

SPK/KW/12/6440

Faculty of Engineering & Technology
First Semester B.E. Examination
BASIC ELECTRICAL ENGINEERING

Time—Two Hours]

[Maximum Marks—40

INSTRUCTIONS TO CANDIDATES

- (1) All questions are compulsory and carry equal marks.
 - (2) Assume suitable data wherever necessary.
 - (3) Illustrate your answers wherever necessary with the help of neat sketches.
 - (4) Use of non-programmable calculator is permitted.
1. (a) Define KCL and KVL for DC circuit. Explain the same with simple circuits. 5
- (b) Find the equivalent resistance across the terminals A and B for the circuit shown in Fig. 1(b) by using star delta transformation. 5

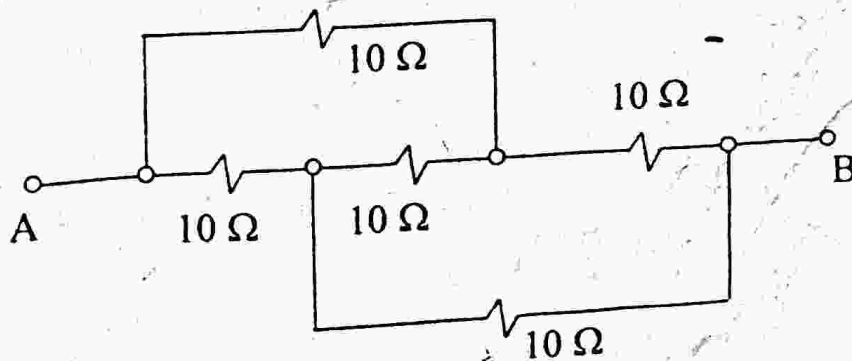


Fig. 1(b)

OR

(Contd.)

2. (a) Define Ideal voltage source and Practical current source. 4
- (b) By using Superposition theorem, find the current in branch of $2\ \Omega$ resistor for the circuit shown in Fig. 2(b). 6

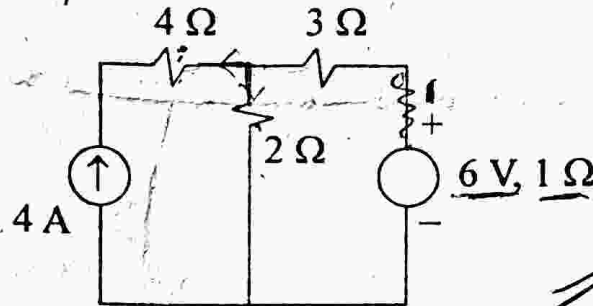


Fig. 2(b)

3. (a) Give similarities between Electric and Magnetic circuit. 3

(b)

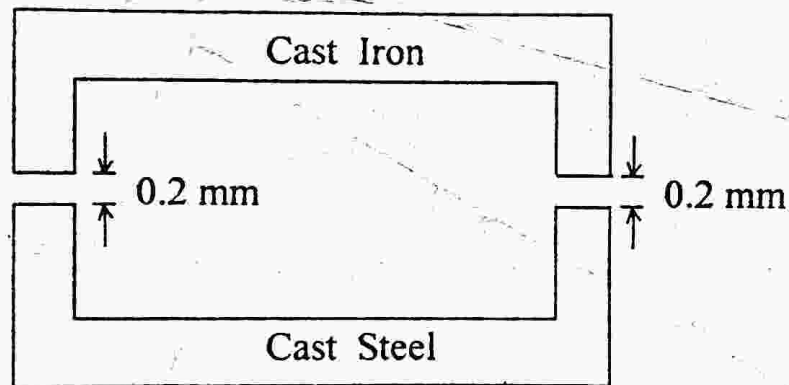


Fig. 3(b)

Series magnetic circuit shown in Fig. 3(b) is made up of two different materials, cast steel and cast iron. Cross-sectional area is $10\ \text{cm}^2$. Each joint reluctance is equal to an air gap of $0.2\ \text{mm}$. Mean length of each material is $0.33\ \text{m}$. Find the ampere turns required to produce a flux of $8 \times 10^{-4}\ \text{Wb}$ in the circuit. The relative permeabilities of cast iron and cast steel are 166 and 800 respectively. 7

OR

4. (a) Draw and explain the Hysteresis loop. 4
 (b) Define the following terms :
 (i) mmf
 (ii) Flux density
 (iii) Magnetizing force. 3
 (c) Explain Leakage and Fringing phenomenon in magnetic circuit. 3
5. (a) For the circuit shown in Fig. 5(a) find : 6
 (i) Branch currents and Total current
 (ii) Power consumed and overall p.f. of the circuit.

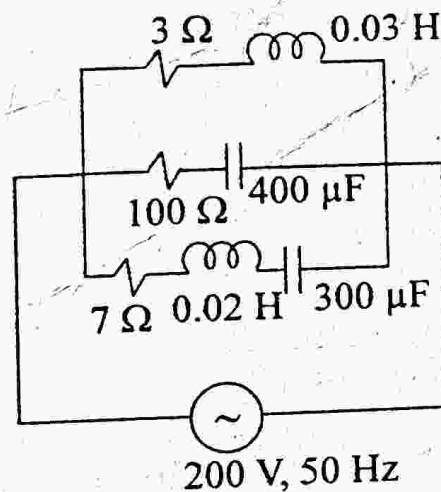


Fig. 5(a)

- (b) Explain the following terms of AC voltage : 4

- (i) Average value
 (ii) RMS value
 (iii) Form factor
 (iv) Peak factor.

OR

(Contd.)

6. (a) Derive the relation between line voltage and phase voltage, line current and phase current for Delta connected 3 phase AC source. 4
- (b) Three equal value coils connected in star consumes 8 kW power at a power factor of 0.8 when connected across 415 V, 3 phase supply. Find the circuit constants of the load per phase. 6
7. (a) Explain working principle of a single phase transformer. 3
- (b) A transformer takes 10 amp on no load at a power factor of 0.1. The turn ratio is 4 : 1 (step down). If the secondary supplies a load current of 200 amp at a power factor of 0.8 lag, find primary current and its power factor. 7

OR

8. (a) Why does a transformer is said to be a constant flux machine ? 3
- (b) A 600 KVA single phase transformer has an efficiency of 92% both at full load and half load and at unity power factor. Determine the transformer efficiency at 60% of full load and 0.8 power factor lag. 7