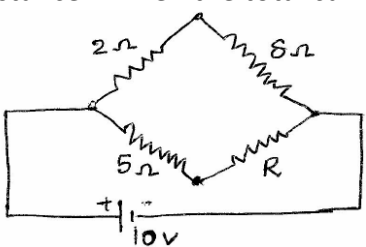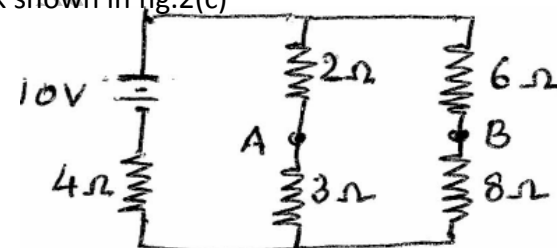## FirstSemester B.E. Degree Examination, Jan 2019

18ELE 15/25BASIC ELECTRICAL ENGINEERING

Time: 3 hrs.   **MODEL PAPER** Max. Marks: 100

Note: Answer FIVE full questions, choosing one full question from each module

		Module – 1	
1	a.	A resistance of 10Ω is connected in series with two resistances each of 15Ω arranged in parallel. What resistance must be shunted across this parallel combination so that the total current taken shall be 1.5A with 20V applied?	6 marks
	b.	For the given circuit calculate the value of the current in either branch and the value of the unknown resistance R when the total current taken by the network is 2.25 A.	6 marks
	c.	Define the following with respect to sinusoidal alternating quantity: (i) Average Value, (ii) RMS value, iii) Form factor and (iv) peak factor	8 marks
		OR	
2	a.	Define RMS value of a sinusoidal alternating quantity and derive an expression for it.	6 marks
	b.	Two resistors are connected in parallel and a voltage of 200V is applied to the terminals. The total current taken is 25A and the power dissipated in one of the resistors is 1500W. What is the resistance of each element?	6 marks
	c.	Find current in the battery, the current in each branch and p.d. across AB in the network shown in fig.2(c)	8 marks
		Module – 2	
3	a.	Show that in a pure inductor the current lag behind the voltage by 90°. Also draw the voltage and current waveforms.	6marks
	b.	A series RLC circuit is composed of 100 Ohms resistance,1.0 H inductance ar	8 marks

		5μF capacitance. A voltage,V(t)=141.4 Cos377t volts is applied to the circuit.Determine the current and vlotages VR , VL and VC	
	c	With the help of a phasor diagram show that in a three phase star connected system the line to line voltage is √3 times the phase to neutral voltage	6 marks
		OR	
4	a	Derive an expression for power in a single phase R-L series circuit in terms of voltage, current and power factor of the circuit.	6marks
	b	Given v=200 sin 377t volts and i=8 sin(377t-30°) amps for an a.c. circuit, determine :a)Power factor b)True power c)Apparent power d)Reactive power indicate the unit of power calculated	8 marks
	c	Three identical coils.each having a resistance of 10 and a reactanece of 10 are connected in delta,across 400 V,3-phase supply.Find the line current and the reading on the two Wattmeters conneted to measure the power.	6 marks
		Module – 3	
5	a	Derive the equation for the induced emf in a single phase transformer	6 marks
	b	With a neat connection diagram explain three way control of lamp. Also develop the truth table indicating the state of the lamp for different positions of the switches.	6 marks
	c	A transformer is rated at 100KVA. At full load its copper loss is 1200 W and its iron loss is 960 W. Calculate (a) the efficiency at full load, unity power factor (b) efficiency at half full load, 0.8 power factor (c) the load KVA at which maximum efficiency will occur and (d) Maximum efficiency at 0.85 power factor	8 marks
		OR	
6	a	Explain the principle of transformer and compare the core and shell type transformer.	6 marks
	b	A single phase 50 Hz core type transformer has a square core of 20 cm side. The permissible maximum density is 1 Wb / m2. Calculate the number of turns per limb on the high and low voltage sides for a 3000 / 220 V ratio	6 marks
	c	What is earthing? Why earthing is required? With the help of sketch explain plate earthing.	8 marks
		Module – 4	
7	a		8 marks
	b		6 marks
	c		6 marks
		OR	
8	a		6 marks
	b		6 marks
	c		8 marks
		Module – 5	

9	a		8marks
	b		6 marks
	c		6 marks
		OR	
10	a		8 marks
	b		4 marks
	c		8 marks