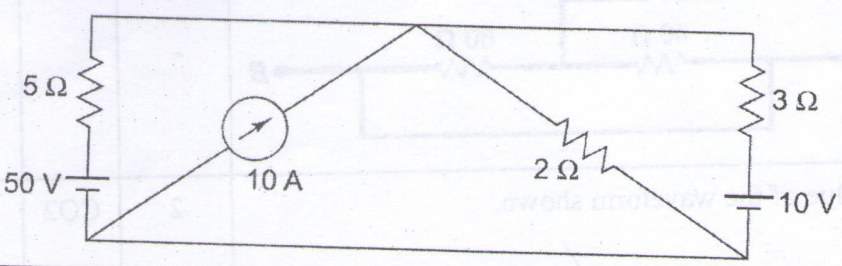
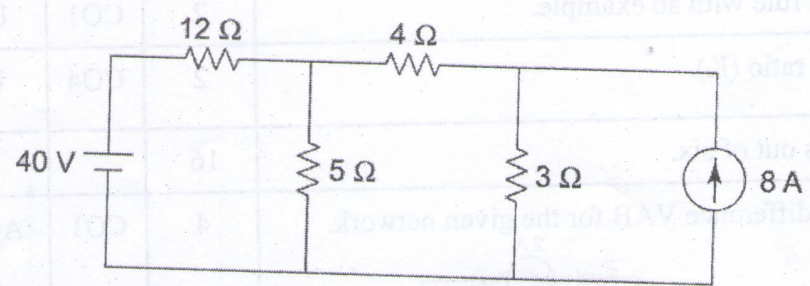


August, 2023 (Supplementary)
(B.Tech.) Program: All Branches
Examination: FY Semester: I
Course code: BSC105 Course Name: Basic Electrical Engineering
Date of Exam: 17/8/2023 Duration: 2.30 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max Marks	CO	BT level
Q 1	Solve any six questions out of eight	12		
i)	State and Explain KVL and KCL with an example.	2	CO1	R
ii)	Compare between R-L and R-C circuits.	2	CO2	An
iii)	Determine the resistance between terminal A & B.	2	CO1	App
iv)	Find the average value of the waveform shown.	2	CO2	App
v)	Compare star and delta connected three phase system.	2	CO3	An
vi)	What is a concept of slip in three phase induction motor.	2	CO5	R
vii)	Explain current division rule with an example.	2	CO1	U
viii)	Explain Transformation ratio (K).	2	CO4	U
Q.2	Solve any four questions out of six.	16		
i)	Determine the potential difference V_{AB} for the given network.	4	CO1	App

ii)	A voltage $v(t) = 150 \sin(314t + 50^\circ)$ is applied to a circuit. It causes a steady-state current to flow, which is described by $i(t) = 15 \sin(314t + 20^\circ)$. Determine the power factor and average power delivered to the circuit.	4	CO2	App
iii)	Explain principle of operation of three phase induction motor.	4	CO5	R
iv)	Single-phase 50 Hz transformer has 80 turns on the primary winding and 280 turns in the secondary winding. The voltage applied across the primary winding is 240 V at 50 Hz. Calculate (i) maximum flux density in the core, and (ii) induced emf in the secondary. The net cross-sectional area of the core is 200 cm^2 .	4	CO4	App
v)	Find the power delivered by the 50 V source in the circuit by any method. 	4	CO1	App
vi)	A balanced delta-connected load of impedance $(8 - j6)$ ohms per phase is connected to a three-phase, 230 V, 50 Hz supply. Calculate (i) power factor, (ii) line current, and (iii) reactive power.	4	CO3	App
Q.3	Solve any two questions out of three.	16		
i)	Determine the current through 4Ω by using Superposition theorem. 	8	CO1	App
ii)	A 50 kVA, 4400/220 V transformer has $R_1 = 3.45 \Omega$, $R_2 = 0.009 \Omega$. The reactances are $X_1 = 5.2 \Omega$ and $X_2 = 0.015 \Omega$. Calculate for the transformer, (i) full-load currents on primary and secondary side, (ii) equivalent resistances, reactances, impedances referred to primary side and secondary side and (iii) total copper loss using individual resistances and equivalent resistances.	8	CO4	App

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iii)	Two circuits, the impedances of which are given by $Z_1 = (6 + j8) \Omega$ and $Z_2 = (8 - j6) \Omega$, are connected in parallel. If the applied voltage to the combination is 100 V, find (i) current and pf of each branch, (ii) overall current and pf of the combination, and (iii) power consumed by each impedance.	8	CO2	App
Q.4	Solve any two questions out of three.	16		
i)	An R-L-C series circuit with a resistance of 20Ω , inductance of 0.4 H and a capacitance of $20 \mu\text{F}$ is supplied with 200 V supply at variable frequency. Find the following w.r.t. the series resonant circuit: (i) frequency at which resonance takes place (ii) current (iii) power (iv) power factor (v) voltage across R-L-C at that time (vi) quality factor (vii) half-power points (viii) resonance and phasor diagrams	8	CO2	App
ii)	Determine the value of current flowing through the 10Ω resistor by Thvenin's theorem. Find R_{Th} and V_{Th}	8	CO1	App
iii)	Draw and explain Two-wattmeter method to measure power in three phase system with the help of phasor diagram. Also, explain power factor calculation in three phase system. Assume star or delta connected load.	8	CO3	App
