

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

24Z360

DEPARTMENT OF PHYSICS

CONTINUOUS ASSESSMENT TEST- 1

Date: 4.11.2024

B.E – CSE/ AI&ML

23Z/N102 – Basics of Electrical & Electronic Systems

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

1. Answer **ALL** questions. Each Question carries 25 Marks.
2. In each question, subdivision **a** contains 1 question and the weightage of the question is 3 marks, subdivision **b(i)** and **b(ii)** carries 6 marks each and subdivision **c** carries 10 marks each.
3. Subdivisions (a) and (b) will be with no choice and Subdivision (c) may be with choice but not in more than 1 question.
4. _____ Data book / _____ table(s) may be permitted.
5. Course Outcome Table :

Qn. 1

CO. 1

Qn.2

CO 2

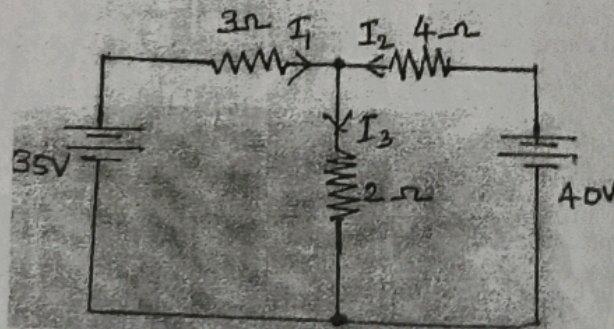
(1 x 3 mark = 3 marks)

1. a) Four resistors of 2Ω , 3Ω , 4Ω and 5Ω respectively are connected in parallel. What potential difference must be applied to the group in order that the total power of 100 watts may be absorbed?

(L3)

(2x6 mark = 12 marks)

- b i) In the network shown find the different branch currents by superposition theorem?



(L3)

- ii) Discuss the condition for maximum power transformation from a source to load in a given circuit.

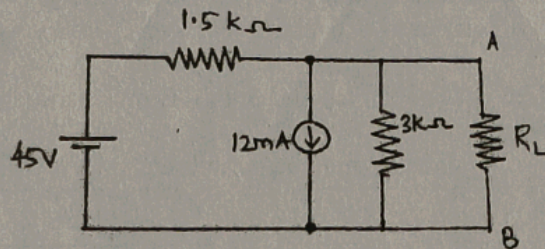
(L2)

(1x10 mark =10 marks)

- c. i) A Wheatstone's bridge ABCD is arranged as follows, $AB = 10\Omega$, $BC = 30\Omega$, $CD = 15\Omega$ and $DA = 20\Omega$. A 2V battery of internal resistance 2Ω is connected between A & C with A positive. A galvanometer of resistance 40Ω is connected between B & D. Find the magnitude and direction of galvanometer current. (L4)

(or)

- ii) Find the voltage across R_L when $R_L = 1k\Omega$. Use Thevenin's theorem to solve the problem.



(1x3 mark =3 marks)

- 2.a) Define RMS value of an alternating current and show that $I_{rms} = 0.707 I_m$. (L2)

(2x6 mark =12 marks)

- b i) A resistance R , an inductance $L = .01H$ and a capacitance C are connected in series. When an alternating voltage $V = 400 \sin(3000t - 20^\circ)$ is applied to the series combination, the current flowing is $10\sqrt{2} \sin(3000t - 65^\circ)$. Find the values of R & C . (L3)

- ii) Derive the voltages and currents in balanced three phase star connection with necessary phasor diagrams.

(L2)

(1x10 mark =10 marks)

- c) A coil of resistance 50Ω and inductance $0.318H$ is connected in parallel with a circuit comprising of 75Ω resistor in series with a $159\mu F$ capacitor. The circuit is connected to 240 V, 50Hz supply.

Calculate i) Supply current ii) Phase angle between supply current and applied voltage. Find also the resistance and reactance of series circuit which will take the same current at the same power factor as the parallel circuit. (L4)