World" and to invoke the applet.	6

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AR16

CODE: 16CE2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2021

ENGINEERING GEOLOGY

(Civil Engineering)

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

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	Explain any two case histories of failures of structures due to geological draw backs?	7
	b	What is the importance of petrology and structural geology?	7
		(OR)	
2.	a	Explain how the physical properties of minerals can be used for the identification of minerals?	8
	b	List out the physical properties of i)Feldspar ii)Calcite iii)kyanite	6

UNIT-II

3.	a	Write a note on the geological classification of rocks?	7
	b	Write an account on the structures and textures of igneous rocks?	7
		(OR)	
4.	a	Explain how do you distinguish the different types of rocks?	8
	b	Explain the physical properties and uses of i)Basalt ii)Lime stone iii)Slate	6

UNIT-III

5.	a	Define i)Outcrop ii)Strike iii)Dip	6
	b	Explain the importance of structures in the rocks?	8
		(OR)	
6.	a	With neat sketches explain the different parts of folds and their significance in civil engineering point of view?	9
	b	What is a joint? Explain the types of joints with their importance?	5

UNIT-IV

7.	a	What are the different types of dams? Explain the geological requirements for them?	4
	b	Write a detailed note on the geological considerations in the selection of a dam site?	10
		(OR)	
8.	a	Explain i)Over break ii)Life of reservoir iii) Effects of tunnelling	6
	b	Enumerate the geological considerations in the tunnelling	8

UNIT-V

9.	a	List out various geophysical methods along with their principle?	7
	b	Write note on the seismic refraction method and its' uses?	7
		(OR)	
10.	a	Explain electrical resistivity method and its' applications?	7
	b	Write about radiometric method of exploration and its' uses	7

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AR16

CODE: 16EE2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2021

ELECTRICAL CIRCUIT ANALYSIS

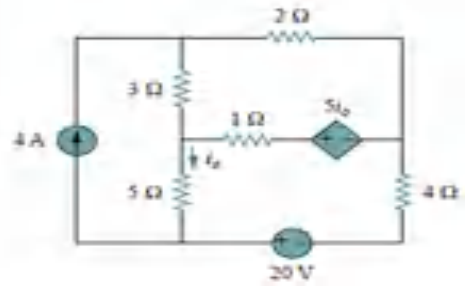
(Electrical and Electronics Engineering)

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

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 Using super position theorem, find the current i_0 in the below figure. 10M



b State Superposition and Maximum power transfer Theorems. 4M

(OR)

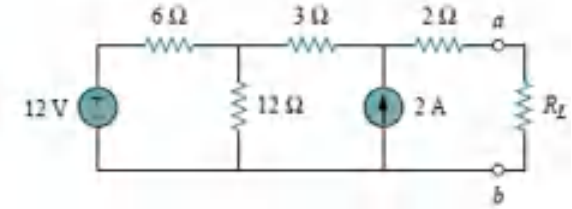
2 State and explain Thevinin's and Norton's Theorems. 14M

UNIT-II

3. State and prove Milliman's Theorem with suitable diagrams 14M

(OR)

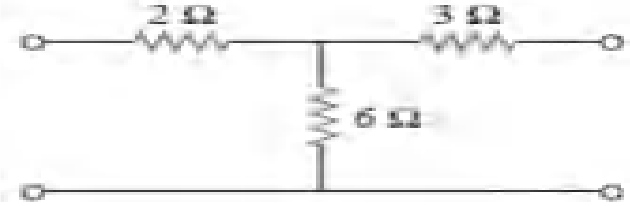
4. a Find the value of Load resistance (R_L) for which load power is maximum. 8M



b State and prove maximum power transfer Theorem with suitable diagrams for DC circuits. 6M

UNIT-III

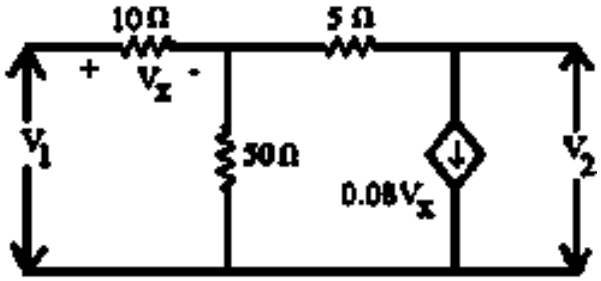
5 Find the Z and Y parameters for the two port network shown in below figure. 14M



(OR)

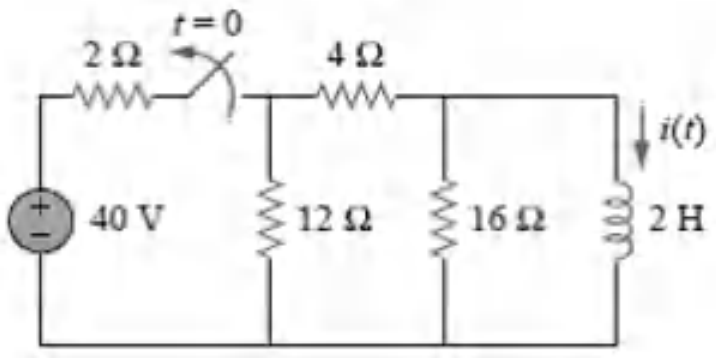
6 a) Express Z parameters in terms of Y-parameters 4M

b) Evaluate ABCD parameters of the network shown in figure. 10M

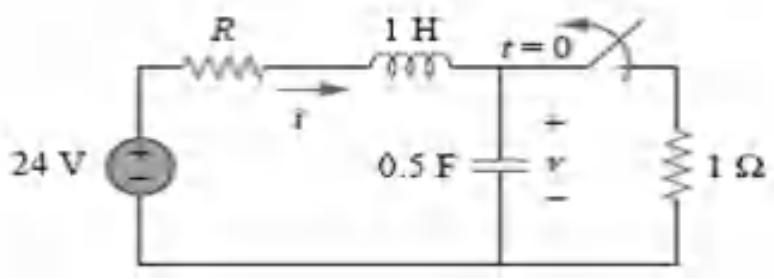


UNIT-IV

7. a) The switch in the circuit of fig.2(a) has been closed for a long time. At t=0, the switch is opened. Calculate i(t) for t>0. **7M**



b) For the circuit in fig.2(b) find v(t) and i(t) for t>0. Consider these cases R=5Ω, R=4Ω and R=1Ω. **7M**



(OR)

8 A DC voltage of V volts is applied to an RC circuit at t=0. Derive the expression for transient current and plot the waveform. 14M

UNIT-V

9. a) Test whether the following function is a positive real function or not. List each step in your testing. $F(s)=s^3+6s^2+7s+3\ /s^2+2s+1$. 7M

b) Explain the properties of positive real function. 7M

(OR)

10. a) Synthesize the LC immittance function $Z(s)=2(s^2+1)(s^2+9)/(s(s^2+4))$ into first cauer form. 7M

b) Synthesize the following function into cauer form 7M

$$Z(s) = \frac{4s^3+3s^2+4s+2}{2s^2+2}$$

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AR16

CODE: 16ME2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2021

THERMODYNAMICS

(Mechanical Engineering)

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

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) Derive the expression for non-flow work in isochoric, isobaric and isothermal processes 7M
   b) Determine the total work done by the gas expands at a constant pressure of 50 bar, from 0.2 m^3 to 0.4 m^3 and then according to the law $pv^{1.3}$= constant up to 0.8 m^3. 7M

(OR)

2. a) State the difference between extensive and intensive properties of thermodynamic system with suitable examples. 5M
   b) A mass of 1.5 kg of air is compressed in a quasi-static process from 0.1 MPa to 0.7 MPa for which pv = constant. The initial density of air is 1.16 kg/m3. Find the work done by the piston to compress the air. 9M

UNIT-II

3. a) Show that efficiency of all reversible heat engines operating between the same temperature levels is the same. 7M
   b) An inventor comes to an industrialist and claims to have developed a device that operating in a thermodynamic cycle receives 800kJ of heat from a source at 450K and produces 280kJ of network while rejecting the waste heat to the atmosphere at 300K. What would you advise to the industrialist? He should invest or not? 7M

(OR)

4. a) Discuss Equivalence of Kelvin-Planck and Clausius statements 6M
   b) A thermally insulated 50-ohm resistor carries a current of 1 A for 1 Sec. the initial temperature of the resistor is 10°C. Its mass is 5 g and its specific heat is 0.85 J/g K. what is the change in entropy of the resistor? And what is the change in entropy of the universe? 8M

UNIT-III

5. a) Define Irreversibility and what are the effects of irreversibility on work output of a system 7M

   b) Air enters a compressor in steady flow manner at 140kPa. 17^0C and 70m/s and leaves it at 350kPa 127^0C and 110m/s. the environment is at 100kpa and 7^0C. Calculate per kg of air a) actual amount of work required b) the minimum work required c) the irreversibility of the process. 7M

(OR)

6. a) Define pure substance explain the formation of steam from ice with neat sketch 7M

   b) Steam enters an engine at a pressure 12 bar absolute and 67°C of superheat. It is exhausted at 0.15 bar. The steam at exhaust is 0.95 dry. Find Drop in enthalpy and Change in entropy. 7M

UNIT-IV

7. a) Distinguish between volumetric analysis and gravimetric analysis and explain the procedure to convert one form the other. 7M

   b) Consider a gas mixture that consists of 3 kg of O_2, 5 kg of N_2 and 12 kg of CH_4. Determine the mass fractions of each component, mole fractions, average molar mass and gas constant of the mixture. 7M

(OR)

8. a) Define Dry bulb temperature, Wet bulb temperature, Dew point temperature, relative humidity 6M

   b) A certain gas has Cp = 1.968 and Cv = 1.507 kJ/kg K. find its molecular weight and the gas constant. A constant volume chamber of 0.3 m3 capacity contains 2 kg of this gas at 5°C. heat is transferred to the gas until the temperature is 100°C. find the work done, the heat transferred, and the changes in internal energy, enthalpy, entropy. 8M

UNIT-V

9. a) What are Compression ratio, Expansion ration and Cut-off ratios? 6M

   b) Discuss Otto cycle with neat sketch and obtain expression of Otto efficiency. 8M

(OR)

10. a) What do you mean by Air standard cycle? What are the assumptions made for air standard cycles? 7M

    b) An Ericsson cycle operating with an ideal regenerator works between 1100 K and 288 K. The pressure at the beginning of isothermal compression is 1.013 bar. Determine (a) the compressor and turbine work per kg of air, and (b) the cycle efficiency. 7M

AR16

CODE: 16EE2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2021

LINEAR CONTROL SYSTEMS

(Electronics and Communication Engineering)

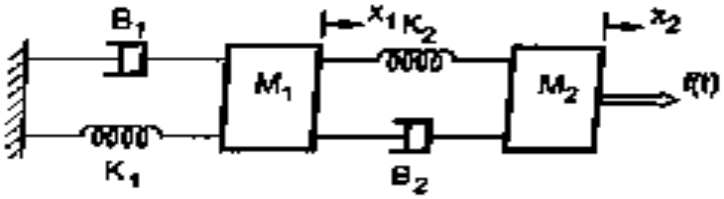
Time: 3 Hours **Max Marks: 70**

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) Define open loop and closed loop systems. Mention their merits and demerits. 6M

   b) Draw the free body diagram and write the differential equations describing the dynamics of the system shown in below figure and obtain the transfer function $\frac{X_1(S)}{F(S)}$. 8M



(OR)

2. Explain the effects of feedback in the control systems. 14M

UNIT-II

3. Derive the expressions for rise time, peak over shoot, settling time of 2nd order system of unit step input. 14M

(OR)

4. Derive the transfer function and develop the block diagram of field controlled DC servo motor. 14M

UNIT-III

5 Draw the root locus plot for a system having open loop transfer functions is $G(S)=\frac{K}{S(S+3)(S+2)}$ 14M

(OR)

6. a) Find the angles of departure for all complex poles of the open loop transfer function of 7M

$$G(S)H(S)=\frac{K}{(S^2+2S+2)(S^2+6S+10)}$$

b) For a unity feedback system with open loop transfer function 7M

$$G(S)H(S)=\frac{K}{S(S+4)(S^2+2S+2)}$$

Obtain the range of K for which the system will be stable using RH – Criterion.

UNIT-IV

7 Draw the polar plot for loop transfer function of a system is given by 14M

$$G(S)H(S)=\frac{S}{(S+1)(S+2)}$$

(OR)

8. Sketch the Bode plot for the open loop transfer function G(S)=100/{S(S+1)(S+2)}, determine gain margin and phase margin. 14M

UNIT-V

9. a) Define state, state vector, state variable. 6M
b) Explain the properties of state transition matrix. 8M

(OR)

10 Determine the state controllability and observability of the following system 14M

$$[\dot{x}]=\begin{bmatrix}0 & 1\\ -1 & -2\end{bmatrix}[x]+\begin{bmatrix}0\\ 1\end{bmatrix}u \quad , \quad y=[1 \quad 0]\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

AR16

CODE: 16CS2004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2021

OBJECT ORIENTED PROGRAMMING

(Common to CSE & IT)

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

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.		Explain about control structures with examples	14M
		(OR)	
2.		Discuss about operators in object oriented programming.	14M

UNIT-II

3.	a	What are classes? Create a class "Employee" with the following data members: name, employee_id, salary, contact_number. Define 2 member functions read_Data() and print_Data() whose task is to read details of employee and display the details of the employee.	7M
	b	Explain about Unary operator overloading with an example program	7M
		(OR)	
4.	a	Explain about classes and objects with an example program	7M
	b	Explain about constructor with an example program.	7M

UNIT-III

5.	a	Explain the significance of inheritance in object oriented programming?	7M
	b	What is abstract class? Explain with example.	7M
		(OR)	
6.		What is inheritance? Explain different types of inheritance.	14M

UNIT-IV

7.	a	Explain about pointers to derived class with an example program?	7M
	b	Explain about achieving run time polymorphism using an example program?	7M
		(OR)	
8.	a	Explain about the usage of pointers with suitable example program?	7M
	b	Explain about compile time and run time binding with necessary examples?	7M

UNIT-V

9		What is exception handling? Explain with an example program.	14M
		(OR)	
10.	a	Explain about writing data into a file with an example program.	7M
	b	Explain about Unformatted Console I/O operations?	7M

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AR13

CODE: 13ME2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March,2021
THERMODYNAMICS
(Mechanical Engineering)

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

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define the point and path functions with examples.
   b) List any two conditions which makes a flow as steady flow.
   c) Write the first law of thermodynamics for a flow process
   d) Define the PPM1
   e) List any four causes of irreversibility.
   f) Define (i) Sensible heat, (ii) Latent heat , (iii) Saturated liquid and (iv) Dryness fraction in steam formation.
   g) Formulate Boyle's law from its statement.
   h) Define the terms : (a) Specific humidity and (b) Relative humidity.
   i) Define the compression ratio.
   j) Indicate Otto, Diesel and Dual cycles on same the P-V co-ordinates.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) State First law of thermodynamics and give mathematical expression 4M
   b) In a cyclic process, heat transfers are +14.7 kJ, -25.2 kJ, -3.56 kJ and +31.5 kJ. What is the network for this cyclic process? 8M

(OR)

3. a) Illustrate the open and closed thermodynamic systems . 4M
   b) A vessel of 10kg of Oxygen is heated in a reversible non-flow constant volume process. So that the pressure increased two times that of initial. The initial tem is 200^0 C. Find the final temperature , Change in IE and enthalpy and heat transfer when R=0.259 kJ/kg K and Cv = 0.652 kJ/kg K 8M

UNIT-II

4. a) A turbine operates under steady flow conditions, receiving steam at the following state: Pressure 1.2 MPa, temperature 188°C, enthalpy 2785 kJ/kg, velocity 33.3 m/s and elevation 3 m. The steam leaves the turbine at the following state: Pressure 20 kPa, enthalpy 2512 kJ/kg, velocity 100 m/s, and elevation 0 m. Heat is lost to the surroundings at the rate of 0.29 kJ/s. If the rate of steam flow through the turbine is 0.42 kg/s, what is the power output of the turbine in kW? 6M
   b) Derive the SFEE 6M

(OR)

5. a) Prove the equilance of Kelvinplanks and Clasius statement 4M
   b) Three identical finite bodies of constant heat capacity are at temperatures 300, 300 and 100 K. If no work or heat is supplied from outside, what is the highest temperature to which any one the bodies can be raised by the operation of heat engines or refrigerators? 8M

AR13

CODE: 13ME2007 SET-1

UNIT-III

6.	a)	Starting from first law of thermodynamics and using the second law of thermodynamics Derive the Gibb's equation	6M
	b)	A thermal energy source at 800K loses 2000kJ of heat to a sink at (i) 500K and (ii) 750K. Determine which heat transfer process is more reversible.	6M

(OR)

7.	a)	Explain the Mollier chart	6M
	b)	A rigid vessel of volume 0.86 m3 contains 1 kg of steam at a pressure of 2 bar. Evaluate the specific volume, temperature, dryness fraction, internal energy, enthalpy, and entropy of steam.	6M

UNIT-IV

8.	a)	Explain the Van der Waals Equation to find the constants 'a and b' in terms of critical properties	6M
	b)	Reproduce the equation of state from laws of perfect gas	6M

(OR)

9.	a)	Define Psychrometric properties Dry bulb temperature (DBT), Wet bulb temperature (WBT), Dew point temperature (DPT), and Relative Humidity (RH)	4M
	b)	A certain gas has Cp = 1.968 and Cv = 1.507 kJ/kg K. find its molecular weight and the gas constant. A constant volume chamber of 0.3 m^3 capacity contains 2 kg of this gas at 5°C. Heat is transferred to the gas until the temperature is 100°C. Find the work done, the heat transferred, and the changes in internal energy, enthalpy and entropy.	8M

UNIT-V

10.	a)	Explain the Otto cycle with p-v and T-S diagram and derive a relation for efficiency.	6M
	b)	Show that the compression ratio for the maximum work to be done per kg of air in an Otto cycle between upper and lower limits of absolute temperatures T3 and T1 is given by $r = \left(\frac{T_3}{T_1}\right)^{\frac{1}{2(\gamma-1)}}$	6M

(OR)

11.		In air standard Diesel cycle, the compression ratio is 16, and at the beginning of isentropic compression, the temperature is 15°C and the pressure is 0.1 MPa. Heat added until the end of the constant pressure process is 1480°C. Calculate (a) Cut-off ration (b) Heat supplied per kg of air (c) Cycle efficiency.	12M

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