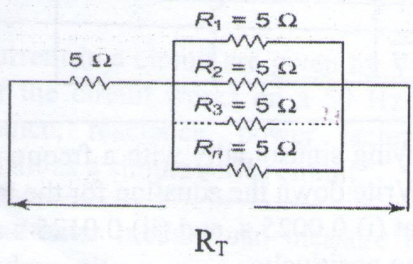
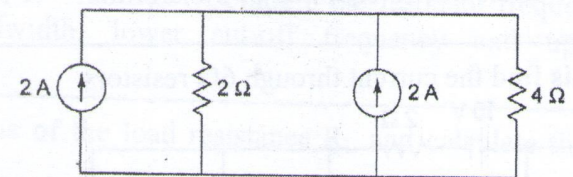


K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

<i>SUP</i> Contant Jan 2024 (Feb / Mar 2024) Program: B.Tech. Scheme II Examination: FY Semester: I Course Code: BSC105 and Course Name: Basics of Electrical Engineering	
Date of Exam: 05-03-2024	Duration: 2.5 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)	Find the total resistance for the given circuit. (Take $n = 4$) 	2	CO1	An
ii)	What is resonance in series RLC circuit?	2	CO2	U
iii)	Convert a given circuit into a single voltage source and single resistance. 	2	CO1	An
iv)	A voltage of 125 V at 50 Hz is applied across a resistor connected in series with a capacitor. The current is 2.2 A. The power loss in the resistor is 96.8 W. Calculate the resistance.	2	CO2	An
v)	Three identical coils each of $[4.2 + j5.6]$ ohms are connected in star across a 415 V, 3-phase, 50 Hz supply. Determine (i) V_{ph} , (ii) I_{ph} , and (iii) power factor.	2	CO3	An
vi)	What is the phase line relation in delta connected system?	2	CO3	U
vii)	Explain transformation ratio (K) of transformer.	2	CO4	U
viii)	Explain the phasor diagram for ideal single-phase transformer.	2	CO4	U

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Supplementary Exam Feb/Mar 2024

Program: B.Tech. Scheme II

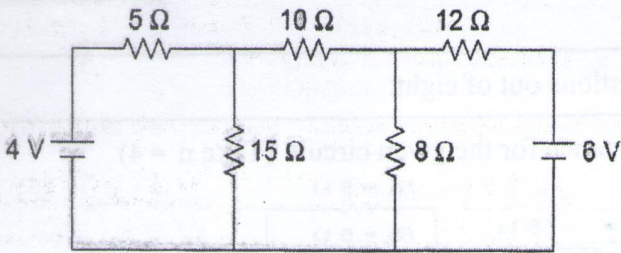
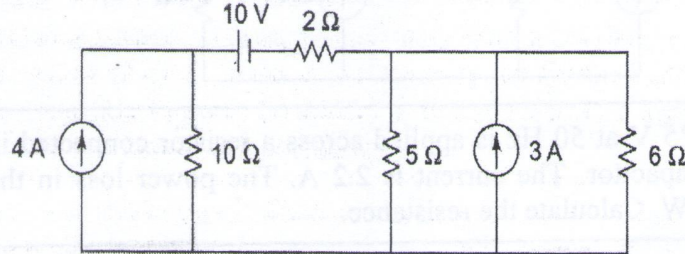
Examination: FY Semester: I

Course Code: BSC105 and Course Name: Basics of Electrical Engineering

Date of Exam: 05-03-24

Duration: 2.5 Hours

Max. Marks: 60

Q.2	Solve any four questions out of six.	16		
i)	Find the value of current flowing through the $8\ \Omega$ resistor by using Superposition theorem. 	4	CO1	An
ii)	An alternating current varying sinusoidally with a frequency of 50 c/s has a rms value of 20 A. Write down the equation for the instantaneous value and find this value at (i) 0.0025 s, and (ii) 0.0125 s after passing through zero and increasing positively.	4	CO2	An
iii)	What are the advantages, disadvantages, and applications of three phase induction motor?	4	CO5	U
iv)	What is transformer? Derive EMF equation of transformer.	4	CO4	U
v)	Using Nodal analysis find the current through $6\ \Omega$ resistors. 	4	CO1	An
vi)	A balanced load of phase impedance $100\ \Omega$ and power factor 0.8 is connected in delta to a 400V, 3-phase supply. Calculate i) resistance and reactance per phase, ii) line current iii) reactive power and iv) apparent power.	4	CO3	An

Supplementary Exam (Feb/Mar 2024)

Program: B.Tech. Scheme II

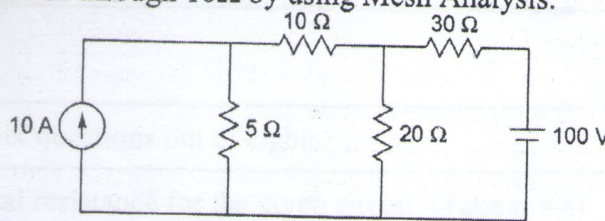
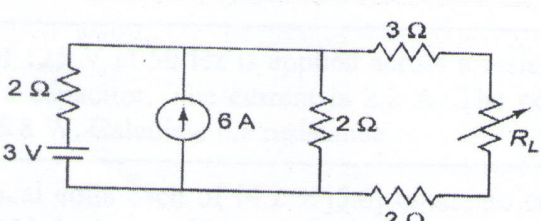
Examination: FY Semester: I

Course Code: BSC105 and Course Name: Basics of Electrical Engineering

Date of Exam: 05-03-24

Duration: 2.5 Hours

Max. Marks: 60

Q.3	Solve any two questions out of three.	16		
i)	<p>Find the current through 10Ω by using Mesh Analysis.</p> 	8	CO1	An
ii)	<p>The voltage and current in a circuit are given by $\vec{V} = 150 \angle 30^\circ$ V and $\vec{I} = 2 \angle -15^\circ$ A. If the circuit works on a 50 Hz supply, determines impedance, resistance, reactance, power factor and power loss considering the circuit as a simple series circuit.</p>	8	CO2	An
iii)	<p>Prove that two wattmeter method can measure the power in three phase star connected circuit.</p>	8	CO3	U
Q.4	Solve any two questions out of three.	16		
i)	<p>A series RLC circuit has the following parameter values: $R = 10\Omega$, $L = 0.014$ H, $C = 100\mu\text{F}$. Compute the resonant frequency, quality factor, bandwidth, lower cut-off frequency and upper cut-off frequency.</p>	8	CO2	An
ii)	<p>Find the value of the load resistance R_L and calculate the maximum power.</p> 	8	CO1	An
iii)	<p>A 5 kVA, 240/2400 V, 50 Hz single-phase transformer has the maximum value of flux density as 1.2 Teslas. If the emf per turn is 8, calculate (i) number of primary turns and secondary turns, (ii) cross-sectional area of the core, and (iii) primary and secondary current at full load.</p>	8	CO4	An
