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

P. Pages : 2

Time : Two Hours

0633

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) Explain Kirchhoff's law's with one example. **4**

  b) Find the equivalent resistance between terminal A-B of fig. 1(b) by star-delta conversion and find 'I'. **6**
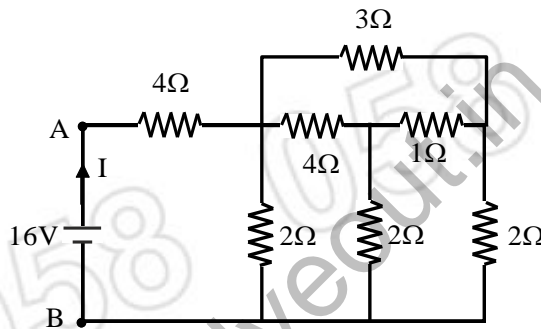

Fig. 1(b)

OR

2. a) Draw the V-I characteristics of - **4**
  i) Ideal voltage source ii) Ideal current source
  iii) Practical voltage source iv) Practical current source

  b) Find the voltage drop across branch AB, using super position theorem. Also power consumed by AB branch Refer fig. 2 (b). **6**
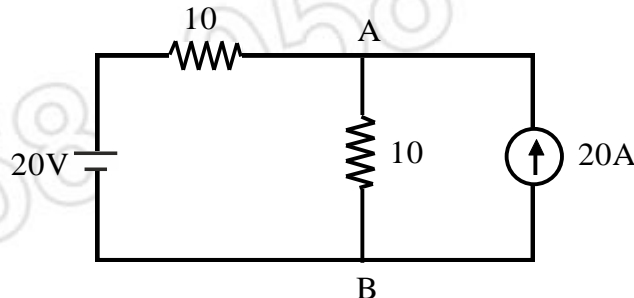

Fig.2 (b)

3. a) An iron core is rectangular in shape, has a mean length of 50 cm. It has saw cut in one of it's length of 2 mm wide. The coil is wound on one of the limb having 100 turns. Find the current required to flow in the coil on to produce an air gap flux density of 0.75 Wb/m^2. Neglect fringing & leakage $\mu_r = 600$. **6**

b) Draw and explain Hysteresis loop curve. 4

OR

4. a) An iron, ring of 8 cm mean diameter is made up of round iron of diameter 1 cm and permeability of 900, has an air gap of 2 mm wide. It consist of winding with 400 turns carrying a current of 3.5 A. 5

Calculate :
i) MMF   ii) Total Reluctance
iii) The flux   iv) Flux density in the ring

b) Define : 5
i) Residual flux
ii) Co-ercive force
iii) Similarities of electric & magnetic circuit.

5. a) Explain the phenomenon of electrical resonance in series a.c. circuits. Derive the expression for resonant frequency. 4

b) A coil takes 10 A from 200V, 50 Hz supply It's resistance is 5Ω. Determine it's - 6
i) Inductance   ii) Real power in kw
iii) Reactive power in kVAR   iv) Impedance
v) Apparent power in kVA   vi) Phasor dig.

OR

6. a) Prove that a 3 phase balanced load draws three times as much power when connected in Delta, as it would draw when connected in STAR. 5

b) Three identical coil's of $(9+j12)\Omega$ are connected in delta to a 400V, 50 Hz, 3ϕ AC supply. Calculate for this load. 5
i) Line current   ii) Vph
iii) cosϕ iv) kvA
v) kw

7. a) Why does a transformer is said to be a constant flux machine. 4

b) A 400/200 V, 1ϕ transformer is supplying load of 50 A at the power factor fo 0.866 lagging. The no load current is found to be 2A at 0.208 power factor lagging. Calculate the current & power factor on primary side of transformer. 6

OR

8. a) Explain O.C. and S.C. test on single phase transformer with circuit diagram. 4

b) The iron and full load copper loss in a 40 kvA single phase transformer are 250 w and 750 w respectively. Calculate : 6
i) Efficiency at 50% of full load 0.8 p.f. leading
ii) Load at which the efficiency is maximum.

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