

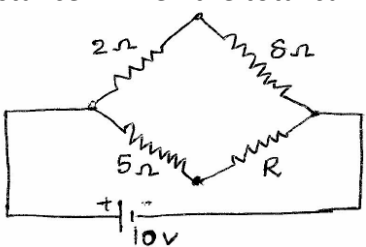
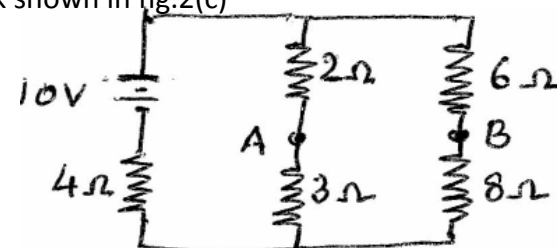
# FirstSemester B.E. Degree Examination, Jan 2019

## 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 $10\Omega$ is connected in series with two resistances each of $15\Omega$ 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? <span style="float: right;">6 marks</span>
	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 $2.25 A$ . <span style="float: right;">6 marks</span>
		
	c	Define the following with respect to sinusoidal alternating quantity: (i) Average Value, (ii) RMS value, (iii) Form factor and (iv) peak factor <span style="float: right;">8 marks</span>
<b>OR</b>		
2	a	Define RMS value of a sinusoidal alternating quantity and derive an expression for it. <span style="float: right;">6 marks</span>
	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? <span style="float: right;">6 marks</span>
	c	Find current in the battery, the current in each branch and p.d. across $AB$ in the network shown in fig.2(c) <span style="float: right;">8 marks</span>
		
Module – 2		
3	a	Show that in a pure inductor the current lag behind the voltage by $90^\circ$ . Also draw the voltage and current waveforms. <span style="float: right;">6marks</span>
	b	A series RLC circuit is composed of $100 \text{ Ohms}$ resistance, $1.0 \text{ H}$ inductance and $10 \mu\text{F}$ capacitance. Calculate the resonance frequency and the quality factor. <span style="float: right;">8 marks</span>

		5 $\mu$ F capacitance. A voltage, $V(t)=141.4 \cos 377t$ volts is applied to the circuit. Determine the current and voltages $V_R$ , $V_L$ and $V_C$	
	c	With the help of a phasor diagram show that in a three phase star connected system the line to line voltage is $\sqrt{3}$ times the phase to neutral voltage	6 marks
		<b>OR</b>	
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 $i=8 \sin(377t-30^\circ)$ 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 reactance of 10 are connected in delta, across 400 V, 3-phase supply. Find the line current and the reading on the two Wattmeters connected to measure the power.	6 marks
		<b>Module – 3</b>	
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
		<b>OR</b>	
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 / m <sup>2</sup> . 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
		<b>Module – 4</b>	
7	a		8 marks
	b		6 marks
	c		6 marks
		<b>OR</b>	
8	a		6 marks
	b		6 marks
	c		8 marks
		<b>Module – 5</b>	

9	a		8marks
	b		6 marks
	c		6 marks
		<b>OR</b>	
10	a		8 marks
	b		4 marks
	c		8 marks