25 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2073 Shrawan

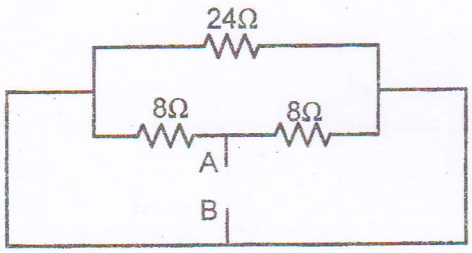
Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BAME, BIE, B. Agri.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Basic Electrical Engineering *(EE401)*

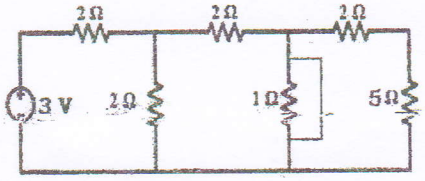
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) A coil has a resistance of 100 ohms, when the temperature is 20°C and 110 ohms when the temperature is 45° C. Find temperature rise when its resistance is 124 ohms, and surrounding temperature is 15° C. [6]

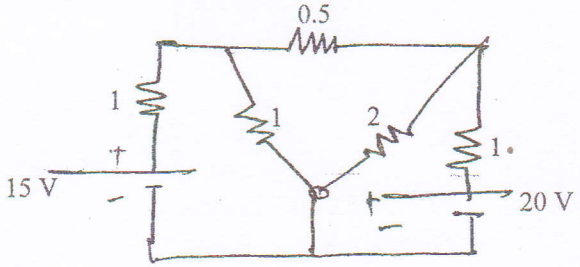
   b) Find the equivalent resistance between A and B for the network shown in figure below. [4]



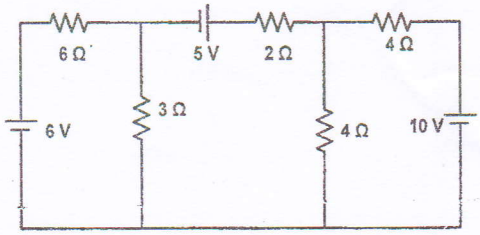
   c) Find current from the source in the following circuit diagram. [6]



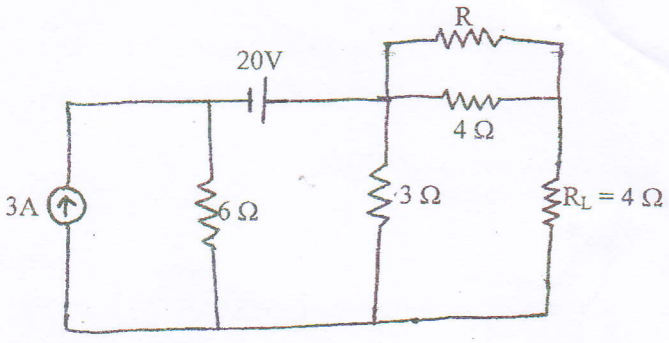
2. a) Find the current in 5-ohm resistor in the network shown below by using superposition theorem. [8]



   b) Find the branch currents in the circuit of figure below by using nodal analysis. [8]

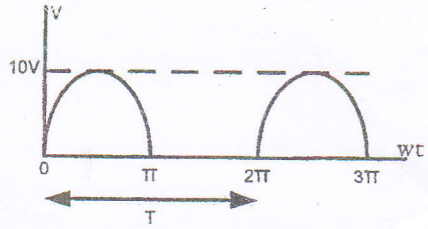


3. a) Find the value of Resistance 'R' such that the load resistance 'R_L' which is equal to 4 Ω, will deliver maximum power. Also find that maximum power. [8]

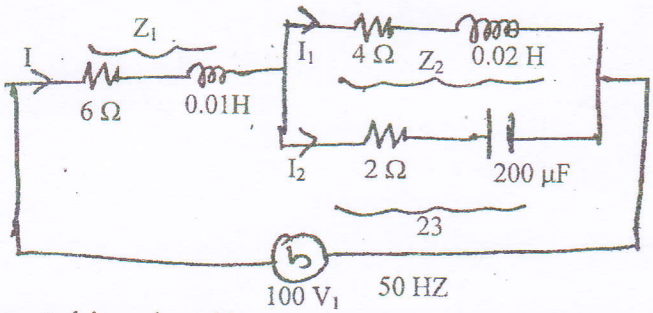


b) Derive an equation for inductance L in terms of flux linkages and current change. [4]

c) Calculate the (i) average value and (ii) RMS value of voltage wave shown in figure below: [4]



4. a) Determine the value of current I_1, I_2 and I and overall factor of the circuit shown in figure below for series and parallel circuit. Also draw the phasor diagram and find the total power consumed by the circuit. [8]



b) A coil is connected in series with a non-inductive resistance of 30Ω across 240V, 50Hz, 1-ϕ supply. The reading of voltmeters across the coil is 180 V and across the resistance is 130 V. Calculate, [8]

i) Inductance of coil
ii) Resistance of coil
iii) Power absorbed by coil
iv) Power absorbed by whole circuit

5. a) Define power factor and explain why in general it should be kept on high as possible in power supply system. [8]

b) Three similar coils each of resistance 7Ω and inductance of 0.03 H are connected in Delta to a 400 V, 3 phase, 50 Hz supply. Calculate the line current and the total power consumed. [8]

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