

# AR18

**CODE: 18CET203**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-2021**

**MECHANICS OF SOLIDS-I**

**(Civil Engineering)**

**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

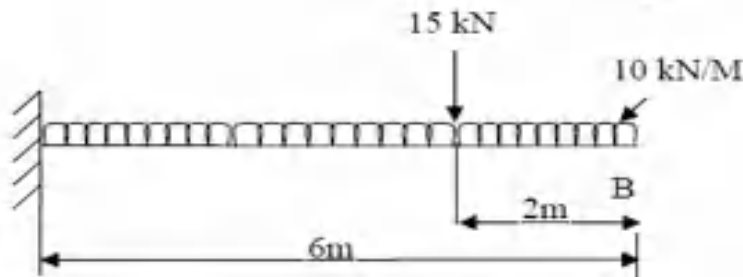
All parts of the Question must be answered at one place

## UNIT-I

1. a) A steel bar of 30 mm square in section is subjected to an axial compressive load of 80 kN. Find the percentage change in volume if the bar is 400 mm long. What are the equal stresses that must be applied to the sides of the bar if the volumetric change is to be zero? Young's modulus is 200 GPa and Poisson's ratio is 0.3. **6M**  
b) Discuss the relationship between Elastic Constants. **6M**  
(OR)
2. a) Outline the stress-strain diagram for mild steel, brittle material and a ductile material and indicate salient points. **7M**  
b) Relate the terms with one another **5M**  
i) Resilience ii) Proof resilience iii) Modulus of resilience

## UNIT-II

3. a) Draw S.F.D and B.M.D for the cantilever beam shown in Figure. **7M**



- b) Differentiate between hogging and sagging bending moment. **5M**  
(OR)
4. a) A beam of 10 m long is simply supported and carries a load of uniformly varying from 50 kN/m at the left end to 150 kN/m at the right end. Draw the shear force and bending moment diagrams. **6M**  
b) Draw the S.F. & B.M. diagrams for cantilever beam of length L carrying a UDL of W/unit length throughout its span. **6M**

### UNIT-III

5. State the assumptions made in the theory of simple bending and derive the bending formula. **12M**

**(OR)**

6. a) A rectangular beam 300 mm deep is simply supported over the span of 4 m. Determine the uniformly distributed load per metre which the beam may carry, if the bending stress should not exceed  $120\text{N/mm}^2$ . Take  $I=8\times 10^6\text{ mm}^4$ . **7M**
- b) What do you understand by neutral axis & moment of resistance? How do you locate Neutral axis? **5M**

### UNIT-IV

7. a) A square of 30 mm side is used as a beam with its diagonal in the horizontal position. If the vertical shear force at a section is 3 kN, determine the value and the location of the maximum shear stress occurring in the cross section. Also, determine the shear stress at the bottom. **7M**
- b) A beam subjected to a bending stress of  $5\text{N/mm}^2$  and the section modulus is  $3530\text{ cm}^3$ . Evaluate the moment of resistance of the beam. **5M**

**(OR)**

8. a) Prove that maximum shear stress in a circular section of a beam is  $4/3$  times the average shear stress. **7M**
- b) A beam of triangular cross-section with a base of 120 mm and 150 mm, the lower surface being horizontal. If the shear force on a section is 30 kN, draw the distribution of shear stress in the beam. **5M**

### UNIT-V

9. a) A solid cylindrical shaft is to transmit 300kW power at 100 r.p.m .If the shear stress is not to exceed  $80\text{N/mm}^2$ , find its diameter. **5M**
- b) State the types of stresses when a closed coiled spring is subjected to  
(i) axial load and  
(ii)axial twisting moment. **7M**

**(OR)**

10. a) State the assumptions made in the theory of pure torsion. **5M**
- b) Derive the torsion equation  $T/J = T/R = G\theta/L$  **7M**

# AR18

**CODE: 18EET204**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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

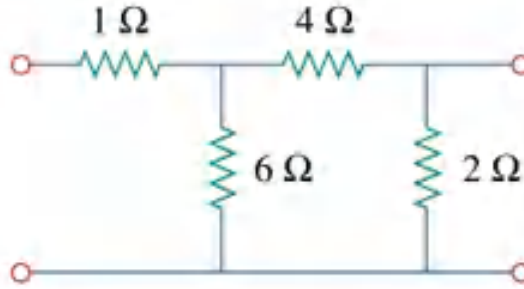
All parts of the Question must be answered at one place

**UNIT-I**

1. a) Express the Y parameters in terms of h parameters of a network. 6M  
b) In a Two port T network, the value of each branch resistance is  $2\Omega$ . Determine short circuit parameters if voltage applied at port-1 is 10 V dc and voltage applied at port-2 is 5V dc. 6M

**(OR)**

2. a) The Y – parameters of a two port network are  $Y_{11}=15$  mho,  $Y_{22}=24$  mho,  $Y_{12}=Y_{21}=6$  mho. Determine ABCD parameters. 6M  
b) Determine the Z-parameters of the network shown in below figure. 6M

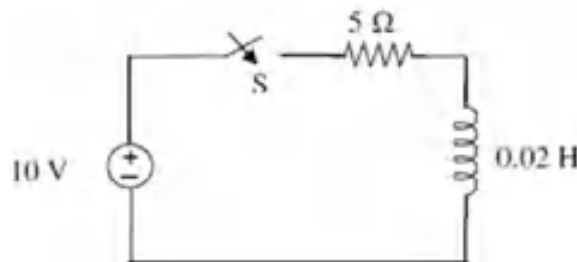


**UNIT-II**

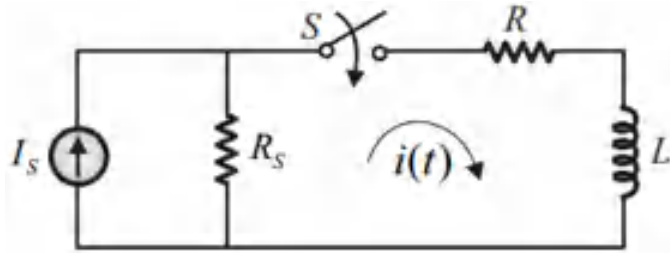
3. a) Derive the current response of a series R-C circuit excited by a DC voltage source. 6M  
b) A resistance R and  $5\mu\text{F}$  capacitor are connected in series across a 100 V d.c. supply. Calculate the value of R such that the voltage across the capacitor becomes 50 V in 5 sec after the circuit is switched on. 6M

**(OR)**

4. a) In an RL circuit shown in Figure, the switch closes at  $t = 0$ . Determine the complete current response. 6M

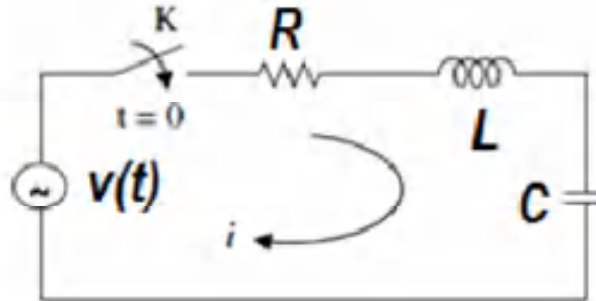


- b) In the given circuit, the switch S is closed at  $t = 0$ . Calculate the rate of change of current  $\frac{d}{dt} i(0^+)$  6M



### UNIT-III

5. A series RLC circuit consisting of  $R=10\ \Omega$ ,  $L=0.5\ \text{H}$  and  $C = 200\ \mu\text{F}$  has a sinusoidal voltage  $V=150\sin(200t + \phi)$ . If the switch is closed when  $\phi = 30^\circ$ , determine the current equation. 12M



(OR)

6. Derive the transient response of RL circuit by a Sinusoidal excitation. 12M

### UNIT-IV

7. a) State and explain the properties of positive real function 6M  
 b) Test whether the polynomial  $P(s) = s^3 + 4s^2 + 5s + 2$  is Hurwitz. 6M
- (OR)
8. a) Test whether  $Z(s) = \frac{(s^2+25s+25)}{(s+4)}$  is positive real function. 6M  
 b) Explain the procedure for testing a given polynomial for Hurwitz character. 6M

### UNIT-V

9. Find the two cauer realizations of driving point function given 12M

$$Z(s) = \frac{10s^4 + 12s^2 + 1}{2s^3 + 2s}$$

(OR)

10. a) Find the first Foster form of driving point function of 6M

$$Z(s) = \frac{2(s+2)(s+5)}{(s+4)(s+6)}$$

- b) Find the second Foster form of RL network function 6M

$$Y(s) = \frac{s^2 + 8s + 15}{s^2 + 5s + 4}$$

# AR18

**CODE: 18MET201**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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

### **UNIT-I**

1. a) What do you understand by macroscopic and microscopic view point? 6M
- b) Show that heat transfer is a path function and not a property. 6M

**(OR)**

2. a) Define thermodynamic equilibrium. List the different types of thermodynamic equilibrium and explain. 4M
- b) Explain the functions of the following: 8M
- (i) Path Function, (ii) Point Function, (iii) Control Volume and (iv) Property.

### **UNIT-II**

3. a) Write limitations of first law. 4M
- b) A gas undergoes a thermodynamic cycle consisting of three processes beginning at initial state. Where  $P_1 = 1$  bar,  $V_1 = 1.5 \text{ m}^3$  and  $U_1 = 512$  kJ. The processes are as follows: 8M

(i) Process 1-2: Compression with  $PV = \text{constant}$  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:  $W_{31} = + 50$  kJ. Neglecting KE and PE changes.

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

**(OR)**

4. A reversible heat pump is used to maintain a temperature of  $0^\circ\text{C}$  in a refrigerator when it rejects the heat to the surroundings at  $25^\circ\text{C}$ . If the heat removal rate from the refrigerator is  $1440 \text{ kJ/min}$ , determine the C.O.P. of the machine and work input required. (ii) If the required input to run the pump is developed by a reversible engine which receives heat at  $380^\circ\text{C}$  and rejects heat to atmosphere, then determine the overall C.O.P. of the system. 12M

### **UNIT-III**

5. a) Define pure substance. 4M
- b) Air enters a compressor operating at steady state at a pressure of 1 bar, a temperature of 300 K, and a velocity of 9m/s through an inlet with an area of  $0.1 \text{ m}^2$ . At exit, pressure is 8 bar, the temperature is 450 K and the velocity is 2 m/s. Heat transfer from the compressor to the surrounding occurs at a rate of 3 kJ/s. Calculate power input to the compressor? 8M

**(OR)**

6. a) Define dryness fraction or quality of steam and write expression for 'x' in terms of mass 6M
- b) Define degree of sub-cooling and degree of superheating with neat T-S diagram 6M

#### **UNIT-IV**

7. a) Define Dalton's Law of partial pressure? 4M
- b) The percentage composition of a fuel on mass basis is as follows: C-90; H<sub>2</sub>-3.5; O<sub>2</sub>-1; S-0.5 and ash-5. Calculate (a) the minimum air required for complete combustion of 1 kg of this fuel and (b) the composition of dry flue gases on mass basis if 50% excess air is supplied. 8M

**(OR)**

8. a) Explain mole fraction and mass fraction. 4M
- b) Determine the theoretical mass of air required for complete combustion of 1kg of fuel containing 83% carbon, 15% hydrogen and 2% oxygen by mass 8M

#### **UNIT-V**

9. a) Draw PV & TS charts of diesel cycle and explain. 4M
- b) In an air-standard dual cycle with a compression ratio of 15, the maximum pressure and temperature are 1 bar and 300 K, respectively. The maximum temperature and pressure are 3000 K and 70 bar, respectively. Determine the (i) work done per kg of air (ii) energy added as heat per kg of air and (iii) thermal efficiency of the cycle. 8M

**(OR)**

10. a) Compare Otto and Diesel cycle for the same compression ratio and same heat rejection. 4M
- b) In an air standard Otto cycle the compression ratio is 7, and compression begins at 35°C, 0.1MPa. The maximum temperature of the cycle is 1100°C. Find (a) the work done per kg of air and (b) the cycle efficiency. 8M

# AR18

**CODE: 18EST202**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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 is a flow chart? Draw a flow chart to find largest number among given three numbers. 6 M  
b) Explain basic structure of C program with suitable example. 6 M
- (OR)
2. a) Briefly explain about expression evaluation in C using an example. 6 M  
b) What are bitwise and logical operators? Explain with suitable programming example. 6 M

## UNIT-II

3. a) Explain the difference between 'break' and 'continue' statements with examples. 6 M  
b) Write a C program to check whether a given number is Armstrong or not. 6 M
- (OR)
4. a) Explain entry controlled and exit controlled statements with syntax. 6 M  
b) Write a C program to perform arithmetic operations using switch control. 6 M

## UNIT-III

5. a) What is an array? Write a program to search an element in an array using linear search technique. 6 M  
b) Illustrate difference between iteration and recursion. Write a program to find LCM of any two given numbers using recursion. 6 M
- (OR)
6. a) Explain the advantages of functions in C language. 6 M  
b) What are different standard library string functions in C? 6 M

## UNIT-IV

7. a) Differentiate between Pointer(\*) and address (&) operator using examples. 6 M  
b) Write a C program to access elements of an array using pointers. 6 M
- (OR)
8. a) Write a program to swap two numbers without using a temporary variable by using pointers. 6 M  
b) Explain Dynamic Memory Allocation Functions in C in detail. 6 M

## UNIT-V

9. a) How type def is used in structures? 6 M  
b) How arrays can be used within structures? How arrays of structures can be initialized? 6 M
- (OR)
10. a) Explain file handling functions in C. 6 M  
b) Write a C program to copy one file to another file. 6 M

# AR18

**CODE: 18CST203**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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) Write about Java data types. 6M
- b) What is an array? With suitable examples, explain how to define, create and use arrays. 6M

**(OR)**

2. a) Does Java support automatic type conversion? Justify your answer with appropriate examples. 6M
- b) Illustrate various control statements of java with suitable examples. 6M

## UNIT-II

3. a) Explain the use of 'final' keyword. 6M
- b) What is a static method? Describe its significance in application development. 6M

**(OR)**

4. a) Write a short note on finalize() method. 6M
- b) Explain method overriding with a suitable example program. How do you ensure that a particular method cannot be overridden. 6M

## UNIT-III

5. a) What is 'super' in java? Explain with example 6M
- b) Can inheritance be applied between interfaces? Justify your answer. 6M

**(OR)**

6. a) Explain multilevel inheritance with the help of abstract class in your program. 6M
- b) What is meant by dynamic method dispatch? Explain with a program. 6M

## UNIT-IV

7. How to define a package? How to access, import a package? Explain with examples. 12M

**(OR)**

8. a) What is meant by re-throwing exception? Discuss a suitable scenario for this. 6M
- b) Write a program to illustrate the use of multiple catch blocks for a try block. 6M

## UNIT-V

9. Describe the need of thread synchronization. How is it achieved in Java programming? Explain with a suitable program. 12M

**(OR)**

10. a) Write a java program to demonstrate thread in java. 6M
- b) Write in detail about applet life cycle. 6M



# AR16

**CODE: 16CE2006**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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 the importance of engineering geology related to civil engineers in working site 7M
- b) Write about the Physical properties of the following rock forming minerals : 7M  
i) Quartz ii) Jasper

**(OR)**

2. a) What are the Physical properties of bauxite mineral? 7M
- b) Explain some of the failures of civil engineering structures due to geological drawbacks? 7M

## **UNIT-II**

3. a) What is texture of a rock? Discuss the various types of textures in sedimentary rocks. 7M
  - b) Explain about geological classification of igneous rocks? 7M
- (OR)**
4. a) What are the rocks used as building materials? Give an account of the properties of rocks as building materials. 7M
  - b) Discuss the common structures and textures of Metamorphic rocks. 7M

## **UNIT-III**

5. a) What are unconformities? Discuss types of unconformities, What engineering problems are created by the presence of unconformities. 7M
- b) Describe the different types of folds with neat diagrams. Add a note on their engineering significance. 7M

**(OR)**

6. a) Classify and describe the different types of faults in rocks and explain how they are recognized in the field? 7M
- b) Classify and describe different types of joints in rock with neat sketches. 7M

#### **UNIT-IV**

7. a) What are the geological conditions necessary for the stability of a dam and life of a reservoir 7M  
b) Explain about the role of Geological considerations in Tunneling 7M

**(OR)**

8. a) Discuss geological considerations for a successful reservoir site 7M  
b) What is the influence of geology for successful tunnelling? 7M

#### **UNIT-V**

9. a) Explain about the Geo-physical study by Gravity method and Magnetic methods with neat sketches 7M  
b) What are the principles of geophysical exploration? Discuss any one method used for interpreting subsurface structures 7M

**(OR)**

10. a) Explain the civil engineering importance of geophysical studies. 7M  
b) Write the principle, parameters, methods and their applications of electrical resistivity method. 7M

**ELECTRICAL CIRCUIT ANALYSIS  
(Electrical and Electronics Engineering)****Time: 3 Hours****Max Marks: 70**

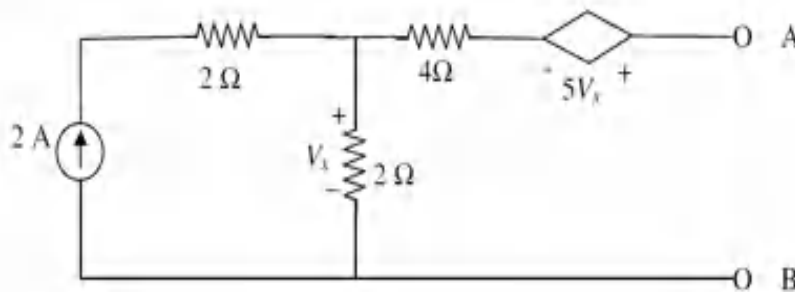
Answer ONE Question from each Unit

All Questions Carry Equal Marks

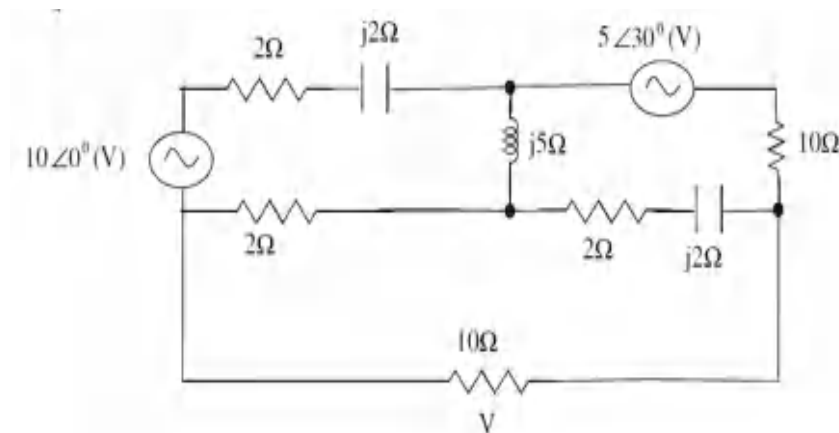
All parts of the Question must be answered at one place

**UNIT-I**

1. State and the explain the superposition theorem with suitable example. 14M
- (OR)**
2. a) Find the Thevenin's equivalent circuit with respect to terminals A and B for the network shown in figure 7M

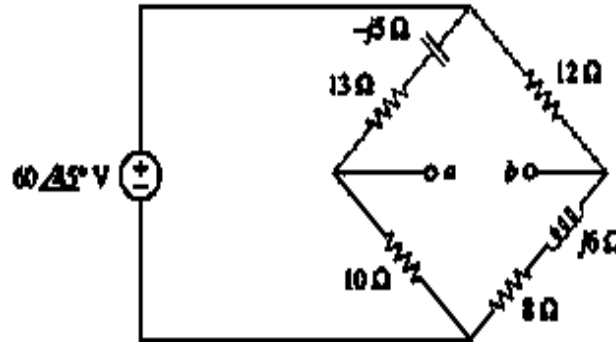


- b) Using the principle of superposition, calculate the voltage V in the network shown in figure 7M



## UNIT-II

3. a) State and explain Tellegen's theorem 7M  
 b) Find the value of  $Z_{ab}$  in the circuit shown in figure, such that maximum power transfer takes place. What is the amount of this power? 7M



(OR)

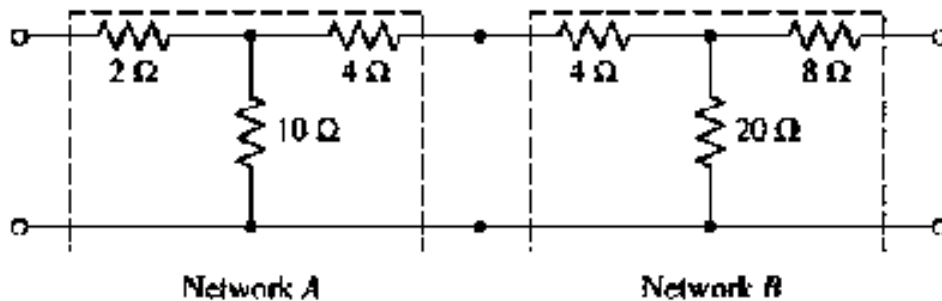
4. a) State and explain Maximum Power Transfer theorem with suitable example. 14M

## UNIT-III

5. a) If h parameters of for some particular two-port is given below. Calculate y parameters 7M

$$h = \begin{pmatrix} 2K\Omega & -3 \\ 5 & 0.01S \end{pmatrix}$$

- b) Find the transmission parameters for the cascaded networks shown 7M

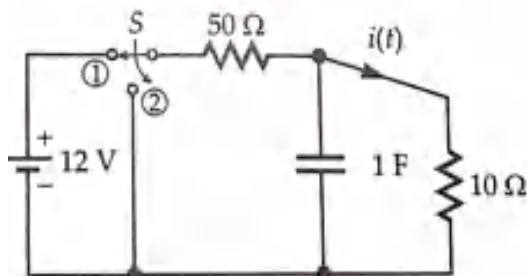


(OR)

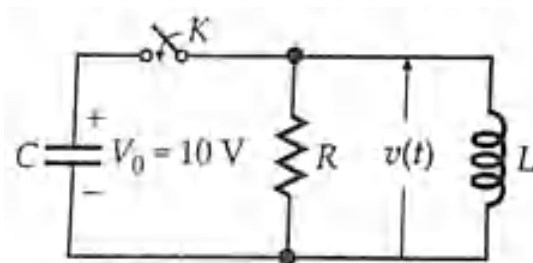
6. a) Derive the relationship between hybrid and Z parameters of two port network? 7M  
 b) Explain the Z and Y parameters of two port network. 7M

## UNIT-IV

7. a) For the fig. given below, Find  $i(t)$  at  $t = 0^+$  following switching of S from (1) to (2). Assume steady state of the circuit while S was at (1). 7M

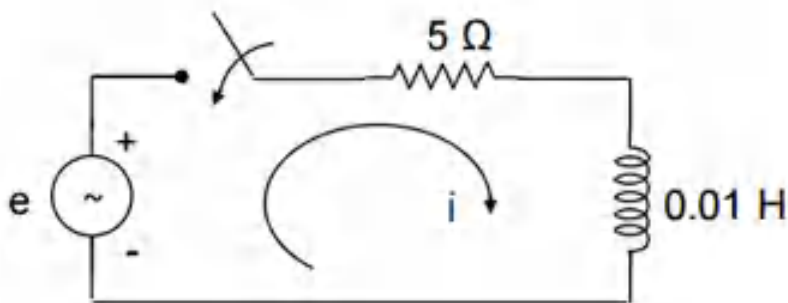


- b) For the fig. given below, represents a parallel RLC circuit where  $R = 0.1\Omega$ ,  $L = 0.5H$  and  $C$  is  $1F$ . Capacitor  $C$  has an initial voltage of  $10V$ . Obtain  $v(t)$ . 7M



(OR)

8. In the initially relaxed RL circuit shown, the sinusoidal source of  $e = 100 \sin(500t)$  V is applied at time  $t = 0$ . Determine the resulting transient current for time  $t > 0$  14M



## UNIT-V

9. Obtain Cauer- I form for given Network function 14M

$$z(s) = \frac{2s^5 + 12s^3 + 16s}{s^4 + 4s^2 + 3}$$

(OR)

10. Obtain Foster- I form for given Network function 14M

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

# AR16

**CODE: 16ME2007**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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. Describe the macroscopic and microscopic point of view of thermodynamics with examples 14M

**(OR)**

2. a) Define energy and Show that energy is a property of the system 7M
- b) Two kg of air expands polytropically ( $n=1.25$ ) from a pressure of 15 bar and a temperature of  $300^{\circ}\text{C}$  to 1.5 bar, then heated at constant pressure to initial volume. Find the work done and heat transfer. 7M

## UNIT-II

3. A reversible heat pump is used to maintain a temperature of  $0^{\circ}\text{C}$  in a refrigerator when it rejects the heat to the surroundings at  $25^{\circ}\text{C}$ . If the heat removal rate from the refrigerator is 1440 kJ/min, determine the C.O.P. of the machine and work input required. (ii) If the required input to run the pump is developed by a reversible engine which receives heat at  $380^{\circ}\text{C}$  and rejects heat to atmosphere, then determine the overall C.O.P. of the system. 14M

**(OR)**

4. a) What are the limitations of First law of thermodynamics and State second law of thermodynamics? 7M
- b) Show that violation of Kelvin-Planck statement leads to violation of and Clausius statement. 7M

## UNIT-III

5. a) What do you understand by Availability and Irreversibility? Why is Availability of a fluid at a higher temperature more than that at a lower temperature? 7M
- b) Air at 1 bar and  $27^{\circ}\text{C}$  is heated in a non-flow system at constant pressure to  $177^{\circ}\text{C}$ . heat is supplied from a constant temperature reservoir at  $527^{\circ}\text{C}$ . The atmospheric temperature is  $20^{\circ}\text{C}$ . What percentage of heat added per kg of air is the available energy? 7M

**(OR)**

6. a) Define dryness fraction or quality of steam and write expression for 'x' in terms of mass 7M
- b) Define degree of sub-cooling and degree of superheating with neat T-S diagram 7M

#### **UNIT-IV**

7. a) Define Mole fraction, Mass fraction, partial pressure with examples 7M
- b) Explain the Daltons law of additive pressures 7M

**(OR)**

8. a) Define the term psychrometry and give different applications of psychometrics 7M
- b) A gas mixture contains 1 kg of O<sub>2</sub> and 3.5 kg of N<sub>2</sub>. The pressure and temperature of mixture are 1 bar and 27<sup>0</sup>C. Determine mass and mole fractions of constituents, average molar weight of mixture, partial pressure of constituents. 7M

#### **UNIT-V**

9. a) Derive the expression for Thermal Efficiency of Diesel Cycle 7M
- b) Air enters at 1 bar and 30<sup>0</sup>C in an engine running on diesel cycle whose compression ratio of 18. Maximum temperature of cycle is limited to 1500<sup>0</sup>C. Calculate i) cut-off ratio ii) Heat supplied per kg of air iii) cycle efficiency. 7M

**(OR)**

10. a) Derive the expression for Thermal Efficiency of Otto Cycle 7M
- b) An air standard Otto cycle has a compression ratio of 7. At the start of compression the pressure and temperature are 1 bar and 27<sup>0</sup>C. if the maximum temperature of the cycle is 727<sup>0</sup>C calculate i) heat supplied ii) net work done iii) Thermal efficiency 7M

# AR16

**CODE: 16EE2005**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-2021**

**LINEAR CONTROL SYSTEMS  
(Electronics and Communication Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

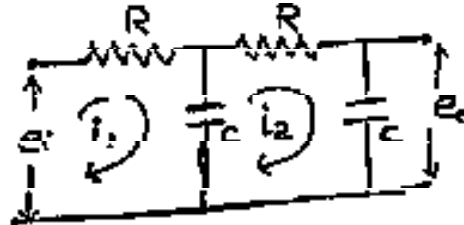
Answer ONE Question from each Unit

All Questions Carry Equal Marks

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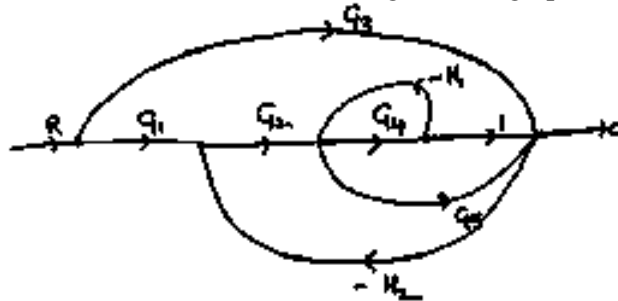
## UNIT-I

1. a) What are the advantages and disadvantages of open loop control systems? 7M
- b) Determine the transfer function for the electrical network given below? 7M



(OR)

- 2 Determine the overall transfer function for the Signal flow graph shown below? 14M



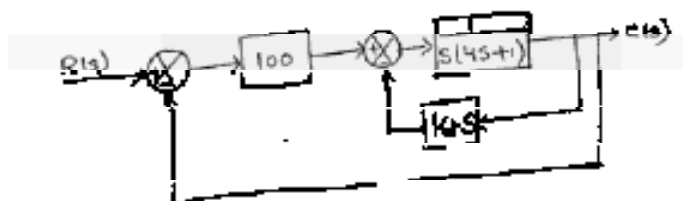
## UNIT-II

3. Determine the transfer function of an armature controlled DC servomotor? 14M

(OR)

4. a) Determine  $c(t)$  and percentage overshoot having  $r(t) = u(t)$  and  $\frac{C(S)}{R(S)} = \frac{8(S+1)}{S^2+2S+2}$  ? 7M

- b) Derivative feedback is employed in the control system shown in the figure to improve its damping. If the required damping factor of the system is 0.5, the value of  $K_d$  must be adjusted to? 7M





### UNIT-III

5. The open loop transfer function of a control system is given by  $G(S)H(S) = \frac{K}{s(s+6)(s+2)}$  sketch the root locus? 14M

(OR)

6. Determine the stability of a system having the following characteristic equation? 14M  
 $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$

### UNIT-IV

7. Construct Bode plot for the system whose open loop transfer function is given below and determine GM & PM? 14M

$$G(S)H(S) = \frac{4}{s(1+0.5s)(1+0.08s)}$$

(OR)

8. Construct Bode plot for the system whose open loop transfer function is given below and determine GM & PM? 14M

$$G(S)H(S) = \frac{1000}{(1+0.1s)(1+0.001s)}$$

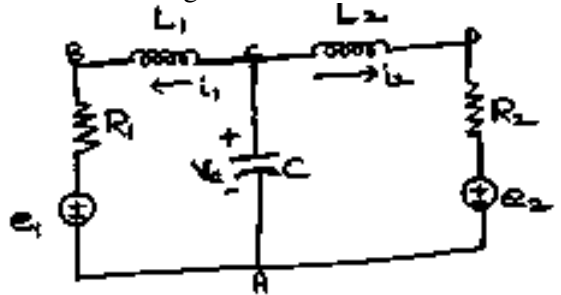
### UNIT-V

9. a) Obtain the state transition matrix for a given state model 7M  
 $\dot{X} = AX$  where  $A = \begin{bmatrix} 0 & 1 \\ -2 & 0 \end{bmatrix}$ ; given  $X(0) = \begin{bmatrix} 1 & 1 \end{bmatrix}^T$  and  $Y = \begin{bmatrix} 1 \\ -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

- b) Find out the transfer function for the following system? 7M  
 $\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}X + \begin{bmatrix} 0 \\ 1 \end{bmatrix}U$ ;  $Y = \begin{bmatrix} 1 & 0 \end{bmatrix}X + \begin{bmatrix} 0 \end{bmatrix}U$

(OR)

10. a) Write the state model for given electrical network? 7M



- b) Design a suitable lag compensating network for  $G(S) = \frac{K}{s(s+2)(s+20)}$  to meet the following specifications  $K_v = 20 \text{ Sec}^{-1}$  P.M  $\geq 35^\circ$ ? 7M

# AR16

**CODE: 16CS2004**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-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. a) | Explain OOPs concepts.  | 8M |
| b)    | List the drawbacks of procedure oriented programming. Explain how object oriented Programming overcomes them. | 6M |

**(OR)**

- |       |  |    |
|-------|--|----|
| 2. a) | What is meant by function overloading? Why it is known as function polymorphism in OOP | 7M |
| b)    | Demonstrate encapsulation and polymorphism.  | 7M |

**UNIT-II**

- |       |   |    |
|-------|---|----|
| 3. a) | Explain about default and parameterized constructors with suitable examples                         | 8M |
| b)    | How members function is defined inside a class and outside the class? Explain With an example each. | 6M |

**(OR)**

- |       |  |    |
|-------|--|----|
| 4. a) | Explain Operator overloading with one example. | 7M |
| b)    | Write down the rules for Operator Overloading. | 7M |

**UNIT-III**

- |       |   |    |
|-------|---|----|
| 5. a) | What is a virtual base class? Write a C++ program illustrating virtual base classes | 8M |
| b)    | Explain hybrid inheritance with a C++ example.                                      | 6M |

**(OR)**

- |       |   |    |
|-------|---|----|
| 6. a) | What is abstract class? Explain with a suitable example                             | 7M |
| b)    | Write a C++ program to implement multiple inheritances with public access specific. | 7M |

**UNIT-IV**

- |       |  |    |
|-------|--|----|
| 7. a) | Explain the role of this pointer in C++ with a programming example   | 8M |
| b)    | What is dynamic binding? How it is different from static binding? List some Advantages of dynamic binding over static binding. | 6M |

**(OR)**

- |       |  |    |
|-------|--|----|
| 8. a) | Explain the usage of pointers in C++ with a suitable example | 7M |
| b)    | Write down the features of Pointers in C++.                  | 7M |

**UNIT-V**

- |       |  |    |
|-------|--|----|
| 9. a) | Write a C++ Program for exception handling using multiple catch statements | 8M |
| b)    | Swap two Numbers using function Template.                                  | 6M |

**(OR)**

- |        |  |    |
|--------|--|----|
| 10. a) | What is the difference between function overloading and function template? | 7M |
| b)     | What is a file mode? Describe the various file mode options available      | 7M |

# AR13

**CODE: 13CE2003**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**II B.Tech I Semester Supplementary Examinations, October-2021**

**ENGINEERING GEOLOGY  
(Civil Engineering)**

**Time: 3Hours**

**Max Marks:70**

**PART –A**

**ANSWER ALL QUESTIONS**

**[1 x 10=10M]**

1. a) What is weathering?  
b) What is the chemical composition of Calcite?  
c) What is the special property of Talc?  
d) Name the mineral which is heavy but soft( less hard)  
e) What are the essential minerals of Granite?  
f) Which rock is metamorphosed as Quartzite?  
g) Name the rock having more than 90% of calcite.  
h) What is plunge of fold?  
i) What is Hade?  
j) How a Reverse Fault is different from a Normal Fault?

**PART –B**

**Answer one question from each Unit**

**[ 5 x 12 =60M]**

**UNIT- I**

2. Describe the different branches of Geology in detail. 12M

**(OR)**

3. What is Structural Geology? How it is going to influence Civil Engineering Structures. 12M

**UNIT- II**

4. Define and elaborate the following mineral properties with suitable examples. 12M  
i) Lustre      ii) Structure      iii) Hardness

**(OR)**

5. Mention streak, Lustre, Hardness, Cleavage, Fracture, Structure, Special property (if any) and Chemical composition of  
i) Feldspar      ii) Hornblende      iii) Kyanite      iv) Galena 12M

# AR13

**CODE: 13CE2003**

**SET-1**

## UNIT- III

6. What is Rock cycle? Elaborate. 12M

**(OR)**

7. a) Describe the various structures and textures of sedimentary rocks. 6M

b) Describe the geological classification of igneous rocks. 6M

## UNIT- IV

8. Describe the terms : 12M

- i) True dip and Apparent dip.
- ii) Strike
- iii) True thickness
- iv) Width of exposed outcrop.

**(OR)**

9. What is an unconformity? Describe the various types of unconformities with neat figures. 12M

## UNIT- V

10. Describe 12M

- i) Any one Radiometric method.
- ii) Any one Seismic Refraction Method of Geophysical Investigations.

**(OR)**

11. What are Geophysical Studies? How are they useful in day to day life? 12M

2 of 2

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Time: 3 Hours

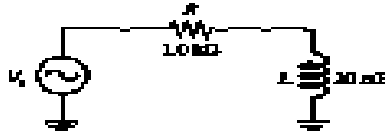
Max Marks: 70

PART-A

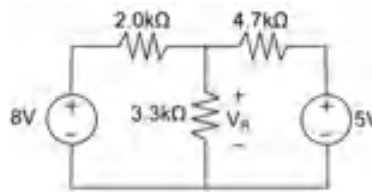
ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

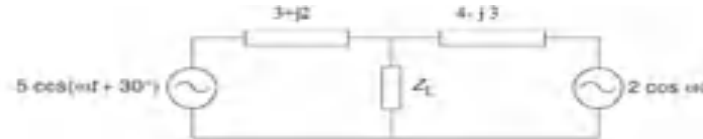
1. a) A bulb is rated as 230V, 230W. Find the rated current and resistance of the filament.
- b) For the series RL circuit as shown in figure, obtain the magnitude of the total impedance and phase angle of 10 kHz.



- c) Recall tree and co-tree.
- d) Define Cutset.
- e) Define Thevenin theorem.
- f) Using the superposition theorem, solve for the voltage drop across the resistor 3.3K for the figure.



- g) State Millman's theorem.
- h) What should be the value of  $Z_L$  for maximum power to be delivered in the circuit for the figure shown below?



- i) What is a two port network?
- j) The z- parameters of a two port network are  $Z_{11}=20\ \Omega$ ,  $Z_{22}=30\ \Omega$ ,  $Z_{12}=Z_{21}=10\ \Omega$ . Find  $y_{11}$  and  $y_{22}$  parameters of the network.

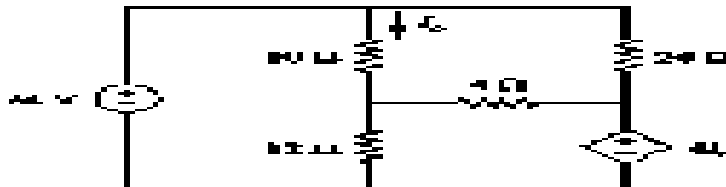
PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Apply mesh analysis technique in the figure shown below to find the current  $I_0$  [6M]



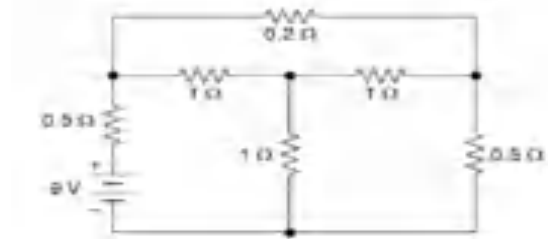
- b) An RLC Series circuit with a resistance of  $10\ \Omega$ , inductance of  $0.2\text{H}$  and a capacitance of  $40\ \mu\text{F}$  is supplied with a  $100\text{V}$ , variable frequency source. Find the following with respect to series resonance circuit [6M]
  1. Frequency at which resonance takes place
  2. Current at resonance
  3. Power Factor at resonance

(OR)

3. Explain the following: [12M]  
i) Star to delta transformation ii) Band width iii) Q factor

### UNIT-II

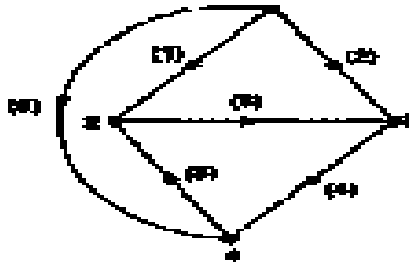
4. a) Draw the graph for the following network and write a tie-set schedule. [6M]



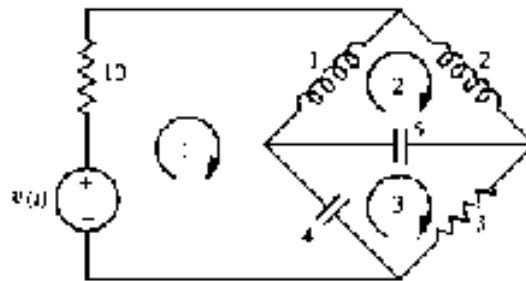
- b) Make use of the tie-set schedule to obtain the loop equations and loop currents for the figure shown in 4a. [6M]

(OR)

5. a) For the graph shown below, Find the complete incidence matrix and reduced incidence matrix. [6M]



- b) Construct the dual for the given circuit. [6M]

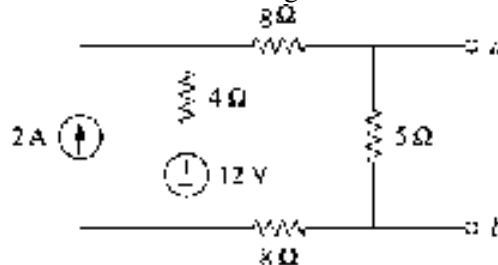


### UNIT-III

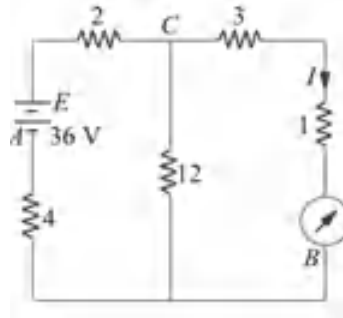
6. State and explain the super position theorem with suitable example. [12M]

(OR)

7. a) Find the Norton equivalent circuit of the figure at terminals *a-b*. [6M]

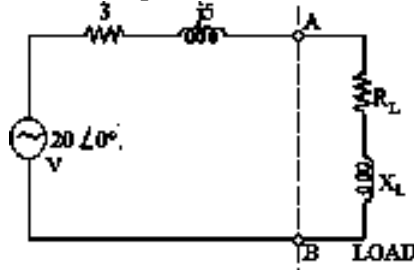


- b) Find the ammeter current using reciprocity theorem (a) when battery is at A and ammeter at B and (b) when battery is at B and ammeter at point A [6M]



#### UNIT-IV

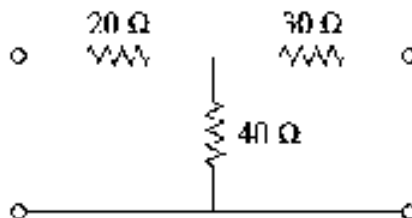
8. a) In the circuit of figure, which load impedance of p.f. = 0.8 lagging when connected across terminals A and B will draw the maximum power from the source. Also find the power developed in the load and the power loss in the source. [6M]



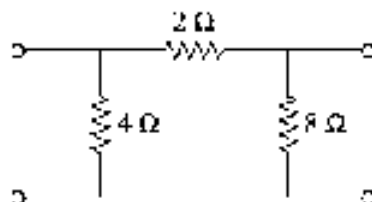
- b) State the compensation theorem and Tellegen's theorem [6M]  
(OR)  
9. State the maximum power transfer theorem. Derive the expression for maximum power. [12M]

#### UNIT-V

10. a) Find the z-parameters for the circuit shown in figure. [6M]



- b) Define z-parameters and h-parameters. [6M]  
(OR)  
11. a) Obtain the y parameters for the network shown in figure. [6M]



- b) Define Y-parameters. Derive the equations to obtain y-parameters from z-parameters. [6M]

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# AR13

CODE: 13EE2007 **SET-1**  
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)  
II B.Tech I Semester Supplementary Examinations, October-2021

## NETWORK ANALYSIS (Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. Define the following
  - a) Electrical Energy
  - b) Inductance
  - c) Time period
  - d) Tree
  - e) Impedance
  - f) Resonance
  - g) Open circuit impedance parameters
  - h) Reciprocity theorem
  - i) Band stop filter
  - j) Transient state

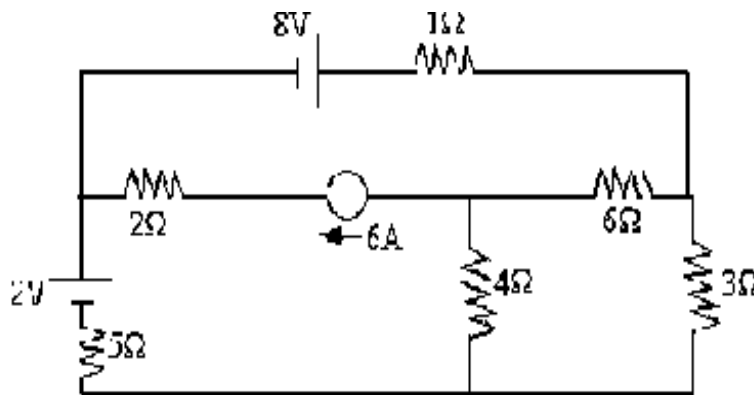
### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

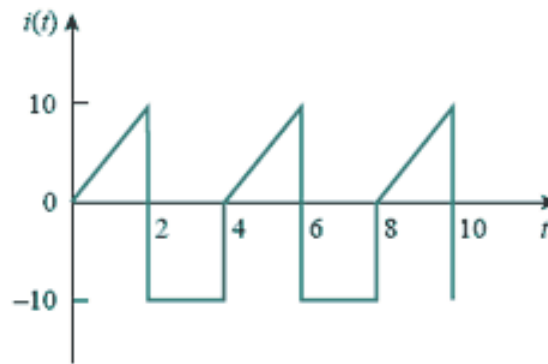
2. a) State and explain KCL and KVL with suitable example?  
(OR)
3. a) Using nodal analysis, determine the Power supplied by 8V Voltage source.



- b) Differentiate between series and parallel circuits in resistive network. What is their circuit representation?

#### UNIT-II

4. a) Given  $i_1(t) = 4 \cos(\omega t + 30^\circ)$  and  $i_2(t) = 5 \sin(\omega t - 20^\circ)$ , find their sum.  
b) Determine the rms value of the current waveform shown fig.. If the current is passed through a 2 ohm resistor, find the average power absorbed by the resistor.



(OR)

5. Define the following:

- |                  |                   |
|------------------|-------------------|
| i) RMS value     | ii) Average Value |
| iii) Form factor | iv) Peak factor   |

### UNIT-III

6. Derive an expression for the current, impedance, average power for a series RL circuit excited by a sinusoidal alternating voltage and also find the power factor of the circuit. Draw the phasor diagram.

(OR)

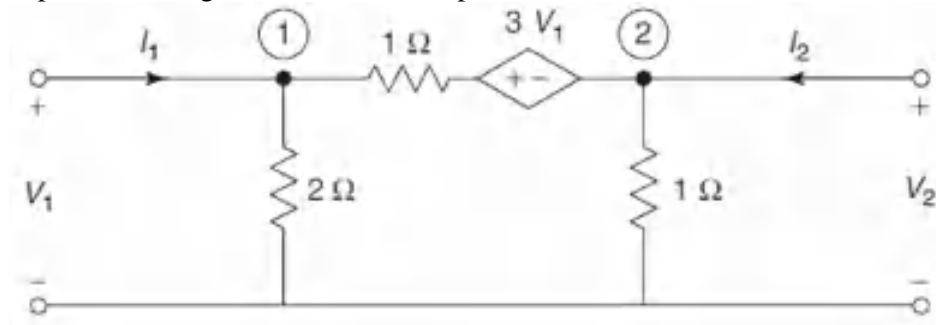
7. a) Explain “dot convention” for a set of magnetically coupled coils.  
 b) Obtain the circuit constants in series RLC circuit that will resonant at 3KHZ. The circuit operates at resonance frequency and consumes 75W from a 100V AC source and its Bandwidth is 1KHZ

### UNIT-IV

8. State and explain the super position theorem with suitable example.

(OR)

9. a) Two 2-port networks A and B are connected in parallel. Each of these networks has their own y-parameters. Show the resultant y-parameters of the combined parallel network is sum of the individual networks A and B  
 b) For the two port network given below. Find Y-parameters.



### UNIT-V

10. Discuss the transient analysis of RLC series circuit excited by DC source using differential equation approach

(OR)

11. Design a proto type band pass filter section (T and  $\pi$ ) having cut-off frequencies of 300 Hz and 6000 Hz and nominal characteristic impedance of 600 ohm. Also find the resonant frequency of shunt arm or series arm.