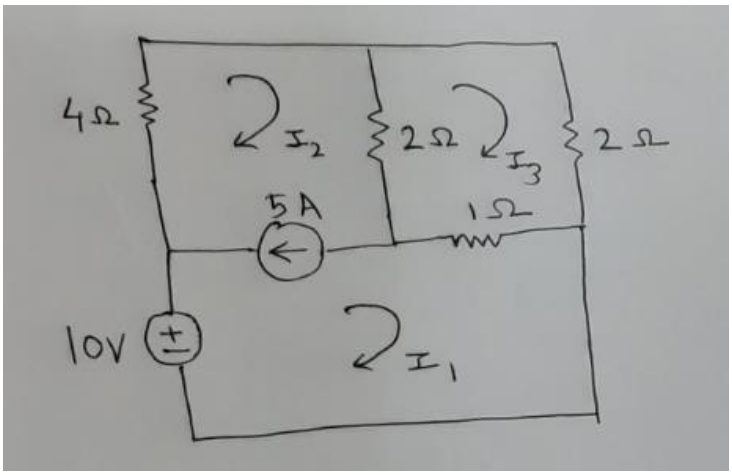
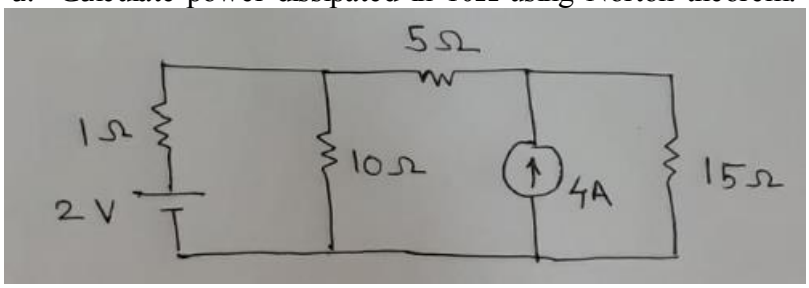
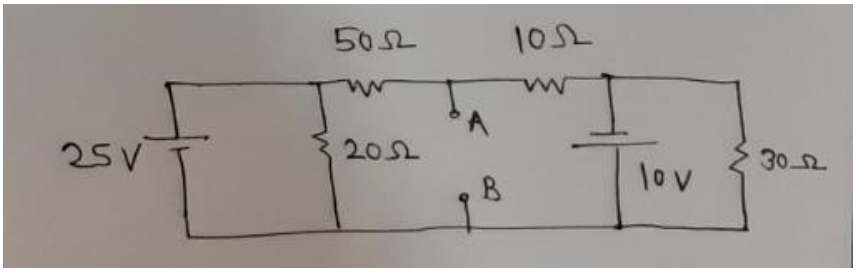
SOMAIYA VIDYAVIHAR UNIVERSITY

Semester: September 2020 – January 2021 **Examination: ESE Examination**		
Programme code: 01 **Programme: B.TECH**	**Class:** FY	**Semester:** I **(SVU 2020)**
Name of the Constituent College: **K. J. Somaiya College of Engineering**	**Name of the Department** COMP/IT	
Course Code: 116U06C107	**Name of the Course:** Elements of Electrical and Electronics Engineering	
Duration : 1 Hour 45 Minutes	**Maximum Marks : 50**	
Instructions: **1)Draw neat diagrams 2) Assume suitable data if necessary**		

Question No.		Max Marks
Q1 (A)	Objective / MCQ type 1. Device used to couple input from AC source to rectifier a. Amplifier b. Transformer c. Filter d. Rectifier 2. The transistor operates in the cut-off region when a. Emitter and collector both junctions forward biased. b. Emitter and collector both junctions reversed biased. c. Emitter junction is forward biased and collector junction is reversed biased. d. Emitter junction is reversed biased and collector junction is forward biased. 3. Direction of rotation of motor is determined by _____ a. Faraday's law b. Lenz's law c. Coulomb's law d. Fleming's left-hand rule 4. A fan draws 320 mA from a 230V AC supply at 0.75 power factor. Find the active power drawn by the fan? a. 55.2 W b. 55.2 KW c. 73.59W d. 73.59 KW 5. In pure inductive circuit the current will a. Lag behind the voltage by 90^0 b. Leads the voltage by 90^0. c. Remains in phase with the voltage d. Lag or leads the applied voltage	10

	6. In two wattmeter method, for what value of power factor one wattmeter reads opposite to that of the another a. 45^0 b. 60^0 c. 90^0 d. 180^0 7. Which part will surely tell that given motor is DC motor and not an AC type? a. Winding b. Shaft c. Commutator d. Stator 8. Hysteresis loss in transformer is proportional to a. f b. f^2 c. f^3 d. $f^{1.5}$ 9. Bandwidth of an ideal operational amplifier is a. Low b. High c. Infinite d. Medium 10. Find the Q factor when the voltage across the capacitor is 2000V and the source voltage is 200V. a. 10 b. 20 c. 30 d. 40	
Q1 (B)	Attempt any FIVE questions out of the following (any 5 out of 7) 1. Draw and explain inverting mode of operational amplifier? 2. Derive the emf equation for single phase transformer. 3. An alternating voltage is given by V=141.4 sin 314t, find frequency, rms value, average value, instantaneous value of voltage at t = 3 msec. 4. Draw and explain output characteristics of a npn transistor in CE configuration. 5. Explain the application of zener diode as a voltage regulator. 6. List the advantages of Three Phase AC over single phase AC. 7. Draw impedance triangle of a series RLC circuit.	10

Q2.	a. Find I_1, I_2 and I_3 in the given electrical network  	10
	OR	
	a. Calculate power dissipated in 10Ω using Norton theorem.  	05
	b. Find the Thevenin's equivalent circuit across terminal AB.  	05
Q. 3a	1. A 100Ω resistor, shunted by a 0.4H inductor is in series with a capacitor C. Voltage of 250V, 50Hz is applied to the circuit. Find the value of C to give unity power factor. **OR** 2. A series R-L-C circuit has the following parameter value. R= 10Ω, L=0.014H and C=100μF. Compute the following i. Resonant frequency in rad/sec ii. Quality factor iii. Bandwidth. iv. lower and upper frequency points of the bandwidth v. maximum values of the voltage appearing across the capacitor, if the voltage V(t) = 1 sin (1000t) is applied to the R-L-C circuit.	05

Q3 b	415 V, 50 Hz, 3 Φ voltage is applied to three Φ star connected identical impedances. Each impedance consists of a resistance of 15Ω, capacitance of 177 μF and inductance of 0.1H in series. Find i. Phase current ii. Line Current iii. Power factor iv. Active Power v. Reactive Power	05
Q4 a.	Draw the phasor diagram considering winding resistance and magnetic leakage when the load is resistive.	05
Q4 b.	Explain full wave bridge rectifier using a capacitor filter.	05