



VIT<sup>®</sup>

Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL ENGINEERING  
CONTINUOUS ASSESSMENT TEST – I  
WINTER SEMESTER 2022-2023 (Freshers)

Programme Name & Branch: BTech (Freshers), BIT

Course Code: BEEE102L

Course Name: Basic Electrical and Electronics Engineering

Faculty Name(s): Dr. Rani.C, Dr.R. Gnanavignesh, Dr. Mukul Chankaya

Emp.ID(s): 10304, 18893, 19722

Class Number(s): VL202230500371, 420, 390

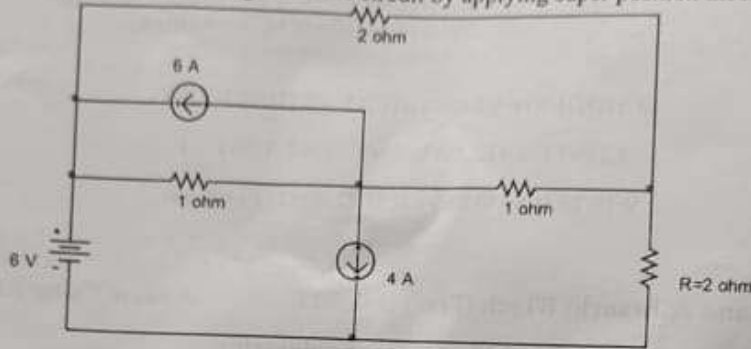
Exam Duration: 90 minutes

Maximum Marks: 50

General instruction(s): Answer All Questions

Q.No	Question	Marks
1.	Determine the current supplied by each battery in the circuit shown below by applying mesh current method.	10
2.	Create Thevenin's equivalent circuit at terminals a-b.	10

3. Determine the current through R in the circuit by applying super position theorem.



10

4. A) An alternating voltage  $v = 250 \sin 800t$  volts is applied across a series circuit containing a  $30 \Omega$  resistor and  $50 \mu\text{F}$  capacitor. Under steady state conditions, analyse and calculate (a) the circuit current (b) the p.d. across the resistor (c) the p.d. across the capacitor and (d) the phase angle between the source voltage and current. (4 marks)

10

B) The power taken by an inductive circuit when connected to a 120V, 50 Hz supply is 400W and the current is 8A. Calculate (a) the resistance, (b) the impedance, (c) the reactance, (d) the power factor, and (e) the phase angle between the source voltage and current. (6 marks)

5. A) Three impedances are connected in series across a 100 V, 2 kHz supply. The impedances comprise:

- (i) an inductance of  $0.45 \text{ mH}$  connected in series with a  $2 \Omega$  resistance,
- (ii) an inductance of  $570 \mu\text{H}$  connected in series with a  $5 \Omega$  resistance, and
- (iii) a capacitor of capacitance  $10 \mu\text{F}$  with a series resistance of  $3 \Omega$ .

Analyse the given circuit by assuming no mutual inductive effects between the two inductances and calculate (a) the circuit impedance, (b) the circuit current, (c) the phase angle between the source voltage and current (d) the voltage across each impedance. Also draw the phasor diagram. (6 marks)

10

B) The instantaneous value of voltage in an AC circuit is given by  $V(t) = 100 \sin (50\pi t - 0.523) \text{ V}$ . Analyse the given circuit and find (a) the peak-to-peak voltage, (b) the average voltage (c) the RMS voltage (d) the frequency and the phase angle between the source voltage and current. (4 marks)