SH-I/ELC/101/C-1/19

B.Sc. 1st Semester (Honours) Examination, 2019-20

ELECTRONICS

Course ID : 11711 **Course Code : SH/ELC/101/C-1**

Course Title : Basic Circuit Theory and Network Analysis

Time: 1 Hour 15 Minutes **Full Marks : 25**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any three* of the following questions: 1×3=3

(a) What are linear circuit elements?

(b) What do you mean by 'Branch' of an electrical network?

(c) Define 'cycle' of an alternating voltage.

(d) Draw the frequency response curve of an RLC Series Circuit.

(e) What are the three types of power used in ac circuit?

(f) What is meant by steady state value of a response?

2. Answer *any three* of the following questions: 2×3=6

(a) What do you mean by ideal current source? Draw its I-V characteristics.

(b) Define 'peak value' and 'effective value' of an alternating quantity.

(c) Draw the phasor diagram of series R-L circuit.

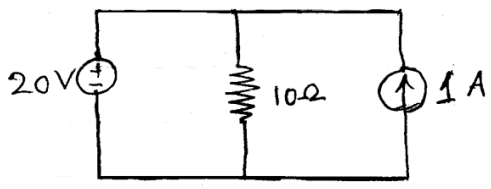
(d) What is an Impedance Triangle?

(e) For purely resistive circuit excited by a sinusoidal varying voltage, what are the phase angle and power factor?

(f) The resistance of two wires is 25Ω when connected in series and 6Ω when connected in parallel. Calculate the resistance of each wire.

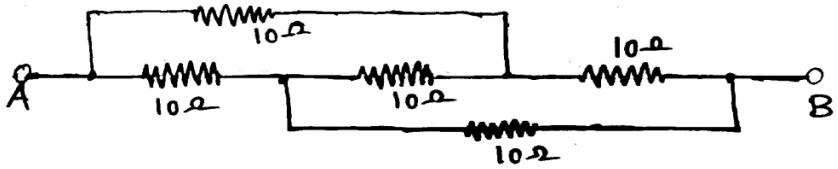
3. Answer *any two* of the following questions: 5×2=10

(a) State Superposition theorem. Determine the current through 10Ω resistor using this theorem. 2+3=5

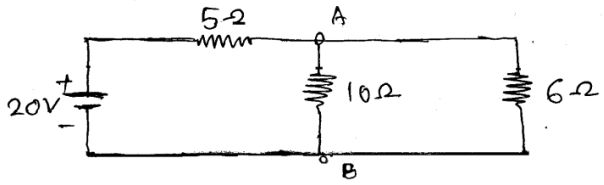


(b) Derive the transient response of series RL circuit with DC input. Sketch the variation of current and voltage across the inductor. 3+1+1=5

(c) Calculate the resistance between the terminals A–B.



(d) Using Norton's Theorem, find the current through 10Ω resistor for the given network. 5



4. Answer *any one* of the following questions: 6×1=6

(a) What are Z-parameters and Y-parameters? Derive the expression for Z-parameters in terms of Y-parameters. 2+4=6

(b) An RLC Series Circuit consists of R = 16Ω, L = 0·5mH and C = 2μF. Calculate the Quality factor (Q) at resonance, bandwidth and half power frequencies. 2+2+2=6

(c) Find the current through the branch a–b of the given network using Thevenin's theorem.