AR18

CODE: 18CET203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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) Sketch the stress-strain diagram for TOR Steel/HYSD bars and mark the Salient points. **7M**

   b) Determine the Poisson's ratio and modulus is 1.2 x 10^5N/mm^2 and modulus of rigidity is 4.8 x 10^4 N/mm^2. **5M**

(OR)

2. a) A tensile test was conducted on a mild steel bar. The following data was obtained from the test: **8M**
   i. Diameter of the steel bar = 4 cm
   ii. Gauge length of the bar = 22 cm
   iii. Load at elastic limit = 250 kN
   iv. Extension at a load of 160 kN = 0.235 mm
   v. Maximum load = 390 kN
   vi. Total extension = 70 mm
   vii. Diameter of rod at failure = 2.35 cm

   Examine: a) The Young's modulus b) The stress at elastic limit
   c) The percentage of elongation d) The percentage decrease in area.

   b) Assess the relationship between modulus of elasticity and modulus of rigidity. **4M**

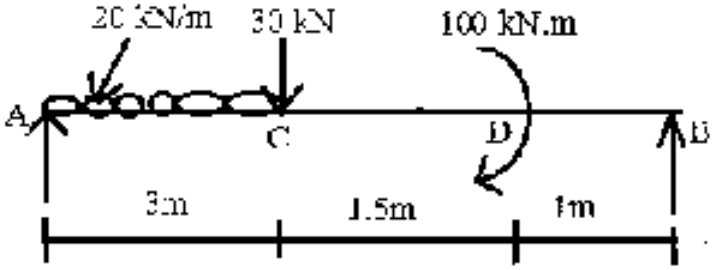
UNIT-II

3. a) A Simply Supported Beam of span 4m is subjected to load of 2kN/m over its entire length. Sketch the bending moment diagram for the beam. **6M**

   b) A cantilever beam of 2 m long carries a uniformly distributed load of 1.5kN/m over a length of 1.6 m from the fixed end and 2 kN at free end. Draws shear force and bending moment diagrams for the beam. **6M**

(OR)

4. a) Draw the shear force and bending moment diagram for the simply supported beam with span 5.5m. **7M**



   b) Draw the S.F. & B.M. diagrams for cantilever beam of length L carrying a UDL of W/unit length throughout its span. **5M**

UNIT-III

5. A simply supported beam of span 6m is subjected to a UDL of 15kN/m over its entire length. The cross section of beam is 20 cm wide and 30cm deep. Analyze and Sketch the variation of bending stress and shear stress in the beam cross section. **12M**

(OR)

6. Find out the section modulus for the following: **12M**
   i) Rectangular section ii) Hollow rectangular section
   iii) Circular section iv) Hollow circular section

UNIT-IV

7. The cross section of T beam is as follows: Flange thickness = 10mm; width of the flange = 100mm; thickness of the web = 10mm; depth of the web = 120mm; If a shear force of 2kN is acting at a particular section of the beam design and draw the shear stress distribution across the section. **12M**

(OR)

8. a) What do you understand by shear centre? Explain its importance. **6M**
   b) Explain about the shear stress distribution of a T-Section. **6M**

UNIT-V

9. Derive the following torsion equation: **12M**

$$\frac{T}{J} = \frac{G\theta}{L} = \frac{\tau}{r}$$

(OR)

10. a) A closely coiled helical spring has a stiffness of 5N/mm. its length when fully compressed with adjacent coils touching each other is 40 cm. The modulus of rigidity of the material of the spring is $8x10^4$ N/mm^2. Determine the wire diameter and mean coil diameter if their ratio is 1/10. What is the corresponding maximum shear stress in the spring? **6M**
    b) A shaft has to transmit 245 kW power at 240 rpm. The maximum torque may be 1.5 times the mean torque. The shear stress in the shaft is not to exceed 40 N/mm^2 and the twist must not exceed 10 per metre length, find a suitable diameter. **6M**
    If
    i) The shaft is solid.
    ii) The shaft is hollow with external diameter twice the internal diameter. Take C = $8x10^4$ N/mm^4.

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AR18

CODE: 18EET204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

NETWORK ANALYSIS AND SYNTHESIS

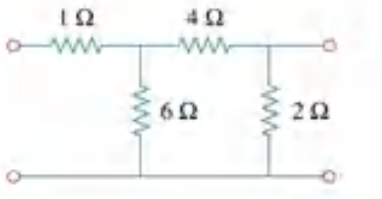
(Electrical and Electronics Engineering)

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

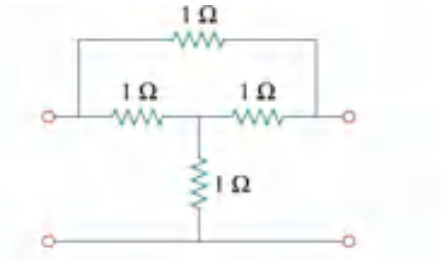
1. a) Find the Z parameters of the network shown below. 4M



b) Write short notes on Two port network parameters. 8M

(OR)

2. a) Convert Z-parameters to Y-parameters for a two-port network. 6M
b) Obtain the Y parameters and hence find the ABCD parameters of the network shown in below figure. 6M



UNIT-II

3. Derive the transient response of RL circuit for DC excitation 12M

(OR)

4. a) A series RLC circuit with R=200 Ω, L=0.1 H & C=100μ F has a constant voltage v=200V applied at t=0. Find the current assuming the capacitor has no initial charge. 6M
b) Find the Pulse response of RC Series Circuit using Differential equation technique. 6M

UNIT-III

5. Derive the transient response of RC circuit for sinusoidal excitation. 12M

(OR)

6. A sinusoidal voltage 25 sin 10t is applied to a RL circuit comprising R=5Ω and L=1H. at time t=0. Assume zero initial conditions. Find the current response of the network. Use Laplace Transformation technique & Differential equation technique. 12M

UNIT-IV

7. a) What are the properties of Hurwitz polynomial? 6M

   b) Test whether the polynomial $P(S) = S^4 + S^3 + 5S^2 + 3S + 4$ is Hurwitz. 6M

(OR)

8. a) Explain the properties of positive real function 6M

   b) Test whether $F(S) = \frac{2S^3 + 2S^2 + 3S + 2}{S^2 + 1}$ is Positive Real function. 6M

UNIT-V

9. Realize the Foster I & II forms of the following impedance function. 12M

$$Z(S) - \frac{4(S^2 + 1)(S^2 + 9)}{S(S^2 + 4)}$$

(OR)

10. Realize the Cauer I & II forms of the following impedance function. 12M

$$Z(S) = \frac{(S + 1)(S + 3)}{S(S + 2)}$$

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AR18

CODE: 18MET201 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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

UNIT-I

1. a) Distinguish between microscopic and macroscopic approaches in thermodynamics. [6]
   b) Explain concept of continuum? How will you define density and pressure using this concept? [6]

(OR)

2. a) Explain the quasi static process with the help of neat sketch. [6]
   b) A mass of gas is compressed in a quasi-static process from 80 kPa, 0.1 m^3 to 0.4 MPa, 0.03 m^3. Assuming that the pressure and volume are related by pv^n = constant, find the work done by the gas system. [6]

UNIT-II

3. a) Derive steady flow energy equation for a single stream entering and leaving a control volume also name the various terms in it. [6]
   b) A heat pump working on the Carnot cycle takes in heat from a reservoir at 5°C and delivers heat to a reservoir at 60°C. The heat pump is driven by a reversible heat engine which takes in heat from a reservoir at 840°C and rejects heat to a reservoir at 60°C. The reversible heat engine also drives a machine that absorbs 30 kW. If the heat pump extracts 17 kJ/s from the 5°C reservoir, determine [6]
   (i) The rate of heat supply from the 840°C source.
   (ii) The rate of heat rejection to the 60°C sink.

(OR)

4. a) Explain the equivalence of Kelvin Plank and Clausius statements. [6]
   b) 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? [6]

UNIT-III

5. a) Define the terms available energy and unavailable energy? [4]
   b) Explain the phase equilibrium diagram for pure substance on h-s coordinates (Mollier diagram). [8]

(OR)

6. a) Draw the phase equilibrium diagram for a pure substance on p-T coordinates. [4]
   b) In a steam generator, water is evaporated at 260°C, while the combustion gas (c_p = 1.08 kJ/kgK) is cooled from 1300°C to 320°C. The surroundings are at 30°C. Determine the loss in available energy due to the above heat transfer per kg of water evaporated (Latent heat of vaporization of water at 260°C = 1662.5 kJ/kg) [8]

UNIT-IV

7. a) Write the ideal gas equation of state. What are the two important assumptions of ideal gas? [4]

   b) 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 0.10 m^3, during which the work done on the gas is 25 kJ. Evaluate the c_p and c_v of the gas and the increase in entropy of the gas. [8]

(OR)

8. a) State the Dalton's law of partial pressure on what assumptions this law is based? [4]

   b) Write down the Van der Walls equation of state? How does it differ from the ideal gas equation of state? [8]

UNIT-V

9. a) Explain Atkinson cycle with various processes involved also represent the cycle on p-v and T-s diagram. [6]

   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: [6]
   (i) The cycle efficiency. (ii) The Net-work.

(OR)

10. a) Explain the Diesel cycle and derive the expression for thermal efficiency. [6]

    b) An engine working on the Otto cycle is supplied with air at 0.1 MPa, 35°C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate the maximum pressure and temperature of the cycle and cycle efficiency. (For air, c_p = 1.005 kJ/kgK, c_v = 0.718 kJ/kgK and R = 0.287 kJ/kgK) [6]

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AR18

CODE: 18EST202 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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 is an algorithm? How it is differ from program? Write an algorithm to find factorial of a given number.	6 M
	b)	Explain about different types of operators supported by 'C'. Give appropriate example.	6 M
		(OR)	
2.	a)	Explain structure of a 'C' program with an example	6 M
	b)	Write the steps for program development in 'C'	6 M

UNIT-II

3.	a)	Differentiate while and do-while statements with an example.	6 M
	b)	Write a program to find Fibonacci numbers upto given number.	6 M
		(OR)	
4.	a)	What are the looping constructs available in 'C' programming language? Explain with examples.	6 M
	b)	Explain break, continue and goto statements with suitable example.	6 M

UNIT-III

5.	a)	What are various storage classes available in C? Explain each type with suitable example.	6 M
	b)	Define array. Explain two dimensional arrays with suitable example.	6 M
		(OR)	
6.	a)	Define function. Explain various categories of functions.	6 M
	b)	Explain the term 'Recursion'. What are the advantages and disadvantages of a recurs function compared to a non-recursive function?	6 M

UNIT-IV

7.	a)	Define pointer? Explain about pointer to pointer with an example.	6 M
	b)	Write a program to swap two values using pointes.	6 M
		(OR)	
8.		What is Dynamic memory allocation? What are various functions that are used in Dynamic memory allocation? Explain each with example.	12 M

UNIT-V

9.	a)	Write a program to display the student details like RegdNo, name, branch, pass percentage using structures.	6 M
	b)	Explain about nested stricture in 'C' with an example.	6 M
		(OR)	
10.		Explain the following file functions with an example (i) fprintf( ) (ii) fscanf( ) (iii) fopen( ) (iv) fclose( )	12 M

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AR18

CODE: 18CST203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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)	Develop a java program that reads five integers and to print the count of negative numbers, positive numbers and zero's inputted.	5
	b)	What is an object oriented programming? Explain principals of OOPs?	7
		(OR)	
2.	a)	What is any array? Write a program to create an integer array, read and display elements.	6
	b)	Write a java program to illustrate the call by reference mechanism.	6

UNIT-II

3.	a)	Illustrate constructor overloading with suitable example	6
	b)	Explain the usage of 'super' keyword with example.	6
		(OR)	
4.	a)	Explain the usages of 'static' key word in java in detail.	6
	b)	How to define a class and write a program to access members of class through object with suitable example.	6

UNIT-III

5.	a)	What is an abstract class? Write a Java program to demonstrate abstract class.	6
	b)	Discuss about Dynamic Method Dispatch with Example	6
		(OR)	
6.	a)	Explain about method overriding with example	6
	b)	Differentiate between Abstract Classes and Interfaces	6

UNIT-IV

7.	a)	Differentiate between throw and throws keywords in java.	7
	b)	Write a java program to import a package with suitable example	5
		(OR)	
8.	a)	Discus about access specifier's private, public default and protected.	7
	b)	Write a java program to handle Arithmetic exception using try –catch block.	5

UNIT-V

9.	a)	Discuss about thread priorities in multi threading with example.	6
	b)	Explain creation of Threads using Thread class?	6
		(OR)	
10.	a)	What is an Applet? Explain 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, January-2020

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)	Knowledge of engineering geology is essential to a civil engineer in construction activity. Justify the statement?	7M
	b)	What are the advantages of study of physical properties of minerals over other methods? Explain any five physical properties of minerals used in identification of minerals?	7M

(OR)

2.	a)	Give a brief about any two case histories of failures of major civil engineering projects due to geological drawbacks?	7M
	b)	Distinguish between cleavage and fracture? Explain about determination of hardness of minerals?	7M

UNIT-II

3.	a)	Distinguish between a mineral and rock? Give a brief about classification of igneous rocks?	7M
	b)	Distinguish between dyke and sill? How do you distinguish igneous, sedimentary and metamorphic rocks in the field?	7M

(OR)

4.	a)	Give a brief about textures exhibited by metamorphic rocks?	7M
	b)	How do you distinguish sedimentary rocks and metamorphic rocks in the field?	7M

UNIT-III

5.	a)	Give a brief about various types of faults exhibited by rocks with neat sketches?	7M
	b)	Distinguish between symmetrical folds and asymmetrical folds with sketch? What do you understand about columnar joints?	7M

(OR)

6.	a)	Explain various types of joints exhibited by rocks with neat sketch?	7M
	b)	What is the importance of folds and faults in civil engineering?	7M

UNIT-IV

7.	a)	Give a brief about geological considerations in selection of suitable site for reservoir?	7M
	b)	What do you understand about lining of tunnels?	7M

(OR)

8.	a)	What is the importance of topography, strike and dip of rocks in selection of suitable site for a dam?	7M
	b)	Give a brief about geological considerations in tunnelling?	7M

UNIT-V

9.	a)	Give a brief about seismic refraction method and its applications in civil engineering?	7M
	b)	What are the advantages of geophysical methods over other methods of site investigation? Explain the principle of any two geophysical methods?	7M

(OR)

10.	a)	Give a brief about magnetic method of investigation and its applications?	7M
	b)	Give a brief about radiometric method?	7M

AR16

CODE: 16EE2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

LINEAR CONTROL SYSTEMS

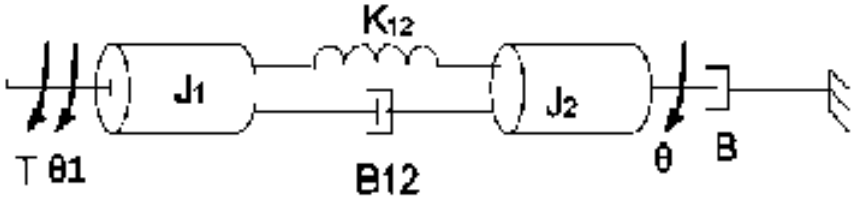
(Electronics and Communication Engineering)

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) State the application of open loop and closed loop control systems. 6M
   b) Obtain the transfer function $\frac{\theta(s)}{T(s)}$ for below dynamic model. 8M



(OR)

2. a) Compare the performances of closed loop and open loop control systems. 6M
   b) Explain about block diagram reduction rules. 8M

UNIT-II

3. a) The closed loop transfer function of unity feedback control system is given by 7M

$$\frac{C(S)}{R(S)} = \frac{5}{S^2 + 4S + 5}$$

Find damping ratio, natural undamped response frequency and percentage peak overshoot for unit step response.

   b) For a unity feed-back system whose over all transfer function is 7M

$$\frac{C(S)}{R(S)} = \frac{10}{S^2 + 6S + 10}$$

Obtain the position, velocity and acceleration error constants.

(OR)

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

UNIT-III

5 Sketch the root locus diagram for the following open loop transfer function: 14M

$$G(S) = \frac{K}{S(S+1)(S+10)}$$

(OR)

6. Obtain the stability of the system whose characteristic equation is given by 14M

$P(S)=S^6+2S^5+8S^4+12S^3+20S^2+16S+16$

UNIT-IV

7. a) Derive expressions for resonant peak, resonant frequency and bandwidth of standard second order system. 7M

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

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

(OR)

8. Sketch the Bode plot for the open loop transfer function 14M

$$G(S)H(S)=\frac{100}{S(1+0.5S)(1+0.1S)}$$

UNIT-V

9. a) Draw the electrical circuit diagram that represents the Lead Compensator and explain in detail. 7M

b) Determine the state controllability and observability of the following system 7M

$$A=\begin{bmatrix}-1 & 0\\ 0 & -4\end{bmatrix}, B=\begin{bmatrix}0\\1\end{bmatrix}, C=\begin{bmatrix}1 & 3\end{bmatrix}$$

(OR)

10. a) What do you mean by state transition matrix? And give its properties 7M

b) The state equation of a linear time-invariant system is given below 7M

$$\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}-2 & 0\\ 1 & -1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}0\\1\end{bmatrix}u$$

Determine State transition matrix

AR16

CODE: 16ME2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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)	Distinguish between intensive and extensive properties and give examples.	6 M
	b)	The properties of a closed system change following the relation pV=3.0 where 'p' is in bar and 'V' is in m^3. Calculate the work done when pressure increases from 1.5 bar to 7.5 bar.	8 M

(OR)

2.	a)	Define (i) Zeroth Law of Thermodynamics and (ii) PMM-I	6 M
	b)	Derive the expression for heat transfer of a closed system in a polytropic process.	8 M

UNIT-II

3.	a)	State the limitations of First Law of Thermodynamics.	5 M
	b)	Explain the equivalence of Kelvin Plank and Clausius statements.	9 M

(OR)

4.	a)	A heat engine operating between two reservoirs at 1000 K and 300 K is used to drive a heat pump which extracts heat from the reservoir at 300 K at a rate twice that at which the engine rejects heat to it. If the efficiency of the engine is 40% of the maximum possible and the COP of the heat pump is 50% of the maximum possible, what is the temperature of the reservoir to which the heat pump rejects heat? What is the rate of heat rejection from the heat pump if the rate of heat supply to the engine is 50 kW?	9 M
	b)	The volume of 1 kg of air increases from 0.5 m^3 to 1.3 m^3 while its pressure decreases from 1 MPa to 0.25 MPa. Then 100 kJ of heat is added to it at a constant pressure process. Calculate the change in entropy for all processes. Assume c_p = 1.005 kJ / kg K and R = 0.287 kJ / kg K.	5 M

UNIT-III

5.	a)	Derive an expression for availability in (i) non-flow process and (ii) steady flow process	6 M
	b)	Find the maximum work per kg of air that can be obtained from a piston cylinder arrangement if the air expands from an initial state 9 bar, 400 K to a final state of 1.5 bar, 300 K. Assume T_0 = 288 and P_0 = 1 bar.	8 M

(OR)

6.	a)	Define dryness fraction and derive an expression for the same with a neat sketch.	5 M
	b)	In a cylinder steam expands from 5.5 bar to 0.1 bar iscentropically. If steam is initially dry and saturated calculate per kg of steam (a) Find the dryness fraction at 0.1 bar (b) Entropy and enthalpy at 0.1 bar from Moiler chart.	9 M

UNIT-IV

7. a) How the Van der Waals equation is different from the ideal gas equation developed by Clerk Maxwell. Explain. 6 M

   b) A certain gas has c_p = 1.968 and c_v = 1.507 kJ / kg K. Find its molecular weight and 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. 8 M

(OR)

8. a) Define the term Psychrometry and explain with a neat diagram how to find different properties using Psychrometric chart. 7 M

   b) Atmospheric air is at 1 bar, 25° DBT and 15° WBT. Calculate 7 M
   (a) Relative humidity (b) Specific humidity
   (c) Vapour density in air (d) Enthalpy of mixture.

UNIT-V

9 Derive an expression for the efficiency of an Otto Cycle with a neat p-V and T-S diagrams. 14M

(OR)

10. a) Derive an expression for the efficiency of a Lenoir Cycle with a neat p-V diagram. 8 M

    b) The compression ratio in a diesel cycle is 14 and the cut off ratio occurs at 10% of the stroke. Determine the cut-off ratio and thermal efficiency of the cycle. 6 M

AR16

CODE: 16EE2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

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

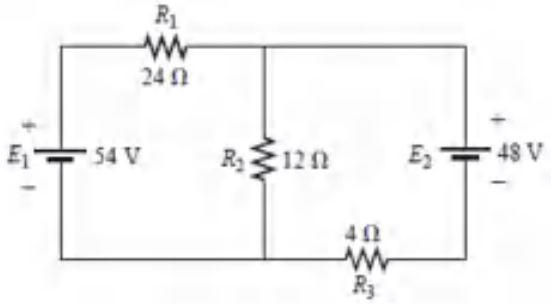
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

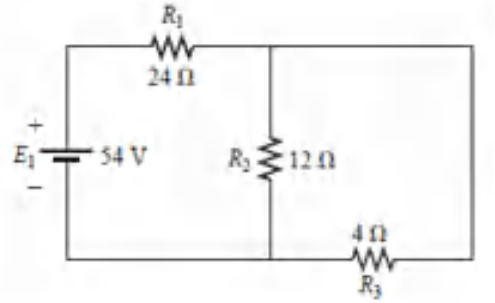
1. State and explain the Thevenin's and norton's theorem for DC excitation. 14M

(OR)

2. a) Using superposition, determine the current through the 4Ω resistor for the circuit shown below. 7M



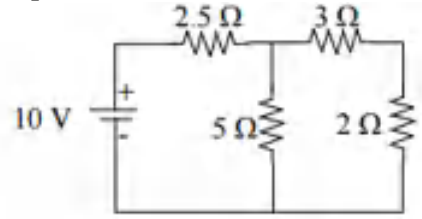
b) For the circuit given below, Verify reciprocity Theorem. Take 4Ω resistor as load. 7M



UNIT-II

3. a) State and prove maximum power transfer Theorem with suitable diagrams for DC circuits. 8M

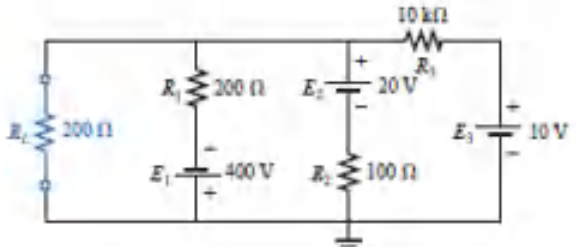
b) For the circuit given below, if the resistance of 5Ω branch increases to 12Ω in the circuit, Determine the compensation source. 6M



(OR)

4. a) State Tellegen's and Milliman's theorems. 8M

   b) Find the current through the load Resistance using Milliman's theorem. 6M



UNIT-III

5. a) In a two port π network ,the value of each branch resistance is 2Ω. Determine open circuit and short circuit parameters if voltage applied at port-1 is 10 V dc and voltage applied at port-2 is 5V dc. 12M

   b) What are the different short circuit parameters? 2M

(OR)

6. a) Explain Z, Y and ABCD parameters of a two port network 14M

UNIT-IV

7. a) Derive mathematical expression for the transient response of series RC circuit for an excitation of V Cos(ωt +φ). 10M

   b) Draw the basic circuit elements along with initial conditions 4M

(OR)

8. a) In a series R-L-C circuit, determine i(t) for $t \geq 0$ in the circuit if R=10Ω, L=0.45 H,C=1 μF and DC input =100 V. 14M

UNIT-V

9. a) Prove that if $Z_1(S)$ and $Z_2(S)$ are both positive real $Z(S) = Z_1(S)^* Z_2(S) / (Z_1(S) + Z_2(S))$ must also be positive real. 4M

   b) The input impedance for the network is $Zin = 2S^2+2 / (S^3+2S^2+2S+2)$ if Z_0 is an L-C network : (a) find the expression for Z_0 (b) synthesize Z_0 in a Foster series form. 10M

(OR)

10. a) Explain the properties of positive real function. 7M

    b) Test whether the polynomial $P(s)=s^4 + 3s^2 + 2$ is a hurwitz polynomial or not 7M

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AR16

CODE: 16CS2004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

OBJECT ORIENTED PROGRAMMING

(Computer Science 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)	What are the advantages of Object Oriented Programming over Procedural Oriented Programming?	7M
	b)	Explain various operators available in C++.	7M
		(OR)	
2.	a)	Write a C++ program to display whether a given number is Armstrong or not using functions.	7M
	b)	Define abstraction? Demonstrate abstraction with suitable C++ program using access specifiers.	7M

UNIT-II

3.	a)	What is Constructor? Demonstrate the use of constructor with suitable C++ Program.	7M
	b)	What is type conversion? Demonstrate various type conversions with suitable C++ Programs.	7M
		(OR)	
4.	a)	Write a C++ program to add two complex numbers using overloaded '+' operator.	7M
	b)	Why class is called as 'user defined data type', justify the answer with appropriate explanation.	7M

UNIT-III

5.	a)	Demonstrate with a suitable C++ program how to inherit private members of a base class to a derived class.	7M
	b)	What is inheritance? Demonstrate multiple inheritance with suitable example.	7M
		(OR)	
6.	a)	Explain in detail about the hybrid inheritance with examples.	7M
	b)	Write a C++ program to demonstrate the order of execution of destructors in the case multilevel inheritance.	7M

UNIT-IV

7.	a)	What is a virtual base class? Write a C++ program illustrating virtual base classes.	7M
	b)	What is polymorphism? Explain in detail advantages.	7M
		(OR)	
8.	a)	Write a C++ program to demonstrate the use of this pointer.	7M
	b)	What is Binding? Differentiate between static and Dynamic Binding.	7M

UNIT-V

9.	a)	Explain class template with an example C++ program.	7M
	b)	What is exception? Differentiate between exception and error.	7M
		(OR)	
10.	a)	Write a generic C++ program to add both integer and floating point values.	7M
	b)	Write a C++ program to copy content of one file to another file.	7M

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AR13

CODE: 13CE2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020
ENGINEERING GEOLOGY
(Civil Engineering)

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

PART-A

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

1. a) What is the scope of Geology?
   b) Explain briefly about Rock cycle?
   c) What is Lusture?
   d) What are the parts of a fault?
   e) Write the classification of Resistivity Methods?
   f) What is the importance of applied geology in different fields.
   g) Differentiate Intrusive and Extrusive Rocks?
   h) Define Hardness?
   i) What are the types of unconformities?
   j) Write the applications of Seismic Refraction Methods.

PART-B

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

UNIT-I

2. a) Explain the terms weathering, erosion and denudation 6M
   b) Write short notes i. Exfoliation, ii. Frost wedging. 6M

(OR)

3. What are the various branches of Geology and explain their relevance form Civil Engineering point of view. 12M

UNIT-II

4. Describe the following group of minerals. 12M
   (a) Feldspar group (b) Garnet group.

(OR)

5. Explain the following: 12M
   (a) Mode of formation of minerals
   (b) Structures of Silicates.

UNIT-III

6. Define the term "rock". Describe the classification of rocks and their characteristics. 12M

(OR)

7. Explain the following: 12M
   (a) Classification of metamorphic rocks.
   (b) Explain the structures and textures of metamorphic rocks

UNIT-IV

8. Explain the following terms with neat sketches. 12M
   (a) Joint Plane, Dip of joints and strike of joints.
   (b) Conformable bed and unconformable beds.

(OR)

9. Write a note on the following: 12M
   (a) Symmetrical and asymmetrical folds
   (b) Isoclinal and Recumbent folds
   (c) Geoanticline and Geosyncline (d) Drag folds.

UNIT-V

10. Explain classification of geophysical methods. 12M

(OR)

11. What are types and applications of seismic refraction methods and explain? 12M

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AR13

CODE: 13EE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020

NETWORK ANALYSIS
(Electronics and Communication Engineering)

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

PART-A

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

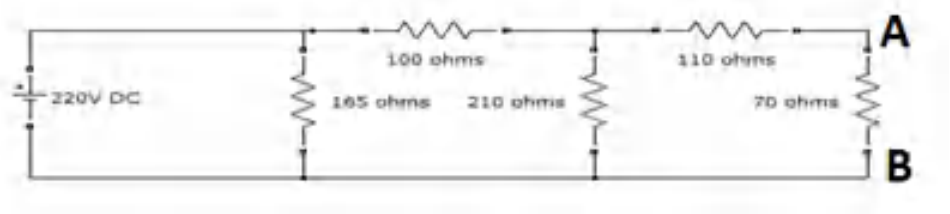
1. a) Define passive and active elements. Give examples.
   b) Define planar and non-planar graph.
   c) Define form factor.
   d) Define self-inductance.
   e) Define coefficient of coupling.
   f) Define bandwidth.
   g) Give the expressions for symmetry and reciprocity in case of admittance parameters.
   h) State Tellegens Theorem.
   i) Determine the time constant in a series RL circui.
   j) List different types of Filters.

PART-B

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

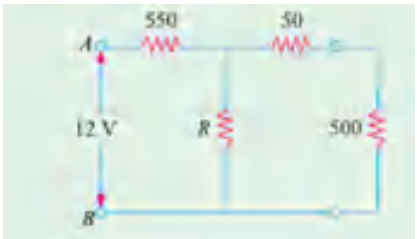
UNIT-I

2. a) State and explain Kirchhoff's laws 6M
   b) Obtain the current flowing through the 70 ohms resistor for the given circuit using mesh analysis. 6M



(OR)

3. a) Explain the importance of source conversion techniques. Demonstrate one of the techniques with an example. 6M
   b) What is the unknown resistor R in Fig. If the voltage drop across the 500 resistor is 2.5 volts? All resistances are in ohm. 6M



UNIT-II

4. a) Write the properties of incidence matrix 6M
   b) Define Tree and co tree and Write the properties of a tree of the graph. 6M

(OR)

5		Define instantaneous value, Average value and rms value and also Find the average value, effective value, peak factor and form factor of the sine wave form.	12M

UNIT-III

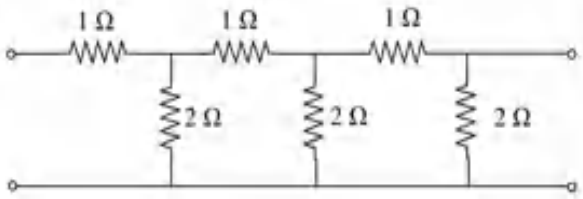
6.	a)	In the series RLC circuit R= 2 Ω, L= 1 mH and C = 0.4 μF Calculate resonant frequency, quality factor and band width.	6M
	b)	Define and derive the bandwidth of an RLC series circuit.	6M

(OR)

7.	a)	Two coils connected in series have an equivalent inductance of 0.8H when connected in aiding, and an equivalent inductance of 0.5H when the connection is opposing. Calculate the mutual inductance of the coils.	6M
	b)	Derive the equivalent inductance of a two series mutual coupled inductance.	6M

UNIT-IV

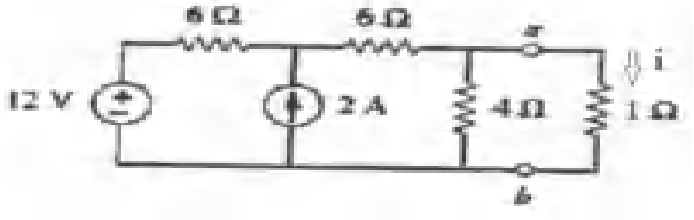
8.	a)	Find the ABCD parameters of the network shown in figure.	6M



	b)	Derive relationship between Y-parameters and Z-parameters of two port network?	6M

(OR)

9.		Define Thevenin's theorem and Obtain the current flowing through the 1 ohms resistor for the given circuit using Thevenin's theorem. Verify with Nortons theorem.	12M

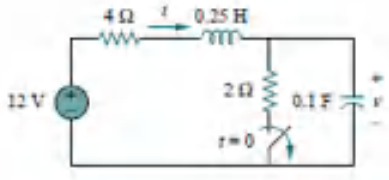


UNIT-V

10.		Design an m-derived T-section and π section high pass filter with a cut off frequency of 2 kHz, design impedance of 700 ohms and m=0.6.	12M

(OR)

11.	a)	The switch in Fig. has been closed for a long time. It is open at t = 0. Find: (i) i(0+), v(0+), (ii) di(0+)/dt , dv(0+)/dt , (iii) i(∞), v(∞).	6M



	b)	A series RL circuit with parameters R= 5 ohms and L = 10H is supplied by a source of 20V. Obtain the expression for current using Laplace approach.	6M

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AR13

CODE: 13ME2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020

THERMODYNAMICS
(Mechanical Engineering)

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

PART-A

Note: Steam Tables are allowed
ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define system and surroundings in thermodynamics?
   b) What is thermodynamics equilibrium?
   c) Define pure substance?
   d) State zeroth law of thermodynamics?
   e) Define PMM-II?
   f) State Carnot's theorem?
   g) What is dead state?
   h) Define dryness fraction?
   i) Define wet bulb and dry bulb temperatures?
   j) Define mean effective pressure?

PART-B

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

UNIT-I

2. a) Explain Joule experiment with a neat sketch?
   b) An engine cylinder has a piston of area 0.12 m^3 and contains gas at a pressure of 1.5 MPa. The gas expands according to a processes which is represented by a straight line on a pressure-volume diagram. The final pressure is 0.15 MPa. Calculate the work done by the gas on the piston if the stroke is 0.30m.

(OR)

3. a) Show that energy is a property of a system?
   b) A stationary mass of gas is compressed without friction from an initial state of 0.03 m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa, the pressure remaining constant during the processes. There is a transfer of 37.6 kJ of heat from the gas during the processes. How much does the internal energy of the gas change?

UNIT-II

4. Derive steady flow energy equation?

(OR)

5. A reversible heat engine operates between two reservoirs at temperatures of 600^0C and 40^0C. The engine drives a reversible refrigerator which operates between reservoirs at temperatures of 40^0C and -20^0C. The heat transfer to the heat engine is 2000 kJ and the net work output of the combined engine refrigerator plant is 360 kJ. a) evaluate the heat transfer to the refrigerant and heat transfer to the reservoir at 40^0C. b) reconsider i) given that the efficiencies of the heat engine and the COP of the refrigerator are each 40% of their maximum possible values.

UNIT-III

6. a) Show that there is a decrease in available energy from a finite energy source at temperature T when the environmental temperature is T_0.

   b) In a certain process, a vapour while condensing at 420^0C transfers heat to water evaporating at 250^0C. The resulting steam is used in a power cycle which rejects heat at 35^0C. What is the fraction of the available energy in the heat transferred from the processes vapour at 420^0C that is lost due to the irreversible heat transfer at 250^0C.

(OR)

7. In a cylinder steam expands from 5.5 bar to 0.1 bar iscentropically. If steam is initially dry and saturated calculate per kg of steam (a) Find the dryness fraction at 0.1 bar (b) Entropy and enthalpy at 0.1 bar from Moiler chart.

UNIT-IV

8. A fluid having a temperature of 150^0C and a specific volume of 0.96 m^3/kg at its initial state expands at constant pressure, without friction, until the volume is 1.55 m^3/kg. Find, for 1 kg of fluid, the work, the heat transferred and the final temperature if a) the fluid is air b) the fluid is steam

(OR)

9. Atmospheric air at 1.0132 bar has a *dbt* of 32^0C and a *wbt* of 26^0C. Compute
a) the partial pressure of water vapour, b) the specific humidity c) the dew point temperature , d) the relative humidity e) the degree of saturation f) the density of the air in the mixture g) the density of vapour in the mixture and h)the enthalpy of the mixture

UNIT-V

10. Explain Otto cycle with p-v and T-s diagrams and derive an expression for air standard efficiency of Otto cycle.

(OR)

11. An air standard dual cycle has a compression ratio of 15 and compression begins at 0.1 Mpa, 40^0C. The maximum pressure is limited to 6 Mpa and 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 e) the cut-off ratio f) the m.e.p of the cycle.

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AR13

CODE: 13EE2004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020
ELECTRICAL CIRCUIT ANALYSIS-I
(Electrical & Electronics Engineering)

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

PART-A

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

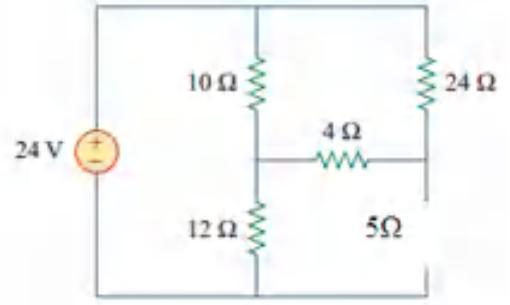
1. a) Define "KVL"?
   b) Three equal resistances of 3Ω are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?
   c) Find the quality factor of a coil for the series circuit consisting of R=10 Ω, L = 0.1H, and C = 10 μF.
   d) Define co-tree?
   e) State the Tellegen's theorem?
   f) Explain how the Norton's equivalent can be obtained from Thevenin's equivalent circuit.
   g) For a two port bilateral network, the three transmission parameters are given by A=16/15, B=17/15 and C=1/2, what is the value of D?
   h) The superposition theorem applied to any circuit, the dependent voltage source in that circuit is always what?
   i) The reciprocity theorem is applicable to which type of network.
   j) What are open circuit parameters?Ω

PART-B

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

UNIT-I

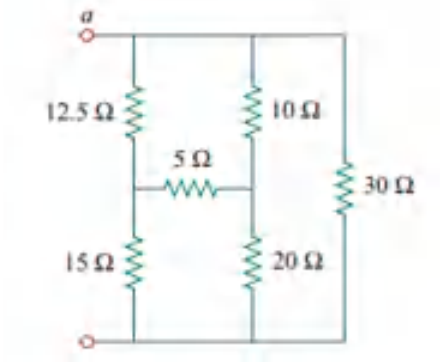
2. a) Use mesh analysis to determine the three mesh currents in the circuit 8M



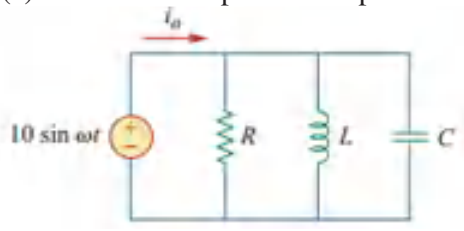
   b) Explain the terms bandwidth and Q factor. 4M

(OR)

3. a) Obtain the equivalent resistance R_{ab} 6M



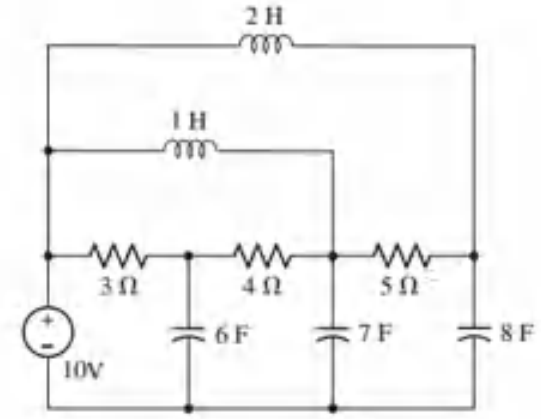
b) In the circuit in Fig., $R = 8k\ \Omega$, $L = 0.2$ mH, and $C = 8\ \mu$F. (a) Calculate ω_0, Q and B. (b) Find ω_1 and ω_2. (c) Determine the power dissipated at ω_0, ω_1 and ω_2. 6M



UNIT-II

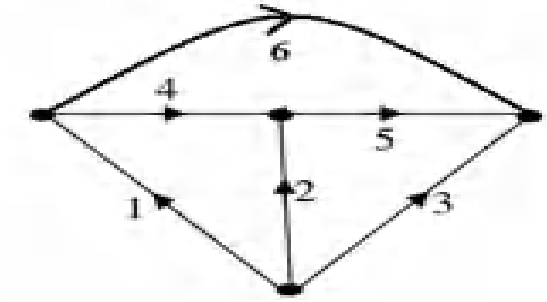
4. a) Define: 6M
i) Graph ii) Oriented Graph iii) Planar Graph, iv) Loop v) Path and vii) Link.

b) Draw the dual circuit for the given circuit? 6M

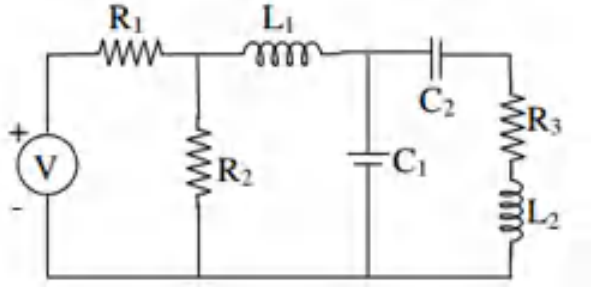


(OR)

5. a) Determine the basic cutest matrix for the oriented graph given in Fig. where the elements 1, 2, 3 are free branches. 6M



b) Draw the dual circuit for the given circuit? 6M

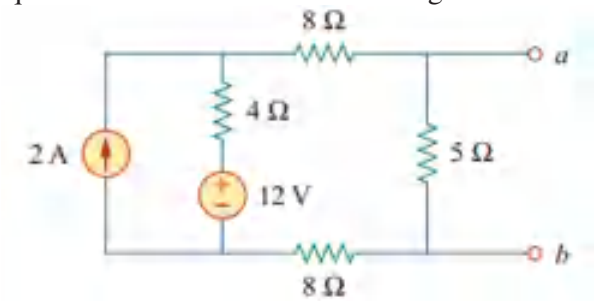


UNIT-III

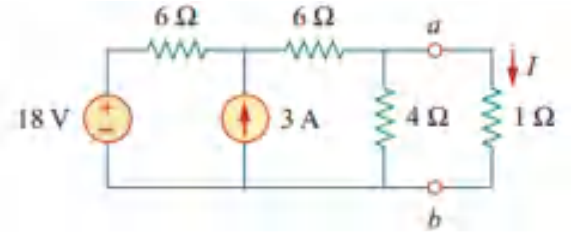
6. State and explain the super position theorem with example. 12M

(OR)

7. a) Find the Norton equivalent circuit of the circuit in Fig. at terminals *a-b*. 6M

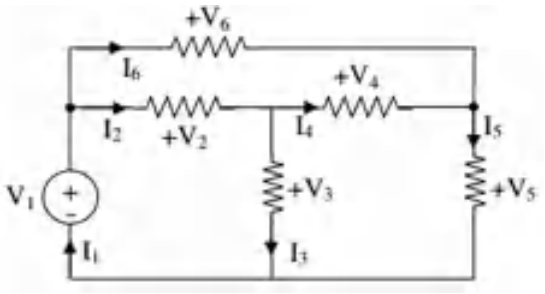


b) Using Thevenin's theorem, find the equivalent circuit to the left of the terminals in the circuit of Fig.. Then find *I* 6M

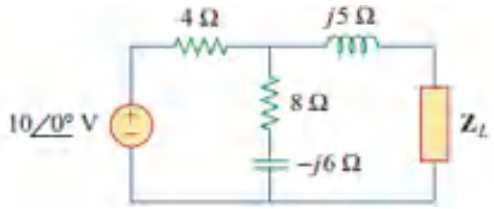


UNIT-IV

8. a) In the network given in Fig., check the validity of Tellegen's Theorem provided $V_1 = 8V$, $V_2 = 4V$, $V_4 = 2V$, Also $I_1 = 4A$, $I_2 = 2A$, $I_3 = 1A$. 6M

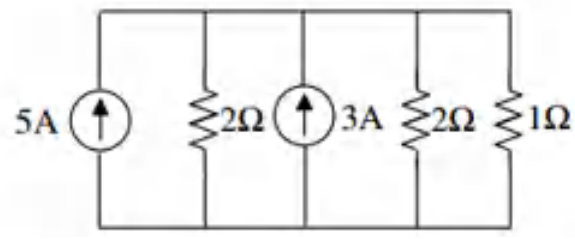


b) Determine the load impedance that maximizes the average power drawn from the circuit of Fig. 6M



(OR)

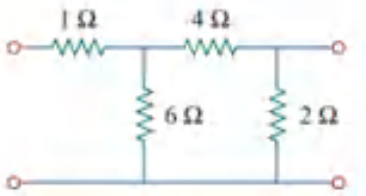
9. a) Find the current through the 1Ω resistor using Millman's theorem for the circuit shown in fig. 6M



b) State and explain the maximum power transfer theorem. 6M

UNIT-V

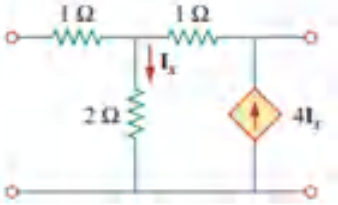
10. a) Determine the z parameters for the circuit 6M



b) Establish the relation between z – parameters and y-parameters. 6M

(OR)

11. a) Find the transmission parameters for the two-port network 6M



b) Explain series and parallel connection of two port networks with example. 6M