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TEE–101

B. TECH. (FIRST SEMESTER)
END SEMESTER EXAMINATION, 2019
(All Branches)
BASIC ELECTRICAL ENGINEERING
Time : Three Hours
Maximum Marks : 100

Note : (i) All questions are compulsory.
(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

1. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
   (a) State and explain the Superposition Theorem with suitable example along with its limitations. (CO1)
   (b) Determine the Thevenin's Equivalent for the circuit as shown in Fig. 1. : (CO1)

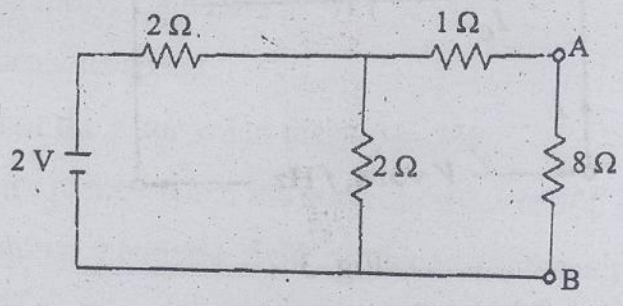

Fig. 1

   (c) Calculate the value of current in branch AB, in circuit as shown in Fig. 2, using Node analysis : (CO1)

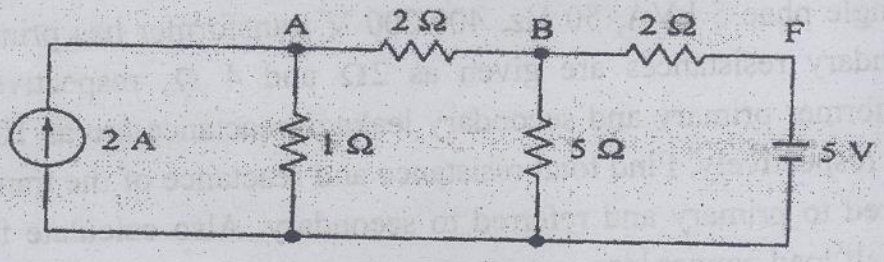

Fig. 2

2. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Derive the relation between line quantities and phase quantities for 3-phase delta connection. (CO3)

(b) A coil of inductance 0.08 H and negligible resistance is connected in series with 15 Ω non-inductive resistance. The combined circuit is energized from a 240 V, 50 Hz supply. Calculate : (CO2)

(i) Reactance of the coil

(ii) Impedance of the circuit

(iii) The current in the circuit

(c) What do you mean by electrical resonance ? Derive the condition of resonance as shown in the Fig. 3 given below :

(CO2)

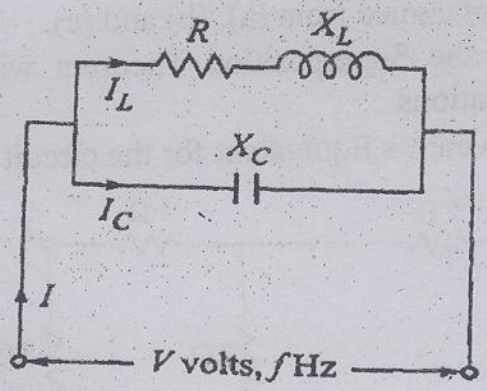

Fig. 3

3. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Write similarities and dissimilarities between electrical and magnetic circuit. (CO4)

(b) A single phae 5 kVA, 50 Hz, 400/200 V transformer has primary and secondary resistances are given as 2Ω and 4 Ω, respectively, and transformer primary and secondary leakage reactance are as 10 Ω and 5 Ω, respectively. Find total resistance and reactance of the transformer referred to primary and referred to secondary. Also calculate full load and half load copper loss. (CO4)

(c) Discuss the various characteristics of an ideal transformer. Also, draw equivalent circuit of practical transformer and discuss it various electrical parameters. (CO4)

4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Write short notes on the following : (CO5)

(i) MCB

(ii) ELCB

(b) What is Lead Acid Battery ? Explain along with its advantages and disadvantages. (CO5)

(c) What is the need of power factor improvement ? Explain any *one* method for power factor improvement. (CO5)

5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Write and explain the working principles of DC generator. (CO6)

(b) A three phase Induction motor is wound for four poles and is supplied from a 50 Hz supply. Calculate : (CO6)

(i) the synchronous speed

(ii) the speed of the rotor when the slip is 3%

(iii) the rotor frequency when the speed of rotor is 900 rpm

(c) How is a rotating magnetic field produced in the air gap of 3-phase induction motor ? (CO6)