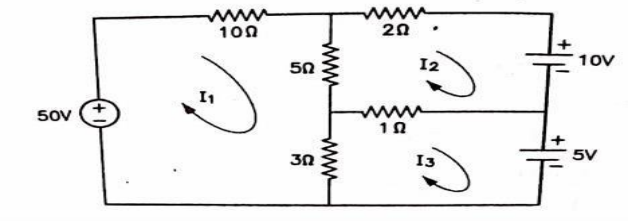
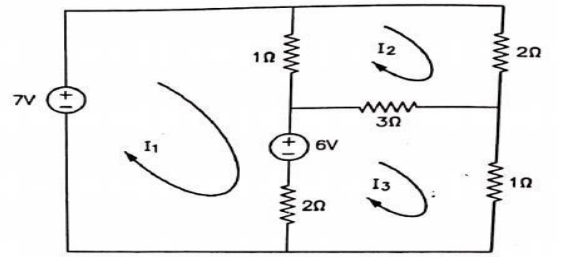
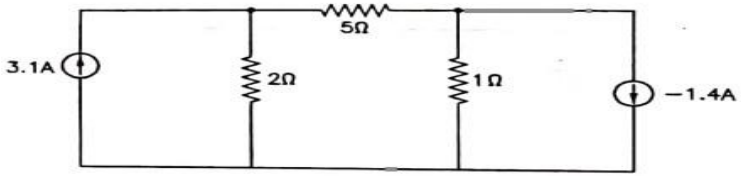
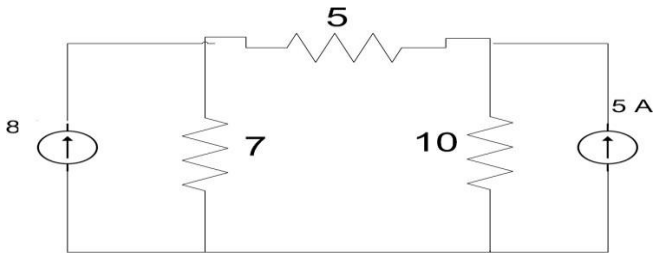
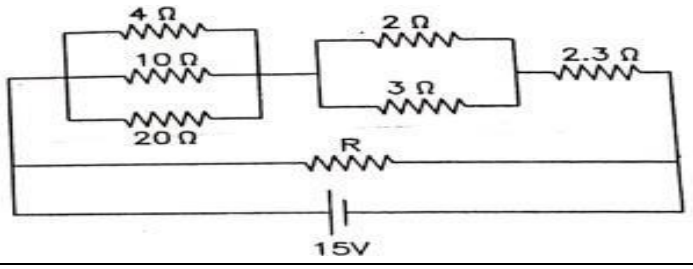
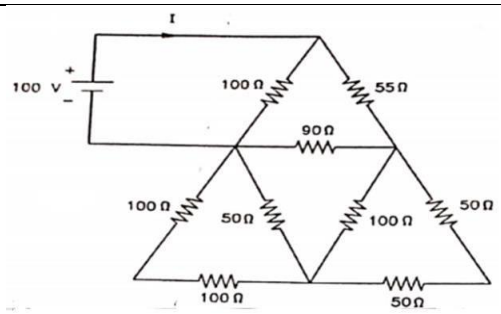
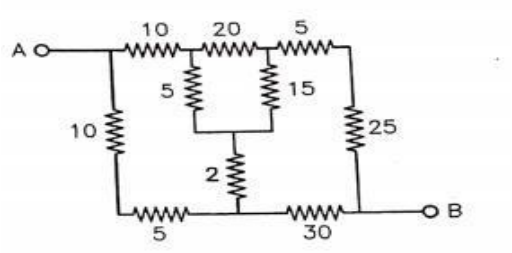
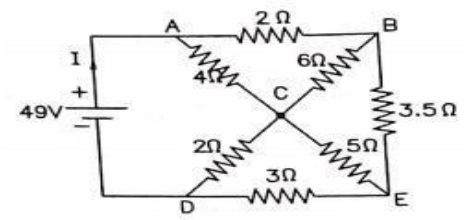
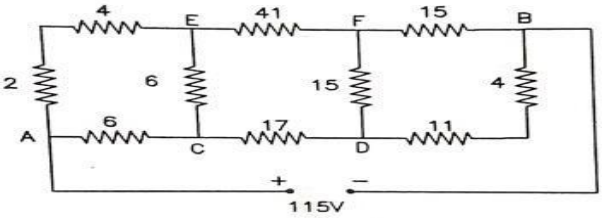
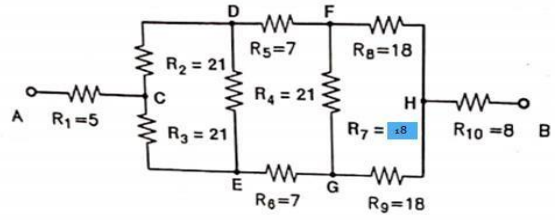
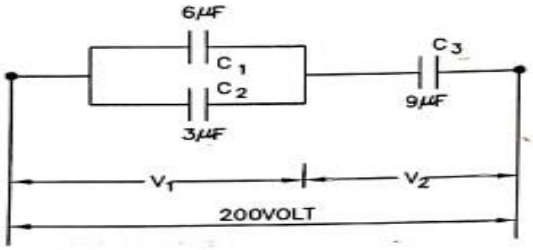
QUESTION BANK
EE145: BASICS OF ELECTRONICS & ELECTRICAL ENGINEERING

SR.NO	QUESTIONS (Unit 1 to 3)	MARKS
1	Give the definition 1. Potential difference 2. Active & passive element 3. Loop & Mesh 4. Conductance & conductivity 5. Electrical energy 6. Resistance & resistivity 7. Node & junction 8. Network & circuit 9. Electric field 10. Electric field strength 11.Electric flux density 12. Absolute Permittivity 13. Potential Gradient 14. Dielectric strength	1 mark for each
2	State and explain Kirchhoff's voltage and current law.	3
3	Explain the factors affecting the resistance value.	5
	Examples related to resistance colour coding	
4	Explain temperature coefficient at different temperature.	5
5	Explain ohm's law with limitations.	3
6	Write the comparison between series and parallel circuit.	5
7	Explain capacitance of parallel plate capacitor for following cases:- Case:- 1 Uniform dielectric medium Case:- 2 Partly air medium Case:- 3 Composite dielectric medium	10
8	Derive the expression $D = s_o s_r E$.	5
9	Derive the expression for energy stored in capacitor.	5
10	Explain charging of capacitor with necessary diagram.	5
11	Explain discharging of capacitor with necessary diagram.	5
12	Calculate the resistance of 100 m length of a wire having a uniformcross section area of 0.1 mm^2 if the wire is made of Manganin having a resistivity of 50*10e-8 ohm-m. If the wire is drawn out to three timesits original length, find out new resistance.	5
13	A resistance wire 10 m. long and cross section area 10 mm2 at 0 degree Celsius passes, a current of 10 A, when connected to a d.c. supply of 200 Volts. Calculate: 1. Resistivity of the material α_0 2. Current which will flow through the wire when the temp. rises to 50 degree Celsius. Given = 0.0003 per degree Celsius.	5
14	A copper coil has a resistance of 12.2 ohm at 28 degree Celsius and 14.4 ohms at 44 degree Celsius, find:- 1. Temperature co-efficient of resistance at 0 degree Celsius 2. Resistance of coil at 0 degree Celsius 3. Temperature co-efficient of resistance at 60 degree Celsius 4. Resistance of coil at 75 degree Celsius	5
15	A 100 W, 200 V bulb is connected in series with a 100 W, 250 V, bulb	5

	across 250 V supply. Calculate (i) Circuit current (ii) Voltage across each lamp assume bulb resistance to remain unchanged.	
16	Two bulbs rated 250 V, 60 W and 100 w respectively are connected in series across 200 V. Find voltage across each bulb.	5
17	Determine the mesh currents I_1, I_2 and I_3 for the network shown below. 	5
18	Determine the mesh currents I_1, I_2 and I_3 for the network shown below. 	5
19	Use nodal analysis to find voltage across 5Ω resistor, for the network shown below. 	5
20	Use nodal analysis to find voltage across 5Ω resistor, for the network shown below. 	5
21	Determine the value of R so that the current supplied by the battery is 5 A. 	5
22	For this circuit shown in fig. below calculate the current taken by circuit.	5

		
23	Using star- delta transformation, determine the resistance between the terminal A & B in the given circuit. 	5
24	Calculate the current supplied by the battery in the network of fig shown below. 	5
25	Determine the current in the 17 Ω resistor in the network shown below. 	5
26	Find the resistance between terminals A and B as shown in fig below. 	5
27	A parallel plate capacitor has plate area 4 cm2. The plates are separated by three slabs of different dielectric materials of thickness 0.3, 0.4 & 0.3 mm with relative permittivity 3, 2.5 & 2. Calculate combine capacitance and dielectric stress.	5
28	A parallel plate capacitor has plates of area 2 meter2 spaced by the three slabs of different dielectrics. The relative permittivities are 2,3 and 6 and the thickness 0.4, 0.6 and 1.2 mm. respectively. Calculate the	5

	combined capacitance and the dielectric stress in each material. When the applied voltage is 1000 V.	
29	A capacitor is made of two plates with an area of 11 cm2 which are separated by a Mica sheet 2 mm thick. If relative permittivity of Mica is 6, find its capacitance. If now one plate is moved further to give an air gap 0.5 mm wide between the plate and mica, find the change in capacitance.	5
30	Calculate charge and voltage of each capacitor.  	5
31	When two capacitors A and B are connected across 200 volt d.c. supply, the potential difference across A is 120 volt and that across B is 80 volts. The p.d. across A is rises to 140 volts when B is shunted by 3 microfarad capacitor. Calculate capacitance of A and B.	5
32	Two capacitors having capacitance of 6 microfarad and 10 microfarad are connected in parallel. A 16 microfarad capacitor is connected in series. With this combination and complete circuit is connected across 400 V. Calculate: (i) total capacitance of circuit (ii) voltage across each capacitor (iii) total charge in the circuit and (iv) the charge on each capacitor	5
33	Two capacitors having capacitance of 20 μF and 30 μF are connected in series across a 600 V d.c. supply. Calculate the potential difference across each capacitor. If a third capacitor of unknown capacitance is now connected in parallel with the 20 μF capacitor such that the potential difference across 30 μF capacitor is 400 V, calculate (i) the value of unknown capacitance and (ii) energy stored in the third capacitor.	5
34	Capacitors of $8\mu F$ is connected to a d.c. supply through a resistance of 1MΩ. Calculate the time taken for the capacitor to reach 95% of its final charge.	5
35	A capacitor of $50\mu F$ is connected through 100 kilo ohms resistance to a 230V d.c. supply. Calculate the time taken to reach the capacitor voltage to 200V after closure of switch.	5
36	A 20 μF capacitor initially charged to a potential difference of 500 V is discharged through an unknown resistance. After one minute, the potential difference at the terminals of the capacitor is 200 V. What is the magnitude of the resistance.	5
37	Derive the equation for delta to star and star to delta conversion.	6

Charotar University of Science and Technology [CHARUSAT]

Faculty of Technology and Engineering

Subject: EE145 Basics of Electronics & Electrical Engineering

Question bank

Unit-4 (Electromagnetism)

1 Define: Magnetic field, Magnetic flux, Magnetic flux density, MMF, Magnetic field Intensity, Permeability ,Reluctance

2 Derive ohm's law of magnetic circuit.

3 Comparison between electric and magnetic circuit.

4 Explain following

1) Flemings right hand rule
2) Faradays laws
3) Lenz's law

5 Explain:

1) Dynamically induced EMF
2) Statically induced EMF along with Self and Mutually Induced EMF

6 Define self inductance and mutual inductance.

EXAMPLES

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Faculty of Technology and Engineering

Subject: EE145 Basics of Electronics & Electrical Engineering

1st Semester B. Tech. (EC/CSE/CE/IT)

Question Bank (Unit 5-8)

Unit 5: AC Fundamentals

1	Why AC system is adopted in real environment compare to DC system?
2	Comparison of A.C with D.C.
3	Explain basic principle of Generation of Alternating voltage and derive equation of alternating Voltage e= Em Sin ωt for single phase circuit.
4	Define: Waveform, Alternation, Instantaneous Value, Amplitude ,Cycle, Time Period, Frequency
5	Relation between Frequency and angular velocity Relation between frequency, speed and number of poles
6	Define Average or mean value and effective or RMS value for AC quantities.
7	Explain Form Factor and Peak Factor for alternating quantity.
8	Calculate form factor and peak factor of half wave rectified sine wave.
9	Calculate form factor and peak factor of full wave rectified sine wave.
10	Define Phase, Phase difference, Lagging and Leading quantities
11	A square coil of 5 cm side and having 70 turns is rotated at a uniform speed of 900 r.p.m about an axis at right angles to a uniform magnetic field of 0.5 Wb/m^2.Detemine angular velocity and also Calculate the instantaneous value of the induced e.m.f., when the plane of the coil is (i) at right angle to field(ii) in the plane of the field
12	RMS value of an alternating current is 30 A and its frequency is 25 Hz. Write its equation to find its instantaneous value. Also calculate 1) its average value and 2) Time period.
13	A sinusoidal voltage has a value of 100 V at 2.5 ms and it takes time of 20 ms to complete one cycle. Find the maximum value and time to reach it for the first time after zero.

Unit 6: Single Phase AC series circuits

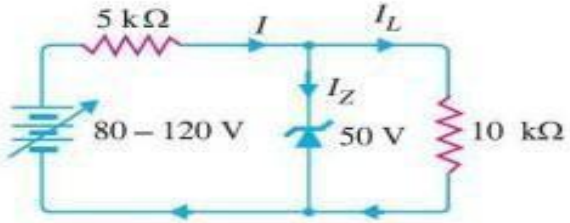
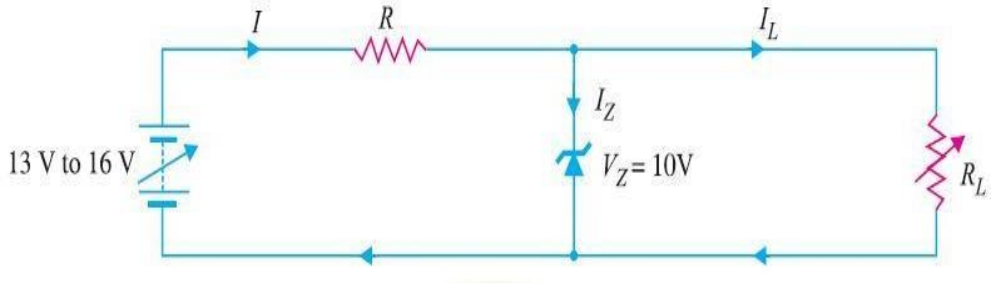
1	Explain Resistive circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
2	Explain Inductive circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
3	Explain Capacitive circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
4	Explain series R-C circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
5	Explain series R-L circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
6	Explain series R-L-C circuit with phasors diagram. Also explain power factor, active power, reactive power, apparent power.
7	What is resonance in series R-L-C circuit? Explain inductive reactance, capacitive reactance, impedance, resonance curve.
8	Derive the expression for Q –factor.
9	A 200 V variable frequency supply drives a series RLC circuit comprising a R= 20 Ω, L= 0.5 H, and C= 0.1μF. Calculate (i) Resonance Frequency (ii) Quality factor for Bandwidth of 6.37 Hz
10	A series circuit has resistance of 10 ohms, inductance 200/π mH and capacitance 1000/π μF. Calculate 1)the current , flowing in the circuit of supply voltage 250 V, 50Hz 2) Power factor for the circuit

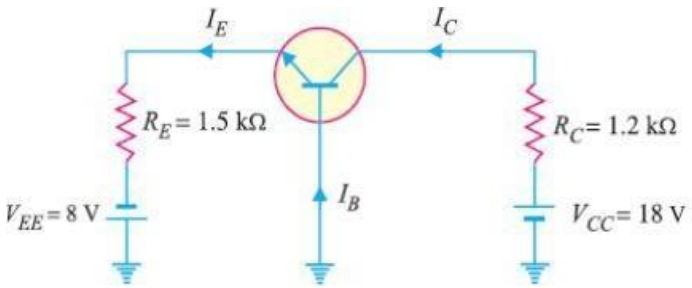
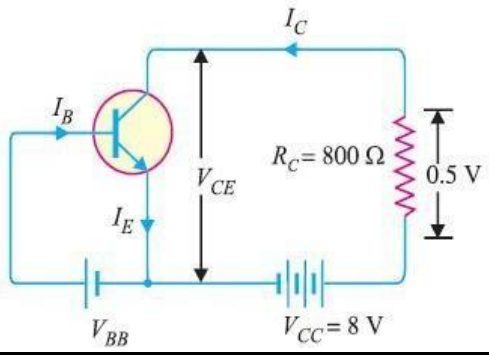
	3) Power drawn from the supply 4) Also draw the phasors diagram.
11	A coil of resistance 10 ohms and an inductance of 1H and a capacitance of 15.83 µF are connected in series across 100 V supply. The current drawn is found to be 10 A. Determine the frequency of supply.

Unit 7: Polyphase Circuits

1	List advantages of 3 phase system over single phase system.
2	Define Phase Sequence.
3	Voltage and current relation in 3-phase star connected system.
4	Voltage and current relation in 3-phase delta connected system.
5	Examples related to 3-phase star and delta connected system.

Unit 8: Basics of Electronics

1	Define: Semiconductor, Intrinsic semiconductor, Extrinsic semiconductor
2	For the circuit shown in Figure, Find the maximum and minimum values of Zener Diode current. 
3	Explain Zener diode as voltage regulator.
4	Explain V-I characteristics of PN junction diode
5	A 10-V zener diode is used to regulate the voltage across a variable load resistor. The input Voltage varies between 13 V and 16 V and the load current varies between 10 mA and 85 mA. The minimum zener current is 15 mA. Calculate the value of series resistance R. 
6	Explain common base connection with current amplification factor and expression for output current.

7	Explain common emitter connection with current amplification factor and expression for output current.
8	Explain common collector connection with current amplification factor and expression for output current.
9	Explain Input and output characteristics of Common Emitter connection.
10	Explain Input and output characteristics of Common Base connection.
11	Derive the relation between α , β and γ .
12	Define: Modulation, Demodulation, Bandwidth
13	For common base circuit shown in Figure. Determine IC and VCB. Assume transistor to be of silicon. 
14	A transistor is connected in common emitter (CE) configuration in which collector supply is 8V and the voltage drop across resistance R_C connected in the collector circuit is 0.5V. The value of R_C = 800 Ω. If α = 0.96, determine : (i) Collector-Emitter voltage (ii) Base current 

15	Determine VCB in the transistor circuit shown in Figure. The transistor is of silicon and has β = 150.