Course Code: 20EE0251 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR
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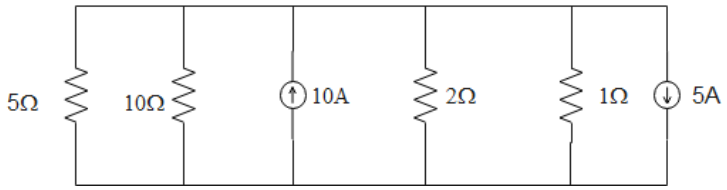
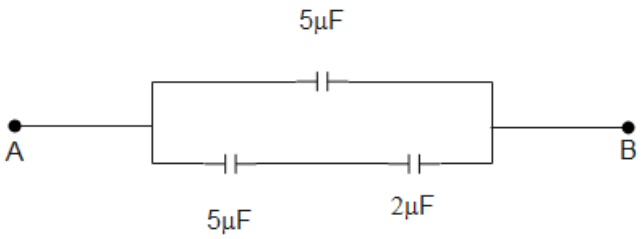
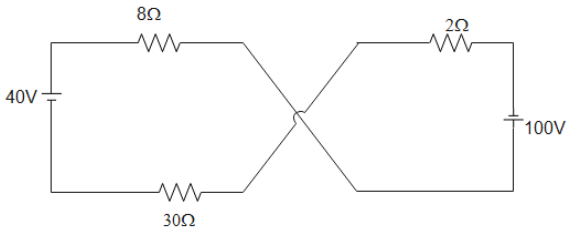
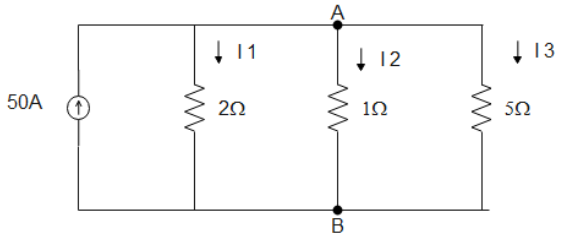
QUESTION BANK (DESCRIPTIVE)

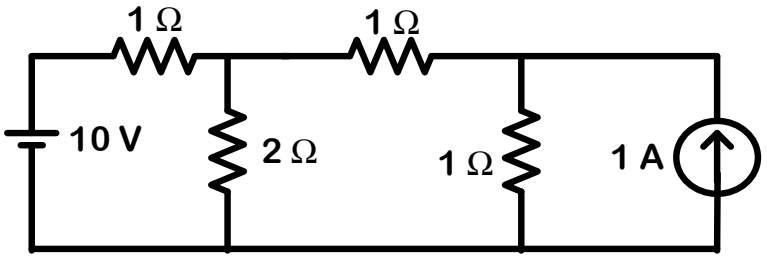
Subject with Code : Basic Electrical and Electronics Engineering (20EE0251)
Course & Branch. B.Tech - MECHANICAL
Year & Semester : I - B. Tech. & I - Semester **Regulation:** R20

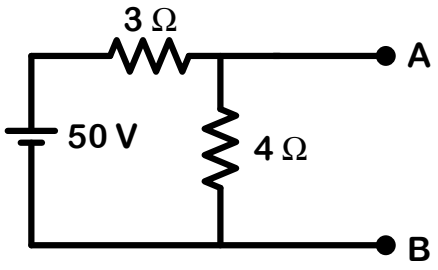
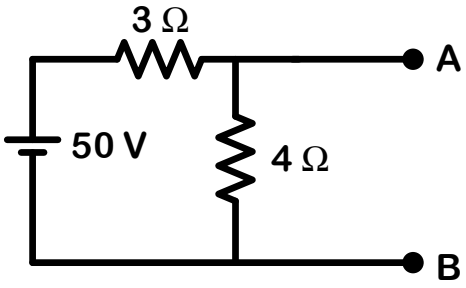
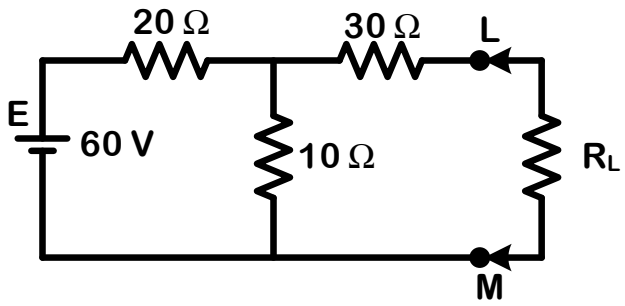
UNIT –I
INTRODUCTION TO ELECTRICAL ENGINEERING

1	a)	State and explain Ohm's law.	[L1][CO1]	[5M]
	b)	Find the voltage across 10 ohm resistor and the current passing through it in the given circuit below. 	[L3][CO1]	[5M]
2		State and prove Kirchhoff's laws with suitable example	[L2][CO1]	[10M]
3	A	Explain Basic circuit components in detail.	[L2][CO1]	[5M]
	B	Define independent source and dependent source and mention the different types of dependent sources.	[L3][CO1]	[5M]
4		Explain the following in detail i) Resistive networks ii) Inductive networks iii) Capacitive networks	[L1][CO1]	[10M]
5	A	Write the derivation for equivalent resistance in parallel circuit.	[L2][CO1]	[5M]
	B	A 5ohm , 10 ohm ,20 ohm, resistors are connected in series across 120V DC supply calculates Total Resistance, Total current, Voltage drop across each resistor.	[L4][CO1]	[5M]
6	a)	A current 5A flowing through a coil of 1000 turns establishes a flux of 0.3 mwb. Determine the inductance of the coil also find the energy stored in the coil.	[L4][CO1]	[5M]
	b)	Find the equivalent capacitance of the combination of capacitors as shown in fig 	[L2][CO1]	[5M]

7	a)	**E**xplain in detail about RMS value, Average value, Form Fctor,Peak factor.	[L1][CO1]	[8M]
	b)	Explain Faradays law of EMI	[L2][CO1]	[2M]
8	a)	Find the voltage across 30 ohm resistor and current passing through it.. 	[L3][CO1]	[6M]
	b)	What is the principle of AC Voltages?	[L4][CO6]	[4M]
9	a)	Derivation for equivalent capacitance in series circuit.	[L3][CO1]	[5M]
	b)	. Determine the current in all resistors in the given circuit. 	[L4][CO1]	[5M]
10		Explain principle of AC voltages with neat diagram and waveform.	[L1][CO1]	[10M]

UNIT –II
NETWORK THEOREMS AND DC GENERATOR

1	a)	State Super position theorem	[L1][C02]	[2M]
	b)	Calculate the current in 20Ω resistor in the given circuit using super position theorem. 	[L3][C02]	[8M]
2	a)	State Thevenin's theorem.	[L1][C02]	[2M]
	b)	Find the Thevenin's equivalent circuit across AB for the circuit shown.	[L3][C02]	[8M]

				
3	a)	State Norton's theorem.	[L2][C02]	[2M]
	b)	Find Norton's equivalent circuit across AB for the given circuit. 	[L3][C02]	[8M]
4		Determine the maximum power delivered to the load resistance R_L 	[L2][CO2]	[10M]
5		State and prove Reciprocity theorem with suitable example	[L4][C02]	[10M]
6		With neat diagram give the constructional features of a DC machine	[L5][C02]	[10M]
7		Explain the principle and operation of DC generator.	[L1][C02]	[10M]
8	a)	Derive the EMF equation of a DC Generator	[L3][C02]	[5M]
	b)	A 4 pole lap wound dc generator has a useful flux of 0.07wb per pole Calculate the generated emf when it is rotated at speed of 900rpm with the help of prime mover. Armature consists of 440 number of conductors calculate the generated emf.if lap wound is replaced by wave wound?	[L4][C02]	[5M]
9	a b c d e	Explain Separately excited Dc Generator Shunt DC Generator Series Dc Generator Compound Dc Generator Self excited DC Generator.	[L1][C02]	[10M]
10	a)	Explain Long Shunt Compound Generator and short shunt generator with neat diagram	[L1][C02]	[5M]
	b)	List the applications of four types of dc generators.	[L2][C02]	[5M]

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UNIT –III
DC MOTORS AND TRANSFORMERS

1	a)	Discuss about the principle of operation of DC motors	[L1][C03]	[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.	[L4][C05]	[5M]
2	a)	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][C03]	[10M]
3	a)	Derive Torque equation of dc motor.	[L2][C03]	[5M]
	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][C03]	[5M]
4	a)	Explain about constructional details of dc motor.	[L1][C03]	[5M]
	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.	[L34[C03]	[5M]
5	a)	Briefly discuss about various types of DC motors with neat diagram.	[L2][C03]	[10M]
6	a)	Derive EMF equation of a transformer	[L3][C03]	[5M]
	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.	[L4][C03]	[5M]
7	a)	Explain constructional details of transformer.	[L1][C03]	[5M]
	b)	A 20 kVA, 2000/200V, 50Hz transformer has 66 secondary turns. Calculate the number of primary turns and primary and secondary currents. Neglect losses.	[L4][CO3]	[5M]
8	a)	Explain in detail about various transformer losses.	[L2][C03]	[10M]
9	a)	Derive the condition for maximum efficiency of the transformer.	[L3][C03]	[5M]
	b)	Discuss about the voltage regulation of the transformer.	[L2][C03]	[5M]
10	a)	Enumerate the types of DC motors	[L1][C03]	[2M]
	b)	List the application of DC motors.	[L1][C03]	[2M]
	c)	Write the expression for transformer ration in terms voltage, current and turns	[L1][C03]	[2M]
	d)	What is working principle of transformer?	[L2][C03]	[2M]
	e)	Enumerate the various losses associated with transformer.	[L2][C03]	[2M]

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UNIT –IV
SEMICONDUCTOR DEVICES

1	a)	Distinguish between conductors, semiconductors and insulators	[L4][CO5]	[5M]
	b)	Explain why an intrinsic semiconductor is relatively a poor conductor of electricity with a neat sketch of atomic structure.	[L2][CO5]	[5M]
2		Discuss the conduction properties of semiconductors and explain the process of electron hole Pair generation and recombination.	[L6][CO5]	[10M]
3		Distinguish between intrinsic and extrinsic semiconductors and explain the process of conduction In each of them.	[L4][CO5]	[10M]
4	a)	What is Doping? Describe P-and N-type semiconductors?	[L1][CO5]	[5M]
	b)	Explain the behavior of PN junction diode.	[L2][CO5]	[5M]
5		Explain the working of a PN junction diode when it is connected in forward bias and reverse bias. Draw VI Characteristics of PN Junction Diode.	[L2][CO5]	[10M]
6	a)	List out the Diode Specifications and Diode Applications.	[L1][CO5]	[4M]
	b)	Explain Drift and Diffusion currents in a PN Junction Diode.	[L2][CO5]	[6M]
7	a)	Explain the working principle of Half Wave Rectifier. Draw its input and Output waveforms with neat circuit diagram.	[L2][CO5]	[5M]
	b)	Determine the expression for Ripple factor and Efficiency of Half Wave Rectifier.	[L5][CO6]	[5M]
8	a)	Explain the working principle of Full Wave Rectifier. Draw its input and output waveforms with neat circuit diagrams.	[L2][CO5]	[5M]
	b)	Determine the expression for Ripple factor and Efficiency of Full Wave Rectifier.	[L5][CO6]	[5M]
9	a)	Explain the working principle of Bridge Wave Rectifier. Draw its input and output waveforms with neat circuit diagram.	[L2][CO5]	[5M]
	b)	Discuss the operation of full wave rectifier with capacitor filter.	[L6][CO5]	[5M]
10	a)	Discuss Zener Diode breakdown mechanism.	[L6][CO5]	[5M]
	b)	Explain its Volt-Ampere characteristics of Zener diode in its reverse bias with circuit diagram	[L2][CO5]	[5M]

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UNIT –V
BJT

1	a)	Explain the working of a NPN bipolar junction transistor. And Why is it called Bipolar?	[L2][C05]	[4M]
	b)	Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor.	[L2][C06]	[6M]
2	a)	Discuss the operation of PNP transistor with diagram	[L6][C05]	[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][C06]	[5M]
3		Explain the common base configuration and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence	[L2][C06]	[10M]
4		Explain the Input and Output characteristics of a BJT in CE Configuration. Indicate the regions of operations in the output characteristics and list the applications in those regions.	[L2][CO5]	[10M]
5		Explain the common Collector circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence.	[L2][C06]	[10M]
6	a)	Explain the functioning of Common Collector Configuration of BJT. State why this arrangement is also called an emitter follower circuit.	[L2][C05]	[5M]
	b)	Compare the characteristics of BJT CB,CE and CC transistor configurations	[L4][C05]	[5M]
7	a)	Define the transistor currents of BJT and Evaluate the relation between them	[L1][C06]	[5M]
	b)	A transistor operating in CB configuration has IC = 2.98mA, IE = 3.00 mA and ICO =0.01mA What current will flow in the collector circuit for this transistor when connected in CE configuration with a base current of 30μA.	[L3][C06]	[5M]
8		Explain the Fixed Bias with neat circuit diagram.	[L5][C06]	[10M]
9	a)	Explain the early effect of a BJT?	[L2][C05]	[5M]
	b)	Explain the operating region of BJT when its working?	[L2][C05]	[5M]
10	a)	List the applications of a transistor and explain the transistor acts a switch .	[L1][C05]	[5M]
	b)	Explain in detail the transistor working as a amplifier.	[L2][C05]	[5M]

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UNIT –VI
JFET & MOSFETS

1	a)	Explain about the JFET and draw the construction of JFET(P Channel)	[L2][C06]	[5M]
	b)	Explain the operation of JFET(P Channel)	[L2][C05]	[5M]
2	a)	Explain the construction and principle of operation of N-channel JFET.	[L2][C05]	[5M]
	b)	Define the JFET Volt-Ampere Characteristics and determine FET parameters.	[L1][C05]	[5M]
3	a)	Explain the Drain characteristics of JFET .	[L2][C05]	[5M]
	b)	Explain the transfer characteristics of JFET	[L2][C05]	[5M]
4	a)	Discuss the configuration of JFET	[L6][C06]	[4M]
	b)	Explain the CD configuration and draw its construction	[L2][C06]	[6M]
5	a)	Explain the CG configuration of JFET	[L2][C05]	[5M]
	b)	An N channel JFET as I_{DSS} =8mA and Vp =-5v .Determine the minimum value of V_{DS} for pinch off region and the drain current I_{DS} ,for V_{GS} =-2v in pinch off region	[L5][C06]	[5M]
6	a)	Explain the CS configuration of JFET	[L2][C05]	[5M]
	b)	Compare between CS,CG,CD configurations of JFET	[L4][C05]	[5M]
7	a)	List the applications of JFET.	[L1][C05]	[4M]
	b)	Explain the working of JFET as amplifier.	[L2][C05]	[6M]
8	a)	Explain how the JFET working as a switch.	[L2][C05]	[5M]
	b)	Explain the working operation of DMOSFET.	[L5][C05]	[5M]
9	a)	Explain its working operation of EMOSFET with neat diagram.	[L5][C06]	[5M]
	b)	Compare BJT and JFET.	[L4][C05]	[5M]
10	a)	Explain the static characteristics of MOSFET and draw its characteristics.	[L5][C06]	[6M]
	b)	List the applications of MOSFET.	[L1][C05]	[4M]

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