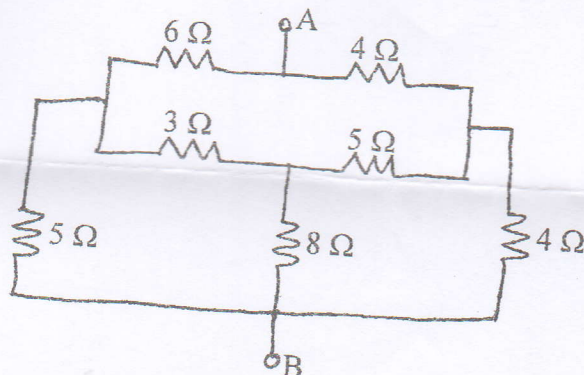


Exam.	Back	
Level	BE	Full Marks 80.
Programme	BEL, BEX, BAME, BCT, BIE, B.Aagri.	Pass Marks 32
Year / Part	I / I	Time 3 hrs.

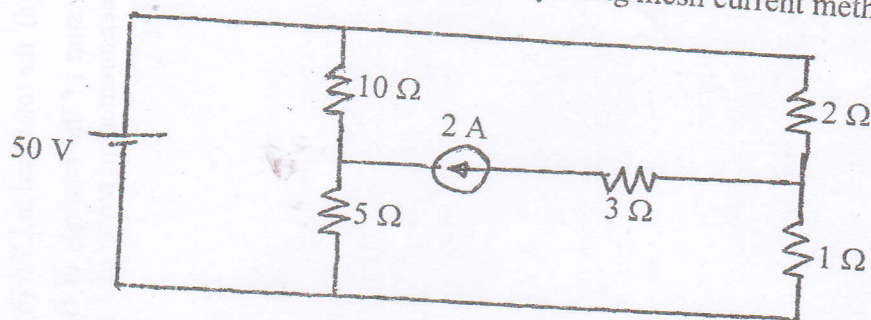
Subject: - Basic Electrical Engineering (EE401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) What do you mean by ideal and practical voltage and current source? Explain the method for converting practical voltage source into current source and vice versa. [5]
- b) A 60 watt, 240 V incandescent filament lamp is switched on at 20°C. The operating temperature of the filament is 2000°C. Determine the current taken by the lamp at the instant of switching ON. The temperature coefficient of resistance of the filament material is 0.0045°/k. [6]
- c) A circuit containing three resistors with resistances 12Ω, 18Ω and 36Ω respectively joined in parallel is connected in series with a fourth resistance. The whole circuit is supplied at 60V and it is found that power dissipated in 12Ω resistance is 36watt. Determine the value of fourth resistance and the total power dissipated in the group. [6]
2. a) Make comparison table between series and parallel circuit. [5]
- b) For the circuit shown in below figure, determine the resistance between points A and B using star / delta transformation theorem. [4]

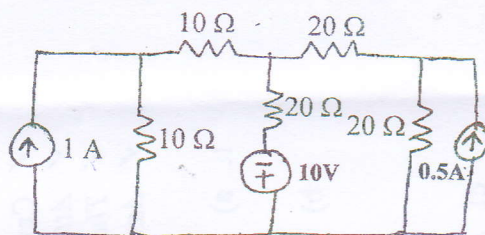


- c) Find all branch currents in the given circuit by using mesh current method. [6]



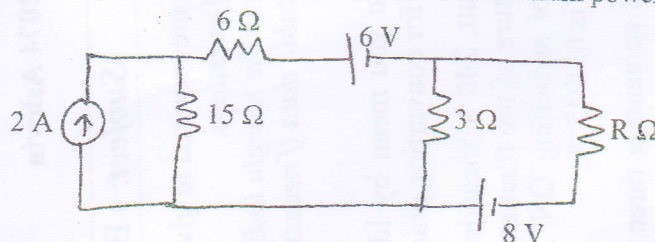
3. a) Using Nodal analysis, determine currents in each branch of the network shown in below figure. Also find the total power loss in the network.

[8]



- b) Find the value of Resistance 'R' to have maximum power transfer in the circuit as shown in below figure. Also obtain the amount of maximum power.

[8]



4. a) Two inductances L_1 and L_2 are connected in parallel. Derive the relation showing the equivalent inductance of the combination when mutual flux helps the individual flux. what will be the equivalent inductance of the combination when mutual flux opposes the individual flux?

[4]

- b) Two alternating currents represented by the equations $i_1 = 7\sin\omega t$ and $i_2 = 10\sin\left(\omega t + \frac{\pi}{2}\right)$ are fed into a common conductor. Find the equation for the resultant current and its RMS value.

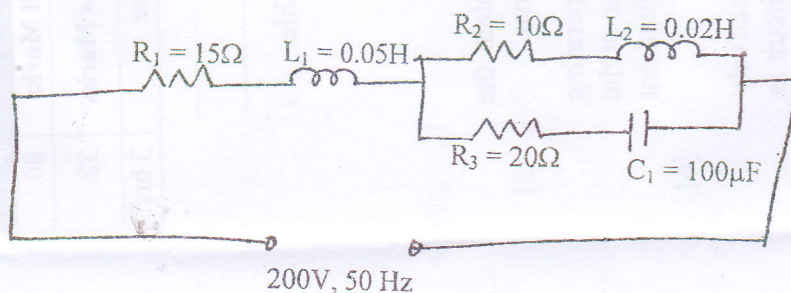
[4]

- c) Below Figure shows a series parallel circuit. Find:

[8]

- total impedance
- current drawn from the circuit
- voltage across the parallel branches
- current flowing through each parallel branch
- power factor
- Active, reactive and apparent power

Also, draw the phasor diagram of the circuit.



5. a) A fluorescent lamp takes a current of 0.75 A when connected across a 240 V , 50 Hz a.c supply. The power consumed by the lamp is 80 watt . Calculate the value of the capacitance to be connected in parallel with the lamp to improve the power factor to (i) unity (ii) 0.95 lagging. [6]
- b) The following balanced three phase loads are connected to a 415 V , three phase, four wire supply. [4]
- (i) 160 kVA at 0.7 power factor lagging
 - (ii) 50 kVA at 0.65 power factor leading
 - (iii) 50 kW at unity power factor
- Calculate (a) the total load in kVA (b) the line current (c) the combined power factor
- c) Prove that sum of the readings of two wattmeters is equal to the total three phase power in measurement of power of 3-phase circuit by 2 wattmeter method. [6]
