BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

SEMESTER : I
SESSION : MO/2023

CLASS: B.TECH/IMSC.
BRANCH: BT/CIVIL/CHEMICAL/MECH/PIE/FT/PHYSICS

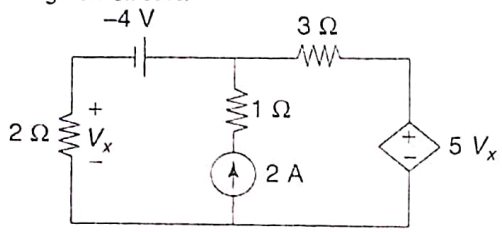
SUBJECT: EE101 BASIC OF ELECTRICAL ENGINEERING

FULL MARKS: 25

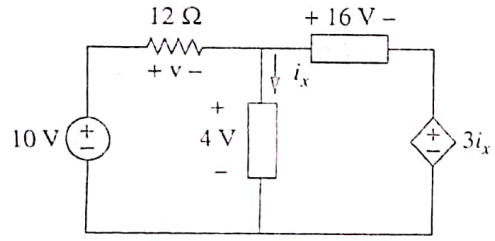
TIME: 02 Hours

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

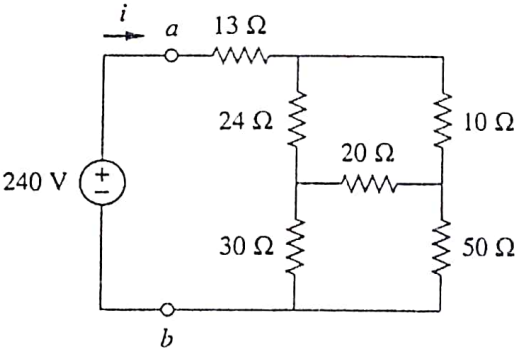
			CO	BL
Q.1(a)	Define (i) bilateral and unilateral elements (ii) active and passive elements.	[2]	CO1	BL1
Q.1(b)	Apply mesh analysis to calculate the current through the 3Ω resistor and the voltage Vx of the given circuit.	[3]	CO1	BL3



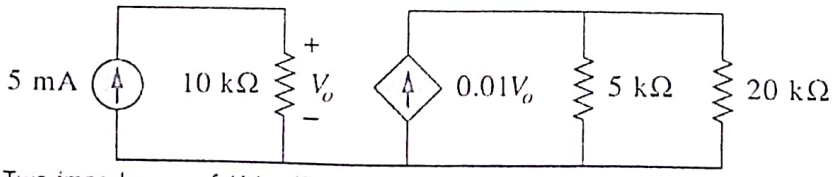
Q.2(a) Apply KVL/KCL to calculate the value of i_x and v in the given circuit. [2] CO1 BL3



Q.2(b) Apply star delta conversion, to estimate the equivalent resistance R_{ab} across the terminals a-b and the current i in the circuit below. [3] CO1 BL3



Q.3(a) For the circuit given below, calculate the current, voltage and power associated with the 20kΩ resistor. [2] CO1 BL3

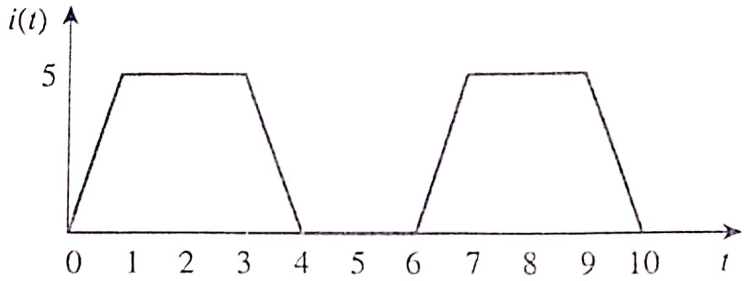


Q.3(b) Two impedances of (14 + j5) Ω and (18 + j10) Ω are connected in parallel across a 200 V, 50 Hz AC supply. Determine (i) the current in each branch and total current, (ii) the power factor of each branch, and (iii) draw the phasor diagram. [3] CO2 BL3

PTO

Q.4(a) Define the RMS value and average value of a signal. [2] CO2 BL1

Q.4(b) Calculate the RMS and average value of the waveform shown below: [3] CO2 BL3



Q.5(a) Define (i) Q-factor and (ii) Bandwidth [2] CO2 BL1

Q.5(b) A series resonant circuit has an impedance of 500 Ω at resonant frequency. Cut-off frequencies are 10 kHz and 100 Hz. Calculate (i) resonant frequency, (ii) value of L, C, and (iii) quality factor at resonant frequency. [3] CO2 BL3

:::::18/10/2023:::::