Total No. of Questions – [3] Total No. of Printed Pages: 2

G.R. No.	

U118-102(T1)

OCTOBER 2018 / 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 where ever required.**
5) **Assume suitable data, if required.**

Q 1) Attempt any **two.**

a) Using Superposition theorem, find the current I_1 through 2Ω resistance for the network shown in fig.1. [4]

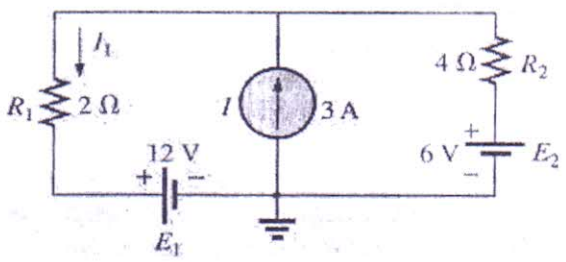

Fig.1

b) For the circuit shown in fig.2, the black box contains resistors and independent sources only, the current I is 1.5 A and 0.75 A for R = 0 and R = 2Ω respectively. What is the current I for R = 1Ω ? [4]

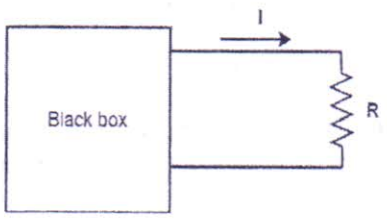

Fig.2

c) For the circuit shown in fig. 3, determine and draw Thevenin's equivalent network across the terminals A and B. [4]

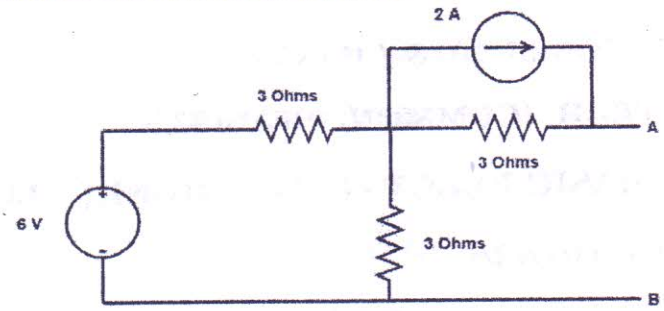

Fig.3

Q 2) Attempt any **two**.

a) A resistance R is connected in series with an inductive coil having resistance r and inductance L across 230 V, 50 Hz single phase ac supply. The current in the circuit is 1.8 A while the voltages across resistance R and the coil are 80 V and 170 V respectively. Calculate the inductance L and resistance r associated with the coil. Also find the phase angle between the current and the supply voltage. [4]

b) A single phase ac voltage given by $v = 200\sqrt{2}\sin(314.2\,t + \pi/3)$ Volts while the current is given by $i = 10\sqrt{2}\sin(314.2\,t - \pi/6)$ Amp. Derive an expression for instantaneous power and hence find the average power consumed by the circuit. [4]

c) Three impedances each of $(8 + j6)\ \Omega$ are connected in star across a three phase, 400 V, 50 Hz ac supply. Calculate total power and power factor of the load. What would be the total power if the same impedances are now connected in delta ? [4]

Q 3) Attempt any **one**.

a) The no load test on a single phase transformer gave 250 V on low voltage side when its high voltage side is excited by rated voltage with a voltage source of frequency 50 Hz. Number of turns on high voltage side are 1000 while the maximum flux density in the core is found to be 0.0045 Wb.
Determine :- i) Number of turns on low voltage side
ii) Voltage induced on high voltage side
iii) KVA rating of the transformer if the low voltage side carries full load current of 320 A
iv) full load current on high voltage side [4]

b) A 40 KVA, 2000/250 V, 50 Hz, single phase transformer has i) efficiency of 97% at full load and 0.8 power factor lagging and ii) efficiency of 98% at half load and unity power factor
Determine:- i) core losses and copper losses at full load ii) efficiency of the transformer at full load and unity power factor condition. [4]