BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: BTECH **SEMESTER : II**
BRANCH: CSE/AI&ML/ECE/EEE **SESSION : SP/2023**

SUBJECT: EE101 BASIC OF ELECTRICAL ENGINEERING

TIME: 02 Hours **FULL MARKS: 25**

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
1.(a)	A bridge network ABCD is shown as in Fig. 1. Evaluate by star/delta transformation, the network resistance as viewed from the battery terminals.	2.5	CO1	BL3

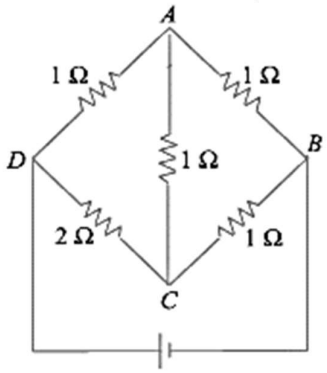

Fig. 1

1.(b)	Evaluate the current *i* and also the power and voltage of the dependent source in Fig. 2. All resistances are in ohms.	2.5	CO1	BL3

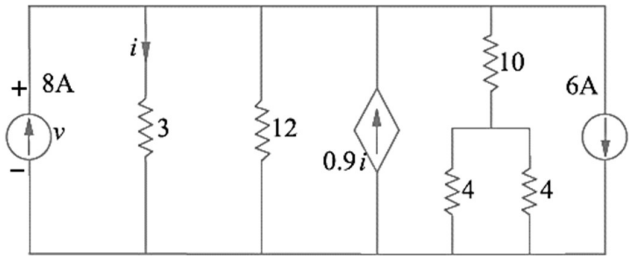

Fig. 2

2.	Evaluate the current *I*, by altering the two voltage sources to equivalent current sources and then apply Nodal Analysis for the Fig. 3	5	CO1	BL3

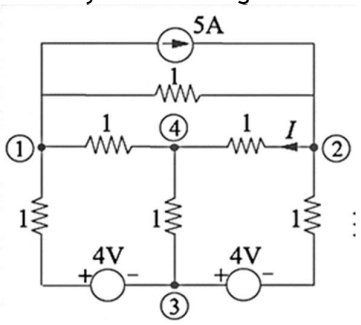

Fig. 3

PTO

3.	Analyze the three mesh currents as in Fig. 4 using Super-Mesh Principle.	5	CO1	BL4

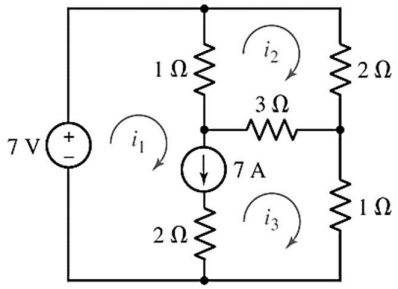

Fig. 4

4.(a)	When AC is passed through a pure inductor or capacitor, derive and justify why the average power consumed by a pure inductor or capacitor is zero? Also attain the maximum instantaneous power for any one of the loads.	2.5	CO2	BL3
4.(b)	For RL Series circuit attain the voltage triangle, impedance triangle and power triangle. Determine what will be observed in power consumption of the network, if p.f. is varied?	2.5	CO2	BL3 & BL4
5.(a)	Analyze the RMS Value, Average Value , Form Factor and Peak Factor of the current waveform as in Fig. 5.	2	CO2	BL4

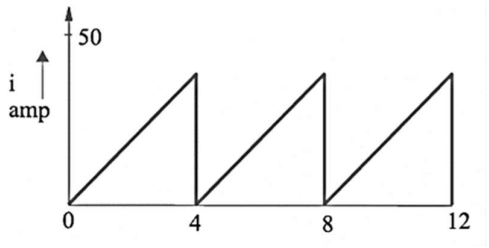

Fig.5

5.(b)	A tungsten filament bulb rated at 500 W, 100 V is to be connected in series with a capacitor. The supply being 220 V, 50Hz. Estimate : (i) The value of the capacitor such that the voltage and power consumed by the bulb are according to the rating of the bulb. (ii) The power factor of the current drawn from the supply. (iii) The phasor diagram of the circuit.	3	CO2	BL3

::::::29/05/2023::::::M