SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY
(AUTONOMOUS)
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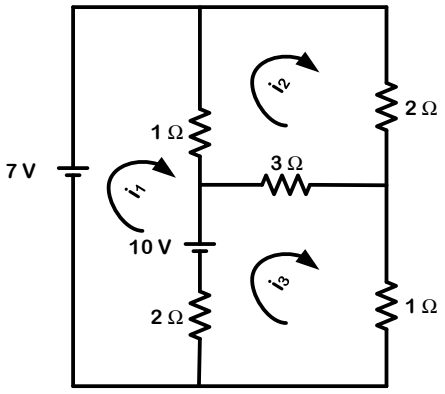
QUESTION BANK (DESCRIPTIVE)

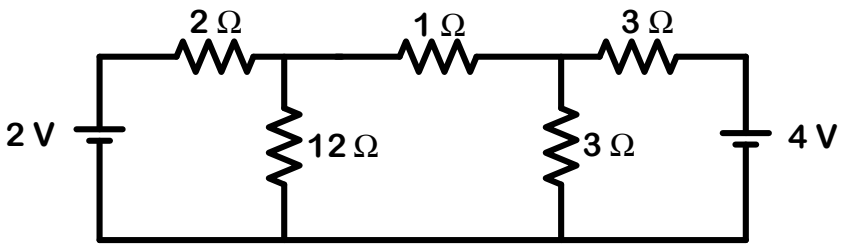
Subject with Code : Basic Electrical and Electronics Engineering (19EE0240)
Course & Branch : B. Tech - CSE
Year & Semester : I - B. Tech. & II - Semester **Regulation :** R19

PART-A
UNIT-I
INTRODUCTION TO ELECTRICAL ENGINEERING

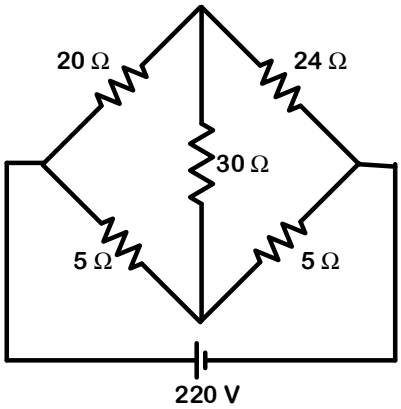
1.	**a)**	State and explain Ohm's law.	**[L2][5M]**
	b)	Explain in detail about passive elements.	**[L2] [5M]**
2.		Three resistances of values 20, 30 and 50 are connected in series across 20 V DC supply. Calculate, i) Equivalent resistance of the circuit. ii) Total current from the supply. iii) Voltage drop across each resistor. iv) Power dissipated in each resistor.	**[L3][10M]**
3.		Discuss about various energy sources in detail.	**[L4][10M]**
4.	**a)**	State and prove Kirchhoff's laws with suitable examples.	**[L3][5M]**
	b)	Find i_1, i_2, i_3 for the given circuit by using Kirchhoff's laws?	**[L3][5M]**



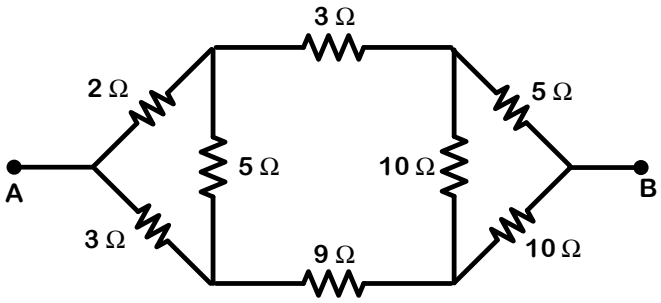
5.		Find the current through 12Ω resistor for the given circuit using Kirchoff's laws.	**[L3][10 M]**



6. Find the current delivered by the source for the circuit shown in figure. **[L3][10 M]**



7. Find the voltage to be applied across AB in order to drive a current of 5A into the circuit. **[L3][10M]**



8. Explain in detail about star to delta transformation of given resistive netwrok. **[L2][10M]**

9. Explain the following in detail **[L2][10M]**

i) Resistive networks

ii) Inductive networks

iii) Capacitive networks

10.

a) Define RMS value, **[L1][2 M]**

b) Define average value, **[L1][2 M]**

c) Define form factor. **[L1][2 M]**

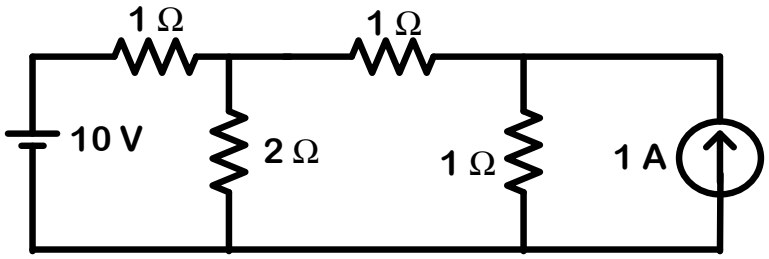
d) Define peak factor. **[L1][2 M]**

e) Prove that the form factor of the sinusoidal wave is 1.11. **[L1][2 M]**

UNIT - II
NETWORK THEOREMS &TWO PORT NETWORKS

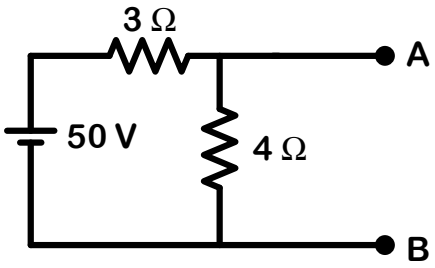
1. **a)** State Super position theorem **[L1][2M]**

b) Calculate the current in 20Ω resistor in the given circuit using super position theorem. **[L3][8M]**



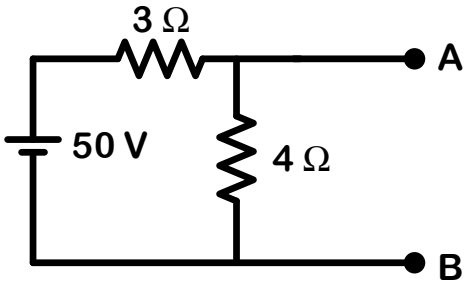
2. **a)** State Thevenin's theorem **[L1][2 M]**

b) Find the Thevenin's equivalent circuit across AB for the circuit shown. **[L3] [8M]**

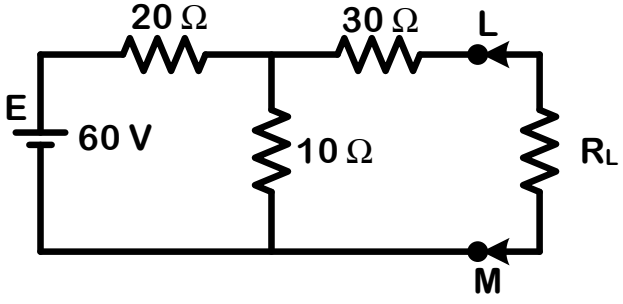


3. **a)** State Norton's theorem. **[L1] [2M]**

b) Find Norton's equivalent circuit across AB for the circuit shown. **[L3] [8M]**

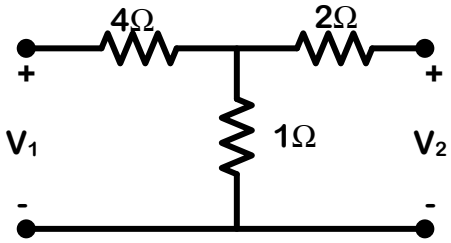


4. Determine the maximum power delivered to the load resistance R_L **[L3][10M]**

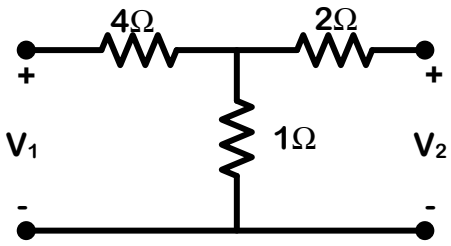


5 State and prove Reciprocity theorem with suitable example. **[L3][10M]**

6.	**a)**	Explain in detail about Impedance parameters	**[L2][5M]**
	b)	Briefly discuss about Admittance parameters	**[L2][5M]**
7.		Find the Open circuit parameters for the given circuit	**[L4][10M]**



8.		Find the Short circuit parameters for the given circuit.	**[L4][10M]**



9.	**a)**	The given ABCD parameters are A=2, B=0.9, C=1.2, D=0.5. Find Y-parameters.	**[L3][5M]**
	b)	The given Y-parameters are Y_{11}=0.5, Y_{12}=Y_{21}=0.6, Y_{22}=0.9. Find the Impedance parameters.	**[L3][5M]**
10.	**a)**	Define Thevenin's and Norton's theorem	**[L1][2M]**
	b)	State Maximum power theorem	**[L1][2M]**
	c)	State Reciprocity theorem	**[L1][2M]**
	d)	Define Super position theorem	**[L1][2M]**
	e)	Mention the importance of two port networks	**[L1][2M]**

UNIT – III

DC MOTORS & TRANSFORMERS

1.	**a)**	Discuss about the principle of operation of DC motors	**[L2][5M]**
	b)	Calculate the value of torque established by the armature of a 4-pole DC motor having 774 conductors, 2 paths in parallel, 24mwb flux per pole when the total armature current is 50A.	**[L3][5M]**
2.		A 220V shunt motor takes a total current of 80A and runs at 800 r.p.m. Shunt field resistance and armature resistance are 50Ω and 0.1Ω, respectively. If iron and friction losses amount to 1600W. Find (i) Copper losses (ii) Armature torque (iii) Shaft torque (iv) Efficiency.	**[L4][10M]**
3.	**a)**	Derive Torque equation of dc motor.	**[L2][5 M]**
	b)	The counter emf of Shunt motor is 227 V. The field resistance is 160Ω and field current 1.5A. If the line current is 36.5A, find the armature resistance also find armature current when the motor is stationary.	**[L3][5 M]**
4.	**a)**	Explain about constructional details of dc motor.	**[L2][6 M]**

	b)	A 6 pole lap wound shunt motor has 500 conductors, the armature and shunt field resistances are 0.05 Ω and 25 Ω, respectively. Find the speed of the motor if it takes 120 A from dc supply of 100 V. Flux per pole is 20 mWb.	**[L3][4 M]**
5		Briefly discuss about various types of DC motors with neat sketches.	**[L2][10M]**
6.	**a)**	Derive EMF equation of a transformer	**[L2][6 M]**
	b)	A 100 kVA, 11000/400 V, 50 Hz transformer has 40 secondary turns. Calculate the number of primary turns and primary and secondary currents.	**[L3][4 M]**
7.	**a)**	Explain constructional details of transformer.	**[L2][6M]**
	b)	A 20 kVA, 2000/200 V, 50 Hz transformer has 66 secondary turns. Calculate the number of primary turns and primary and secondary currents. Neglect losses.	**[L3][4 M]**
8.		Explain in detail about various transformer losses.	**[L2][10M]**
9.	**a)**	Derive the condition for maximum efficiency of the transformer.	**[L2][5 M]**
	b)	Discuss about the voltage regulation of the transformer.	**[L2][5 M]**
10.	**a)**	Enumerate the types of DC motors.	**[L2][2 M]**
	b)	List the application of DC motors.	**[L1][2 M]**
	c)	Write the expression for transformer ration in terms voltage, current and turns	**[L1][2 M]**
	d)	What is working principle of transformer?	**[L1][2 M]**
	e)	Enumerate the various losses associated with transformer.	**[L1][2 M]**

Prepared by**: B.RAMESH**

PART-B

UNIT –I
SEMICONDUCTOR DEVICES
Essay Answer (10 mark) Questions

1. a) Distinguish between conductors, semiconductors and insulators. [L2][CO5][5M]
   b) Draw the atomic structure of a semiconductor and explain why an intrinsic semiconductor is relatively a poor conductor of electricity. [L3][CO5][5M]
2. Discuss the conduction properties of semiconductors and explain the process of electron hole Pair generation and recombination. [L3][CO5][10M]
3. Distinguish between intrinsic and extrinsic semiconductors and explain the process of conduction In each of them. [L2][CO5][10M]
4. a) What is Doping? Describe P-and N-type semiconductors? [L2][CO5][5M]
   b) Explain the behavior of PN junction diode. [L2][CO5][5M]
5. Describe the working of a PN junction diode when it is connected in forward bias and reverse bias. Draw VI Characteristics of PN Junction Diode. [L3][CO5][10M]
6. a) Write notes on Diode Specifications and Diode Applications. [L1][CO5][6M]
   b) Explain Drift and Diffusion currents in a PN Junction Diode. [L2][CO5][4M]
7. a) With neat diagram, explain the working principle of Half Wave Rectifier. Draw its input and Output waveforms. [L3][CO5][5M]
   b) Derive the expression for Ripple factor and Efficiency of Half Wave Rectifier. [L2][CO5][5M]
8. a) With neat diagram, explain the working principle of Full Wave Rectifier. Draw its input and Output waveforms. [L3][CO5][5M]
   b) Derive the expression for Ripple factor and Efficiency of Full Wave Rectifier. [L2][CO5][5M]
9. a) Draw the circuit diagram of a Bridge Rectifier and explain its operation with input and output waveforms. [L3][CO5][5M]

b) Discuss the operation of full wave rectifier with capacitor filter. [L2][CO5][5M]

10. Discuss Zener Diode breakdown mechanism. Draw the Zener diode in its reverse bias and explain its Volt-Ampere characteristics. [L3][CO5][5M]

UNIT –II
BJT
Essay Answer (10 mark) Questions

1. a) Describe in detail the working of an NPN bipolar junction transistor. Why is it called Bipolar? [L2][CO2][4M]

b) Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor. [L3][CO2][6M]

2. a) Discuss the operation of PNP transistor with diagram [L2][CO2][5M]

b) If the base current in a transistor is 20μA when the emitter current is 6.4mA, what are the values of α and β? Also calculate the collector current. [L3][CO2][5M]

3. Draw the circuit diagram for a common base circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. [L3][CO2][10M]

4. a) Discuss with neat diagrams, the Common Emitter Configuration and its characteristics. [L2][CO2] [5M]

b)Explain the characteristics of CE configuration [L2][CO2] [5M]

5. Draw the circuit diagram for a common Collector circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. [L3][CO2][10M]

6. a) Explain the functioning of Common Collector Configuration of BJT.State why this arrangement is also called an emitter follower circuit. [L3][CO2][5M]

b) Compare the characteritcs of BJT CB, CE and CC transistor configurations. [L2][CO2][5M]

7. a) Derive the relationship between IC,IB,IE of BJT configurations. [L2][CO2][5M]

b) A transistor operating in CB configuration has I_C = 2.98mA, I_E = 3.00 mA and I_{CO} =0.01 mA. What current will flow in the collector circuit for this transistor when connected in CE configuration with a base current of 30μA? [L3][CO2][5M]

8. With neat circuit diagram and equations, explain Fixed Bias circuit of BJT. [L2][CO2][10M]

9. Describe the Voltage Divider Bias Network of BJT with diagram and equations. [L2][CO2][10M]

10. a) write the application of a transistor and explain the transistor acts a switch . [L2][CO2][5M]

b) Explain in detail the transistor working as a amplifier [L2][CO2][5M]

UNIT –III
JFET & MOSFETS
Essay Answer (10 mark) Questions

1. a) Explain about the JFET and draw the construction of JFET [L3][CO3][5M]

b) Explain the operation of JFET [L3][CO3][5M]

2. a) Explain the construction and principle of operation of N-channel JFET. [L3][CO3][5M]

b) Define the JFET Volt-Ampere Characteristics and determine FET parameters. [L3][CO3][5M]

3. a) Explain the output characteristics of JFET . [L2][CO3][5M]

b) Explain the transfer characteristics of JFET [L2][CO3][5M]

4. a)Discuss the configuration of JFET [L2][CO3][4M]

b) Explain the CD configuration and draw its construction [L3][CO3][6M]

5. Explain the CS configuration ? With construction and its operation [L3][CO3][10M]

6. Explain the CG configuration ? With construction and its operation [L3][CO3][5M]

7. a)Write the JFET applications [L1][CO3][4M]
   b) Explain the working of JFET as amplifier [L2][CO3][6M]
8. a) Explain how the JFET working as a switch [L2][CO3][5M]
   b) Write the comparision BJT and JFET. [L1][CO3][5M]
9. a) Draw the construction of EMOSFET and explain its operation [L3][CO3][5M]
   b) Expalin the operation DMOSFET [L3][CO3][5M]
10. a) Explain the static characteristics of MOSFET and draw its characteristics [L3][CO3][6M]
    b) Write the application of MOSFET [L1][CO3][4M]

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