Total No. of Questions – [3]

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G.R. No.	

Paper Code - U119 - 102 (T1)

OCTOBER 2019 / IN-SEM (T1)

F. Y. B.TECH. (COMMON) (SEMESTER - I)

COURSE NAME: BASIC ELECTRICAL ENGINEERING

COURSE CODE: ET 10182A

(PATTERN 2018)

Time: [1 Hour] [Max. Marks: 20]

(*) Instructions to candidates:

1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed.**
4) **Use suitable data whereever required.**
5) **Assume suitable data, if required.**

Q 1) Attempt any **two**.

a) For the circuit shown in fig. 1, determine the current flowing through 3Ω resistance using Superposition theorem. [4]

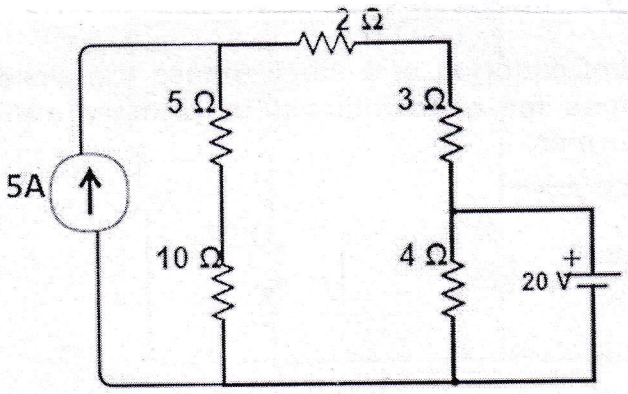

Fig. 1

b) For the circuit shown in fig.1, determine Thevenin's equivalent voltage (V_{Th}) and equivalent resistance (R_{eq}) across the load branch of 3Ω resistance. Hence, draw Thevenin's equivalent network (showing values of V_{Th} and R_{eq}) across the load branch of 3Ω resistance. [4]

c) A series circuit consiting of R = 2 MΩ and C = 0.01μF is connected across a DC source of 50 V. Determine i) the time constant of the circuit ii) voltage across capacitor after 0.01 and 0.02 sec iii) current in the circuit at t = 0. [4]

Q 2) Attempt any **two**.

a) An ac voltage source, $v = V_m \sin \omega t$ Volt is applied across a series circuit. The current in the circuit is given by the expression $i = I_m \sin(\omega t + \Phi)$ Amp. Derive an expression for the instantaneous power and hence find the average power consumed by the circuit. [4]

b) When connected to a 230 V, 50 Hz single phase ac supply, a coil takes 10 KVA and 8 KVAR. For this coil, calculate its i) resistance ii) inductance. Find power consumed by the coil. [4]

c) A coil of resistance 10 Ω and inductance 0.1H is connected in series with a capacitor of 150 μF across 200 V, 50 Hz ac supply, Calculate i) Impedance of the circuit ii) current in the circuit iii) power consumed by the circuit iv) frequency at which circuit will undergo resonance [4]

Q 3) Attempt any **one**.

a) A 1.5 KVA, 220/110 V, 50 Hz, single phase transformer has iron loss of 32 W and full load copper loss of 44 W. Calculate % efficiency of the transformer at i) full load and 0.8 power factor lagging and ii) half load and unity power factor. [4]

b) Derive the emf equation of a single phase transformer and hence write the expressions for emfs induced in primary and secondary winding of the transformer. [4]