B.E.First Semester All Branches (C.B.S.) / B.E. First Semester (Fire Engineering)
Basic Electrical Engineering

P.Pages : 3 Time

: Two Hours

* 0 2 3 3 *

Max. Marks : 40

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Notes : 1.   All questions carry marks as indicated.
2.   Solve Question 1 OR Questions No. 2.
3.   Solve Question 3 OR Questions No. 4.
4.   Solve Question 5 OR Questions No. 6.
5.   Solve Question 7 OR Questions No. 8.
6.   Assume suitable data whenever necessary.

1.   a)   State Kirchhoff's laws with suitable example.   **4**

b)   Transform a current source of 50A having internal resistance of 5 ohm into an equivalent   **2**
voltage source. Draw the network clearly.

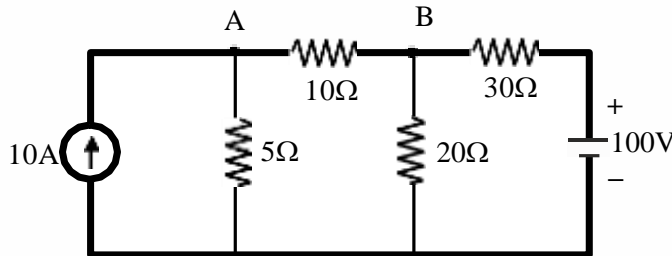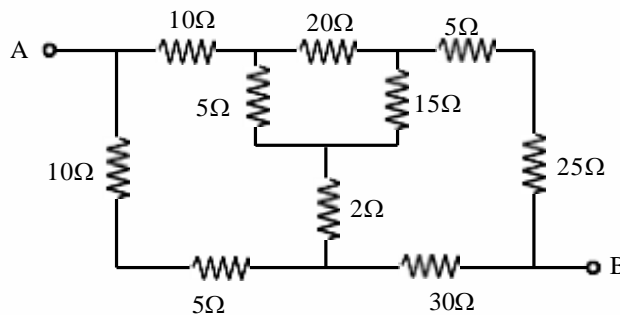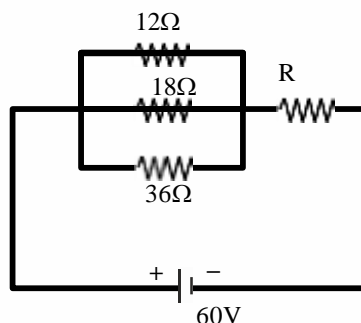c)   Find the current through AB branch using superposition theorem shown in fig 1 (c).   **4**

Fig. 1(c)

OR

2.   a)   Find the equivalent resistance between points A and B.   **6**

b)   Find the value of resistance 'R' shown in figure. When power consumed by the 12 ohm   **4**
resistor in the given circuit is 36w.

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3. a) Define the following. **5**

   i) Reluctance.   ii) Magnetomotive force.
   iii) Leakage flux.   iv) Fringing.
   v) Coercive force

   b) An iron core is circular in shape has a mean length of 50cm. It has a air gap of 2mm width. If a coil of 100 turns is wound on the ring. Find the current required to flow in the coil on to produced on air gap flux density of 0.75 Wb/m². Neglect leakage and fringing. Relative permeability is 600. **5**

OR

4. a) Draw and explain hysteresis loop. **3**

   b) Explain the similarities and dissimilarities between electric circuit and magnetic circuit. (Three points each). **3**

   c) An iron ring of 8cm mean diameter is made up of round iron of diameter 1cm and permeability of 900, has an air gap of 2mm wide. It consist of winding with 400 turns carrying a current of 3.5A. Determine. **4**
   i) Total reluctance   ii) Flux.

5. a) Define the following. **5**

   i) Time period.   ii) Amplitude
   iii) Average value   iv) Crest factor
   v) Instantaneous value

   b) For the circuit shown in figure. **5**

R=50Ω   L=0.1H   C=50μF

230V, 50Hz
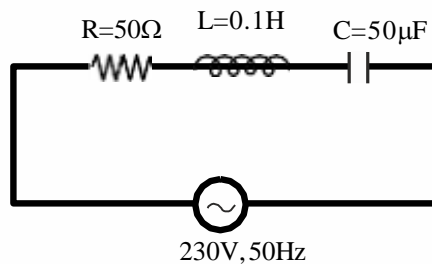
   Calculate the following.
   i) Impedance.

   ii) Current flowing through circuit.

   iii) Power consumed by the circuit.

   iv) Power factors and its nature.

   v) Draw phasor diagram.

OR

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6. a) Prove that a three phase balanced load draws three times as much power when connected in delta, as it would draw when connected in star.   **4**

    b) A balanced star connected load is supplied from a symmetrical three phase, 400V system, The current in each phase 30A and lags 30º behind the phase voltage. Find.   **6**

i)	Resistance per phase.	ii)	Reactance per phase.
iii)	Impedance per phase.	iv)	Active power.
v)	Reactive power.	vi)	Apparent power.

7. a) Why does a transformer is said to be a constant flux machine?   **3**

    b) Draw the equivalent circuit of transformer.   **2**

    c) A 400/200V single phase transformer is supplying load of 50 A at the power factor of 0.866 lagging. The no load current is found to be 2A at 0.208 power factor lagging. Calculate the current and power factor on primary side of transformer. Draw the phasor diagram.   **5**

<div align="center">OR</div>

8. a) Explain open circuit and short circuit test on single phase transformer with circuit diagram.   **4**

    b) The iron and full load copper losses in a 40kvA single phase transformer are 250w and 750w respectively.
Calculate :
i) Efficiency at 50% of full load, 0.8 power factor leading.   **6**

       ii) Load at which the efficiency is maximum.

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