25 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

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

Subject: - Basic Electrical Engineering *(EE401)*

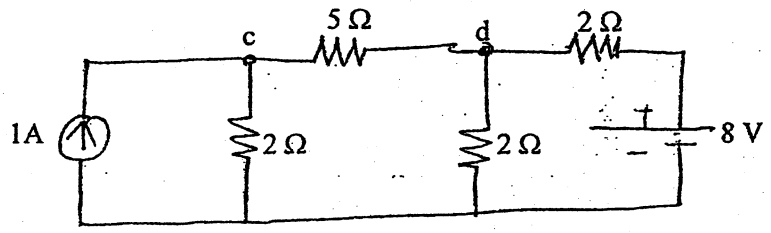
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain ideal current and voltage sources. [4]

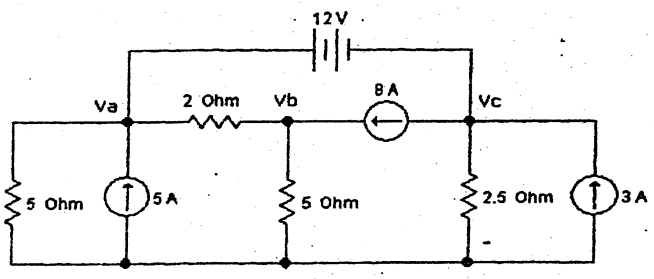
   b) Define temperature coefficient of resistance. The resistance of a certain length of wire is 4.6Ω at 20°C and 5.88Ω at 80°C. Determine (a) The temperature coefficient of resistance of the wire at 0° (b) The resistance of the wire at 60°C. [8]

   c) State and explain Superposition theorem with an appropriate example. [4]

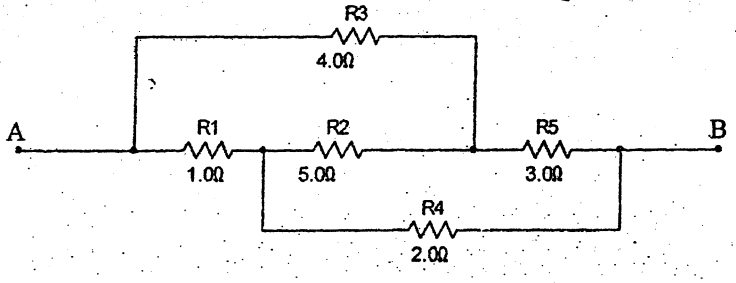
2. a) Find out the current through 5 ohm resistor connected across the terminal c and d in the network shown below using the Venin's theorem. [8]



   b) Use Nodal Analysis Method to determine the V_a, V_b and V_c and calculate current through 2.5 Ω. [8]



3. a) Find the resistance between the terminals A and B in the circuit segment below. [4]



b) Three capacitors A, B and C have capacitances 10, 50 and 25 μF respectively. Calculate: [6]

i) Charge on each when connected in parallel to a 250 V supply

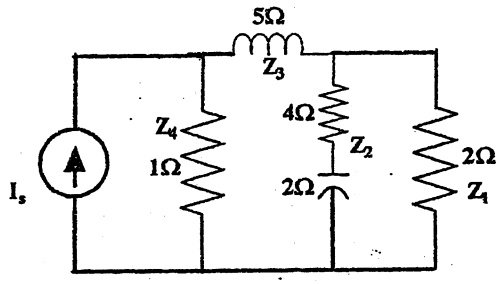
ii) Total capacitance and

iii) p.d. across each when connected in series

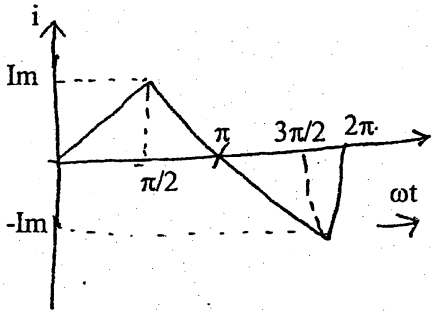
c) State Maximum Power Transfer Theorem and also prove "maximum power will be dissipated when $R_{Internal} = R_L$" [6]

4. a) Derive the expression for electrical current in a pure inductive circuit when input power is $V_m Sinwt$. Draw the wave form of voltage and current and phasor diagram of the circuit. Show analytically and graphically that it does not consume real power. [6]

b) In the given circuit, find the current through the inductor, what is the equivalent impedance? [6]



c) Find the peak factor and form factor of the triangular wave shown in figure below. [4]



5. a) Explain the importance of power factor in an ac circuit, with suitable example. How power factor can be improved? [4]

b) A three phase star connected system with line voltage 400 V is connected to three loads: $25\angle 0°$, $11\angle -20°$ and $15\angle 10°$ (also connected in star). Find the line to line current, total power and current in the neutral of the system. [8]

c) Define phase sequence and explain its significance in three phase system. [4]

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