15 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2075 Ashwin

Exam.	Back		
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)*

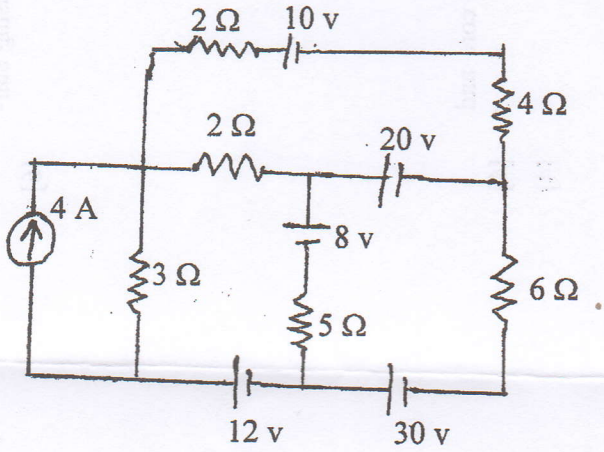
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Differentiate between Practical Voltage Source and Practical Current Source. [4]

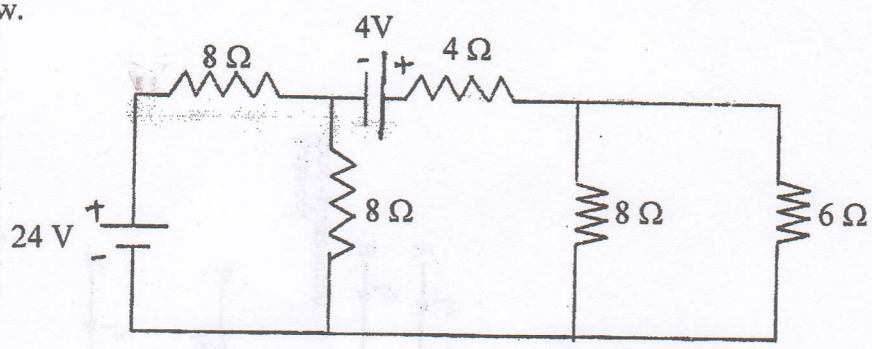
   b) The field winding of dc motor takes 1.15 A current at 20°C. If current falls to 0.26 A after working for some hours, supply voltage remaining constant, find the final working temperature of field winding. Given, $\alpha_0 = \frac{1}{234.5}$ and voltage = 230V. [6]

   c) Three lapms of rating 220 V and 150 watt, 200 watt and 450 watt are connected across 200 V supply. Calculate the resistance of each lamp and the power consumed by each lamp at 200 V. [6]

2. a) Solve the given network with mesh analysis to find voltage drop on 5 Ω resistors. [6]

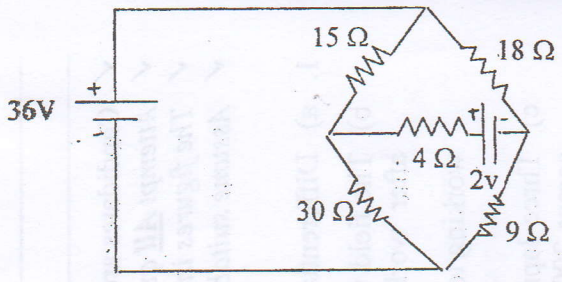


   b) Use nodal analysis to find the current through 4Ω resistor for the network shown below. [6]

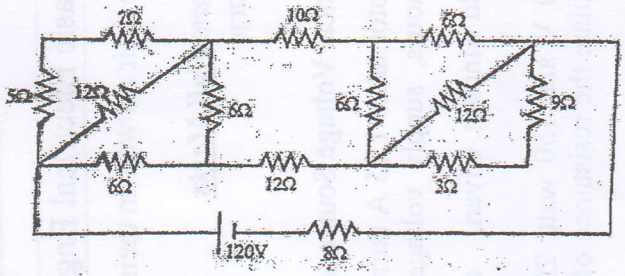


   c) State and explain superposition theorem with suitable example. [4]

3. a) Using thevenin's theorem find the current through the 4Ω for the network shown below. [6]

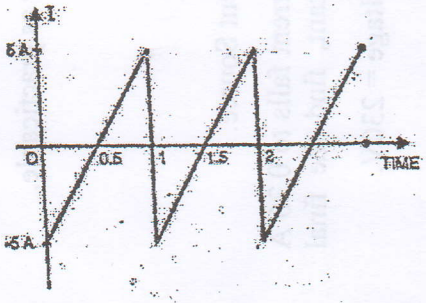


b) Determine the power dissipated in the 8Ω resistor of the given network using star-delta and delta-star transformation. [6]



c) How mutual inductance between two coils depends upon dimensions of core and coils. [4]

4. a) Find the form factor and peak factor of the current waveform given below. [4]



b) A coil of inductance 318.3 mH is connected in series with a 200Ω resistor to a 240 V, 50 Hz supply. Calculate the current flowing, power factor, active and reactive power of the circuit. Also draw the phasor diagram. [6]

c) $Z_1 = (40 - j318.31)$ and $Z_2 = (50 + j62.83)$ are connected in parallel to each other and a source of 100v, 50 Hz is applied across the overall circuit. Calculate (i) circuit current (ii) Active, reactive and apparent power. [6]

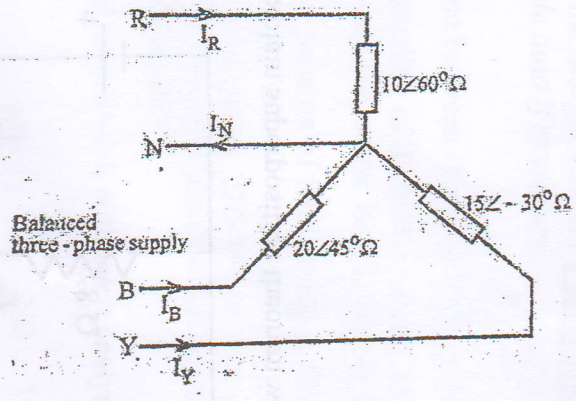
5. a) Discuss the effect of low power factor. A single phase load of 7Kw operates at a power factor 0.7 lagging. It is proposed to improve the power factor to 0.9 lagging by connecting a capacitor the load. Calculate the KVAr rating of the capacitor. [3+5]

b) For the following unbalanced system with balanced three phase supply of 400 V, 50 Hz, calculate: [8]

i) The line currents and neutral current

ii) Active and reactive power abosrbed by the circuit

iii) Draw the phasor diagram.



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