## **Question Paper**

Exam Date & Time: 28-Dec-2018 (08:30 AM - 11:30 AM)



## FIRST SEMESTER B.TECH MAKE-UP EXAMINATIONS, DEC 2018 Basic Electrical Technology [ELE 1051 - 2018 - CHM] Duration: 180 mins.

Marks: 50

## Α

## Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) (4) In the circuit shown, find the current through 8 ohms



A)



B)

(4)In the network below, determine the power consumed by 5 ohms resistor using mesh current analysis



C) A coil of resistance 8 ohms and inductance 0.5H is excited (2) by a DC voltage of 16V at t = 0. Find the current at t =10m-sec. At what time current reaches a value of 1.8A.

2)

In the network shown, find the current in 3 ohms resistor A) using superposition theorem.

(4)



A magnetic circuit is arranged as shown in figure. Find the <sup>(3)</sup> number of turns required in the coil carrying a current of 1.3A to develop a flux density of 0.2 Wb/m<sup>2</sup> in the air gap of 1.2 mm length. Given: Cross sectional area of the structure is 500 mm<sup>2</sup> and the relative permeability of the material is 900.



 C) Draw the dotted equivalent circuit of the magnetic circuit <sup>(3)</sup> shown and hence, find the equivalent inductance. Also, find the induced emf if a current of 2.8A is reversed in 0.2 seconds.



- A coil in series with a capacitor of 100 micro-F is supplied <sup>(4)</sup> by a 200V, 50Hz, single phase AC supply. The voltage across the capacitor is 80V. Find the values of resistance and inductance of the coil if the power factor of the circuit is 0.6 lagging. Also, find the active, reactive and apparent powers.
  - <sup>B)</sup> Determine the current drawn and power consumed in the <sup>(3)</sup> circuit shown. Also, find the value of the capacitive reactance to be connected in series to improve the power factor to unity.



<sup>C)</sup> In the circuit shown, find the value of C such that the circuit<sup>(3)</sup> resonates at 300 rad/sec



<sup>4)</sup> Three impedances, each of (16 + j12) ohms are connected <sup>(3)</sup> <sup>(3)</sup> in delta across a 400V, 3 phase, RYB supply. Determine (i) line currents (ii) readings of the two wattmeters connected to measure the power.

<sup>B)</sup> Three impedances,  $Z_R = (8 + j6)$  ohms,  $Z_Y = (20 + j12)$  <sup>(4)</sup> ohms and  $Z_B = (16 - j12)$  ohms are connected in star across a 400V, 3 phase, RYB supply. Determine the line currents.

With a neat connection diagram, derive the relation <sup>(3)</sup>
between the line and phase values of voltages and currents in a balanced, 3 phase, delta connected load. Draw the complete phasor diagram.

<sup>5)</sup> With relevant circuit diagrams, explain the types of DC <sup>(4)</sup> <sub>A)</sub> motors.

<sup>B)</sup> With a neat connection diagram, explain the starting <sup>(3)</sup> method of single phase Induction motor using a capacitor.

<sup>C)</sup> With the help of block diagram, explain the working of <sup>(3)</sup> digital energy meter.

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