APPENDIX-III

Question Paper Template (For Online Examination)

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

~~No~~ ~~April - May 2022~~ Nov./Dec. 2021 (To be conducted in March 2022)

Program: B.Tech

Examination: FY Semester: I

Course Code: **1UBSC105** and Course Name: **Basics of Electrical Engineering**

Duration: 03 Hours Max. Marks: 60

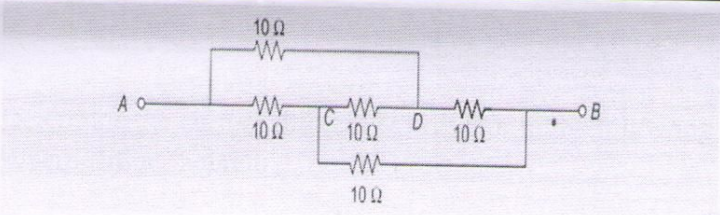
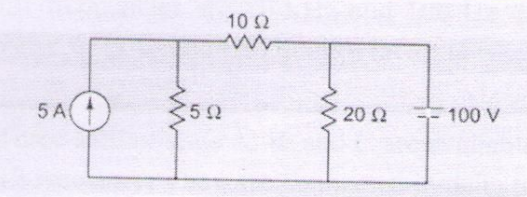
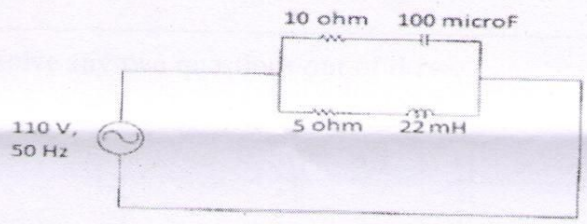
Instructions:

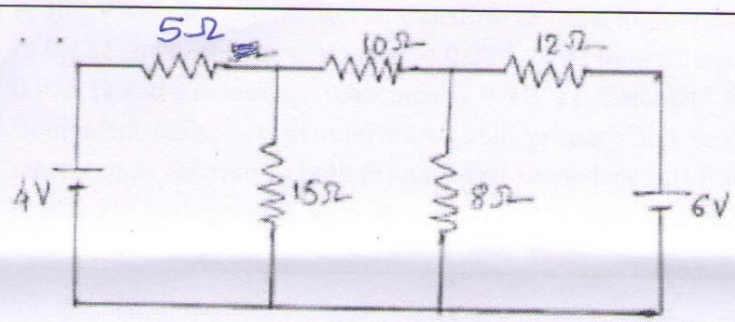
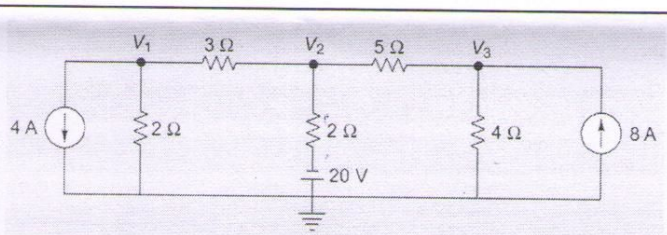
(1)All questions are compulsory.

(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 Thevenin Theorem	**2**	1	2
ii)	Derive the condition for maximum power transfer through network	**2**	1	2
iii)	State Superposition Theorem	**2**	1	2
iv)	Define form factor and peak factor	**2**	2	2
v)	State Relationship between Line voltage, Phase Voltage, Line current and Phase current for balanced star and delta connected system	**2**	3	2

vi)	Give the comparison between series and parallel resonance circuit	**2**	2	2
vii)	State the working principle of Transformer	**2**	4	2
viii)	Define slip in Induction Motor	**2**	5	2
Q.2	**Solve any four questions out of six**	**16**		
i)	A coil having R=10 Ω, L= 40mH is connected in series with a capacitor of 20uF across 230V,50Hz supply. Calculate i) Impedance of the coil ii) Current and Reactive power iii) Draw neat phasor diagram showing all voltages and current.	**4**	2	3
ii)	 Find equivalent resistance between terminal A and B	**4**	1	3
iii)	 Find the value of current flowing through the 20 Ω resistor	**4**	1	3
iv)	 A coil having Resistance 5 Ω and inductance 22 mH are connected in parallel with another impedance having R=10 Ω and C=100 uF . If the applied voltage to the combination is 110V, and f=50Hz. Calculate i) Current and power factor of each branch ii) Overall current and power factor of the combination iii) Power consumed by each branch.	**4**	2	3

v)	Compare between Star and Delta connection	**4**	3	2
vi)	What are the losses in transformer? Explain why the ratings of transformer in KVA not in KW.	**4**	4	2
Q.3	**Solve any two questions out of three.**	**16**		
i)	 Determine the current through 8Ω resistor in the following Network by superposition theorem	**8**	1	3
ii)	A series resonant circuit has an impedance of 500 Ω at resonant frequency. Cut-off frequencies are 10 kHz and 100 Hz. Determine (i) resonant frequency, (ii) value of L, C, and (iii) quality factor at resonant frequency.	**8**	2	3
iii)	Three similar coils A, B, and C are available. Each coil has a 9 Ω resistance and a 12 reactance. They are connected in delta to a three-phase, 440 V, 50 Hz supply. Calculate for this load, the (i) phase current, (ii) line current, (iii) power factor, (iv) total kVA, (v) active power, and (vi) reactive power. If these coils are connected in star across the same supply, calculate all the above quantities.	**8**	3	3
Q.4	**Solve any two questions out of three.**	**16**		
i)	 Calculate the current through the 5 Ω resistor using Nodal analysis .	**8**	1	3

ii)	A pure resistor R, a choke coil and a pure capacitor of 15.91 mF are connected in series across a supply of V volts and carries a current of 0.25 A. The voltage across the choke coil is 40 V, the voltage across the capacitor is 50 V and the voltage across the resistor is 20 V. The voltage across the combination of R and the choke coil is 45 V. Calculate (i) supply voltage, (ii) frequency, and (iii) power loss in the choke coil.	**8**	2	3
iii)	A 30 kVA, 2400/120 V, 50 Hz, transformer has a high-voltage winding resistance of 0.1 Ω and a leakage reactance of 0.22 Ω. The low-voltage winding resistance is 0.035 Ω and the leakage reactance is 0.012 Ω. Calculate for the transformer: (i) Equivalent resistance as referred to both primary and secondary (ii) Equivalent reactance as referred to both primary and secondary (iii) Equivalent impedance as referred to both primary and secondary (iv) Copper loss at full load.	8	4	3