

**Basic Electrical Engineering****Paper - IV**

P. Pages : 2

**KNT/KW/16/7199**

Time : Two Hours



Max. Marks : 40

- 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 Kirchoff'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

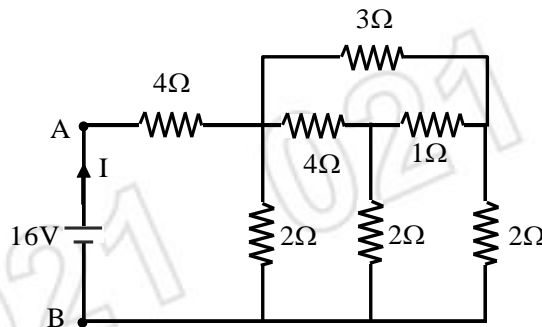


Fig. 1(b)

**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

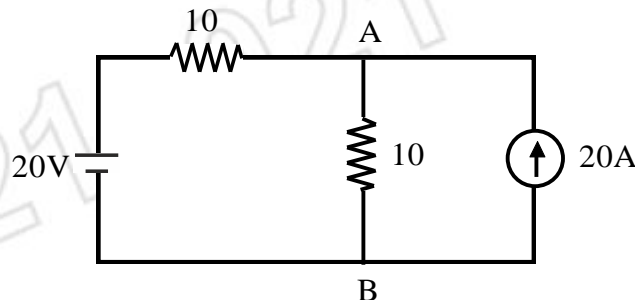


Fig.2 (b)

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  $0.75 \text{ Wb/m}^2$ . 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, 3 $\phi$  AC supply. 5  
Calculate for this load.
- |                 |              |
|-----------------|--------------|
| i) Line current | ii) $V_{ph}$ |
| iii) $\cos\phi$ | iv) kvA      |
| v) kw           |              |
7. a) Why does a transformer is said to be a constant flux machine. 4
- b) A 400/200 V, 1 $\phi$  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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