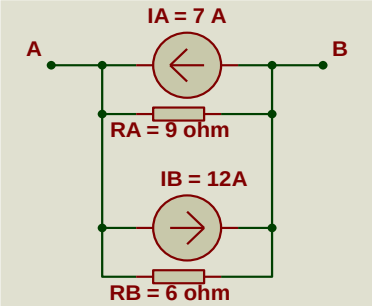
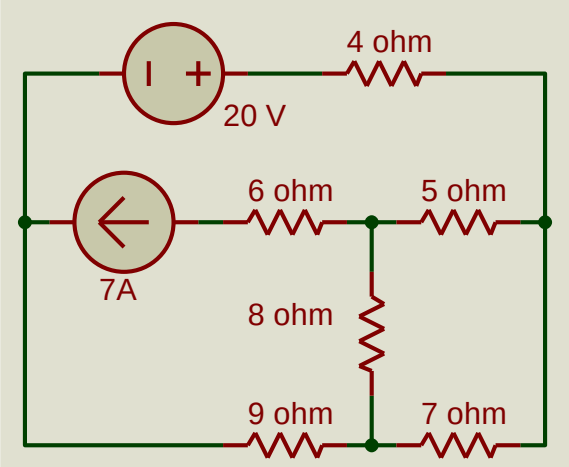
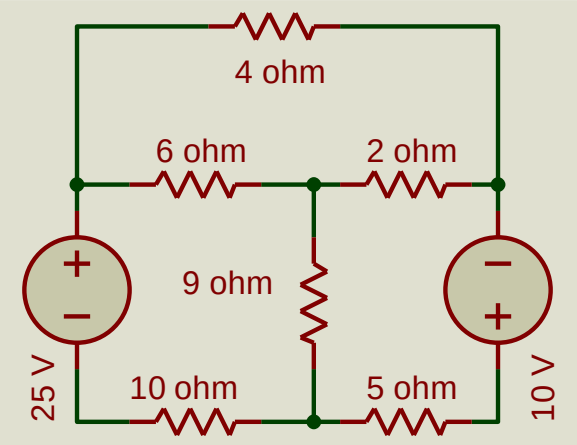
SOMAIYA VIDYAVIHAR UNIVERSITY

Semester: October 2021 – February 2022 **Examination: ESE Examination**		
Programme code: 01 **Programme: B. TECH**	**Class:** FY/~~SY/TY/LY~~	**Semester:** I/~~II/III/IV/V/VI/VII/VIII~~ **(SVU 2020)**
Name of the Constituent College: **K. J. Somaiya College of Engineering**	**Name of the Department** COMP/IT/MECH	
Course Code: 116U06C107	**Name of the Course:** Element of Electrical & Electronics Engineering	
Duration : 1 Hour 45 Minutes (15 minutes extra for uploading)	**Maximum Marks : 50**	
Instructions: 1)Draw neat diagrams 2) Assume suitable data if necessary		

Q. No.		Max Marks
Q1 (A)	I. If two current sources I_A (**7A** and internal resistance of **9 Ω**) and I_B (**12A** and internal resistance of **6 Ω**) are connected as shown below, then equivalent voltage source between terminal A & B will be ____.  **A.** V_{AB} = -18V, 3.6 Ω **B.** V_{AB} = +18V, 3.6 Ω **C.** V_{AB} = -45V, 15 Ω **D.** V_{AB} = +45V, 15 Ω	10
	II. In a OP-AMP based inverting amplifier, if feedback gain is 4 and input signal is 2V peak to peak AC, then output is _____. **A.** 8V peak to peak and in phase with input signal **B.** 8V peak and out of phase with input signal **C.** 8V peak and in phase with input signal **D.** 8V peak to peak and out of phase with input signal	
	III. In a Zener diode, if breakdown voltage is high, then _____. **A.** both P and N are heavily doped **B.** P-type is heavily doped and N-type is lightly doped **C.** both P and N are lightly doped **D.** P-type is lightly doped and N-type is heavily doped	
	IV. If line voltage of 450 V, is supplied to 3Φ star type balanced network of pure resistance 15 Ω/phase, then line current will be ___A. **A.** 10 **B.** 51.96 **C.** 30 **D.** 17.32	

	V. Which DC motor is most suitable for elevators? **A.** DC cumulative compound motor **B.** DC differential compound motor **C.** DC series motor **D.** DC shunt motor	
	VI. A circuit with a resistor, inductor and capacitor in series is resonant of f_0 Hz. If all the component values are now doubled, the new resonant frequency is. **A.** $2f_0$ **B.** $f_0/4$ **C.** $f_0/2$ **D.** f_0	
	VII. If each branch of a delta network has resistance 18 Ω, then each branch of the equivalent star type network has resistance __ Ω. **A.** 3 **B.** 6 **C.** 9 **D.** 54	
	VIII. A parallel resonant circuit consists of iron core coil of R Ω resistance and L H inductance in parallel with capacitor of C μF, behaves like __. **A.** a pure resistor of value much higher than R **B.** a pure resistor of value R **C.** an open circuit **D.** a short circuit	
	IX. In the two wattmeter method of measurement, if wattmeter readings are equal and opposite, then phase angle of the load is ___. **A.** 60˚ **B.** 90˚ **C.** 0˚ **D.** 30˚	
	X. The inductive reactance of a 1Φ transformer depends on _____. **A.** EMF **B.** MMF **C.** magnetic flux **D.** leakage flux	
Q1 (B)	Attempt any **FIVE** questions out of the following **SEVEN** questions. I. Convert star network of $\mathbf{R_A=8\,\Omega, R_B=11\,\Omega}$ & $\mathbf{R_C=15\,\Omega}$ to equivalent delta network. II. What is addition of $\boldsymbol{I1 = 20Sin(\omega t + \frac{\pi}{4})}$, $\boldsymbol{I2 = 14Sin(\omega t - \frac{\pi}{6})}$? III. Draw input and output characteristics of a common-emitter amplifier. IV. What are advantages of Zener diode? V. Define superposition theorem. VI. A load resistance (RL Ω) is connected across 15V DC supply with internal resistance of 16 Ω. What is the maximum power that can be absorbed by the load resistance? VII. Compute quality factor in a parallel R-L-C resonant circuit where R= 9 Ω, L= 0.12 H and C= 330 μF.	10

Q. 2	**Attempt any two questions** I. Draw phasor diagram of single phase transformer considering its winding resistance and magnetic leakages, when capacitive load is connected to it. II. Two wattmeters are used to measure input power of a 3Φ balanced delta circuit consisting of impedance (15+j10) Ω. If supply voltage is 400V, 3Φ AC then calculate readings of both the wattmeters. III. Draw neat circuit diagram of a single phase bridge rectifier and explain its working.	10
Q. 3	Calculate power absorbed in 9 Ω resistor in the following circuit using **mesh analysis** method.  **OR** Calculate current flowing through **4 Ω** resistor in the following circuit using **Norton's theorem**. 	10
Q. 4	An iron core coil is connected across a non-inductive resistance of **80 Ω.** When a **240 V, 50 Hz, 1Φ AC** supply is connected to the circuit, the coil draws current of **5 A** and total circuit current is **7 A**. Determine self-resistance and inductance of the coil, power absorbed by the coil and total power absorbed by the circuit.	10