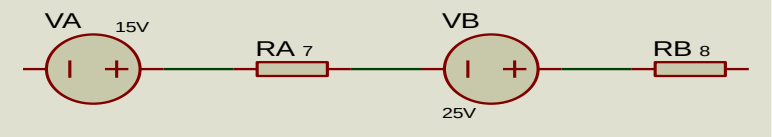
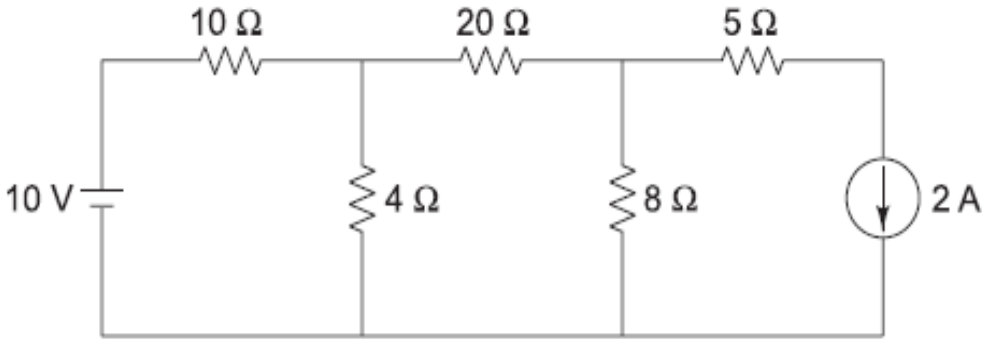
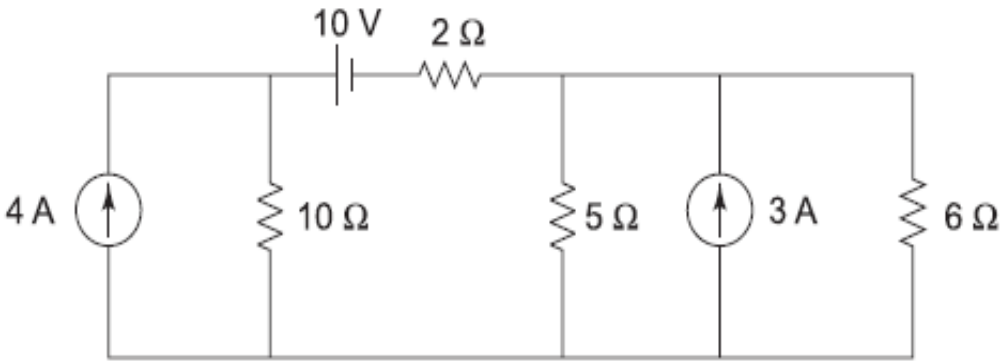
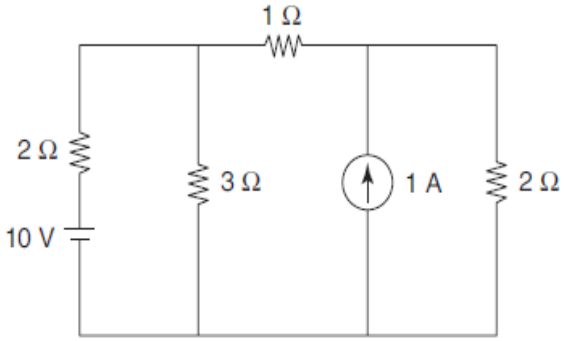
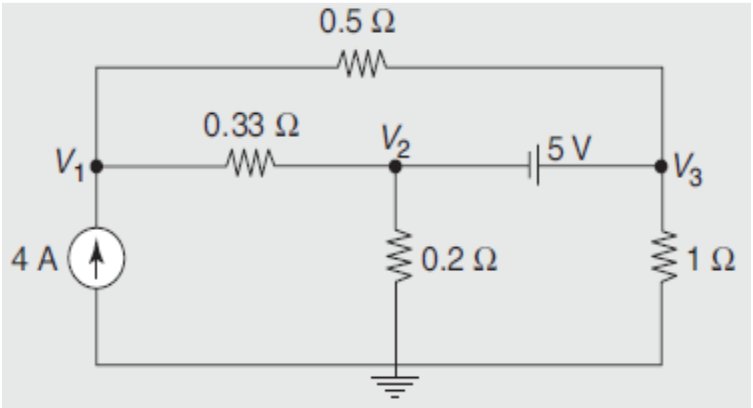
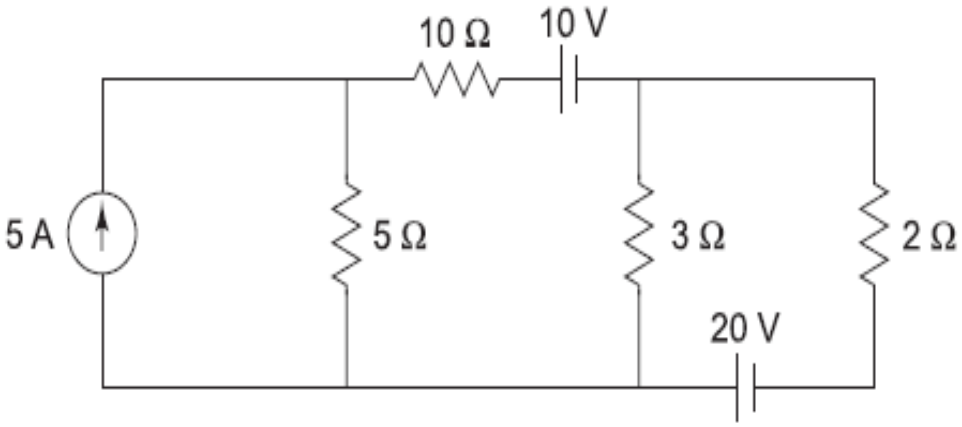
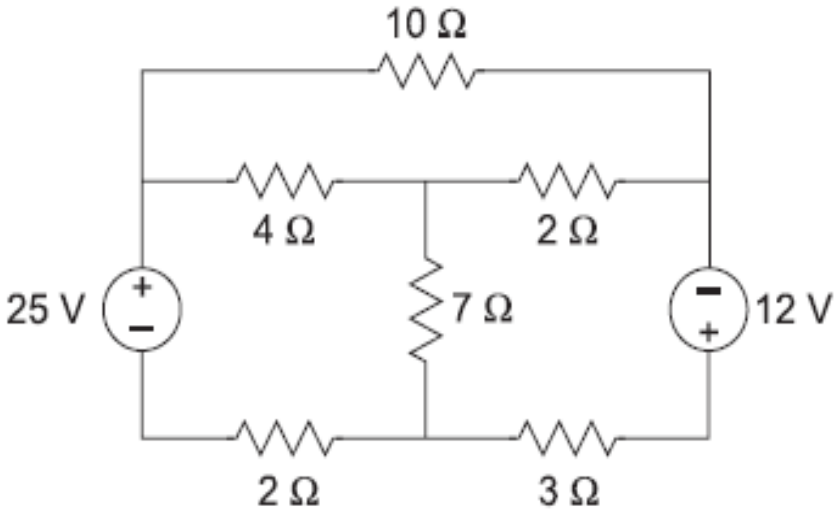
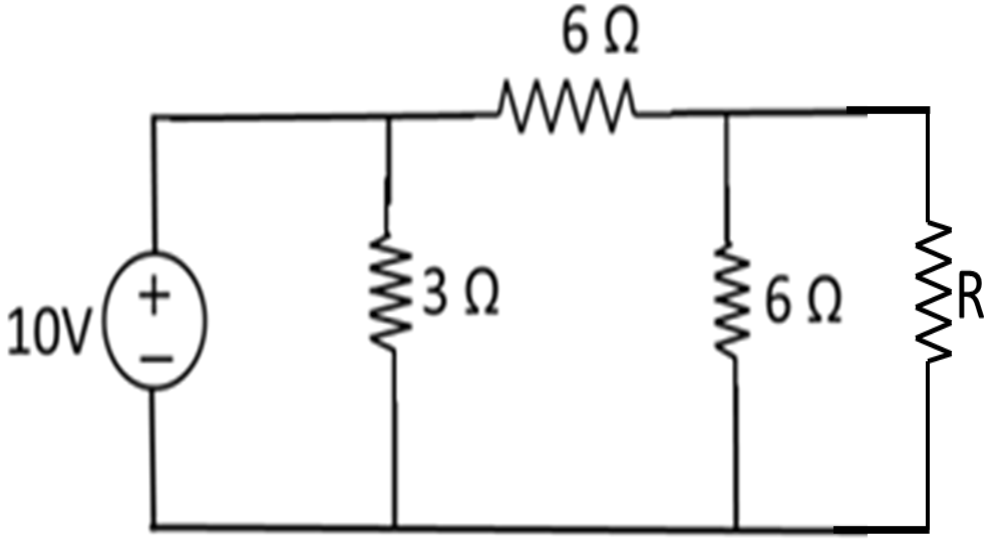
K. J. Somaiya College of Engineering, Mumbai-77
(A Constituent College of Somaiya Vidyavihar University)
Semester: **August – November 2020**
In-Semester Examination

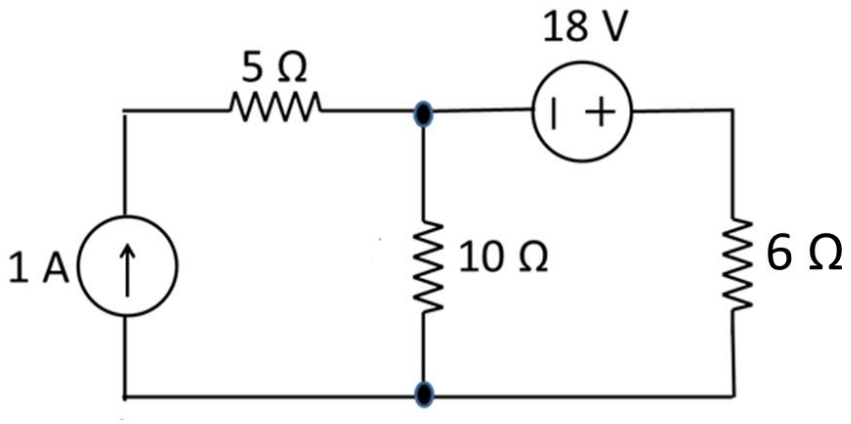
Class: FY B. Tech
Branch: C Group **Semester: I**
Full name of the course: Elements of Electrical and Electronics Engineering
Course Code: 116U06C107
Duration: 1hr. 35 min (attempting questions) + 20 min (uploading) Max. Marks: 30

Q. No	Questions	Marks
Q1	I. An AC signal represented by v=25 sin (100πt) is to be rectified. The minimum peak inverse voltage rating of the diodes used in full wave rectifier with center-tap transformer and bridge rectifier must be _____ A. 25 V and 25 V B. 50 V and 25 V C. 50V and 50V D. 25 V and 50 V	10 marks (1 MARK EACH)
	II. A full wave rectifier with capacitor filter is used in design a power supply with input supply frequency 50Hz and load resistance of 1000 Ω. The ripple factor of 0.01 can be ensured with capacitor value of _____ μF. A. **110.8** B. **288.7** C. **577.4** D. **821.6**	
	III. In the forward active mode of bipolar junction transistor, the base emitter junction and base collector are _____. A. **Forward bias and forward bias** B. **Forward bias and reverse bias** C. **Reverse bias and forward bias** D. **Reverse bias and reverse bias**	
	IV. The doping concentrations to ensure Zener breakdown in diode is _____. A. less than 10^{16} cm^{-3} B. greater than 10^{17} cm^{-3} C. less than 10^{10} cm^{-3} D. between 10^{10} to 10^{16} cm^{-3}	
	V. In the bipolar junction transistor, the relative doping of emitter, base and collector are _____. A. low, high and moderate respectively B. high, low and moderate, respectively C. high, moderate and low respectively D. low, high and moderate, respectively	
	VI. In common emitter BJT voltage amplifier the output voltage at collector is _____. A. in phase with input voltage and has positive DC shift B. in phase with input voltage and has zero DC shift C. 180^0 out of phase with input voltage and has positive DC shift D. 180^0out of phase with input voltage and has zero DC shift	
	VII. If each branch of a delta circuit has resistance $\sqrt{3}R$, then each branch of the equivalent star type circuit has resistance ____ A. $\boldsymbol{R}/\sqrt{\boldsymbol{3}}$ B. $3R$ C. $\boldsymbol{\sqrt{3}R}$ D. $R/3$	
	VIII. The nodal method of circuit analysis is based on _____ . A. **KVL and Ohm's law** B. **KCL and Ohm's law** C. **KCL and KVL** D. **KCL, KVL and Ohm's law**	

	IX. An ideal current source has _____. A. **Zero internal resistance** B. **A small internal resistance** C. **Infinite internal resistance** D. **A large internal resistance**	
	X. If two voltage sources V_A (**15V** and internal resistance of **7 Ω**) and V_B (**25V** and internal resistance of **8 Ω**) are connected in series addition as shown below, then equivalent current source will be _____ .  A. **2.667 A, 15 Ω** B. **5.268, 15 Ω** C. **2.667 A, 3.733 Ω** D. **5.268 A, 3.733 Ω**	
Q2 A	Calculate voltage drop across **8 Ω** resistor in the given following electrical network using **Mesh Analysis**. Write mesh equations Calculate mesh currents Calculate current through **8 Ω** resistor  **OR** Calculate current flowing through **5 Ω** resistor in the given following electrical network using **Nodal Analysis.** Write node equations Calculate node voltages Calculate current through **5 Ω** resistor 	2 marks 2 marks 1 mark 2 marks 2 marks 1 mark

Q2 B	Calculate current flowing through **3 Ω** resistor in the given following electrical network using **Super-Mesh Analysis**. Write mesh equations Calculate mesh currents Calculate current through **3 Ω** resistor  **OR** Calculate node voltages V_1, V_2 and V_3 in the given following electrical network using **Super-Node Analysis**. Write node equations Calculate node voltages  	 2 marks 2 marks 1 mark 3 marks 2 marks
Q3 A	Calculate current flowing through **2 Ω** resistor in the given following electrical network using **Norton's Theorem**. Calculate short circuit current Calculate Norton's equivalent resistance Calculate current through **2 Ω** resistor  	 2 marks 2 marks 1 mark

	OR Calculate power absorbed by **10 Ω** resistor in the given following electrical network using **Thevenin's Theorem**. Calculate Thevenin's voltage Calculate Thevenin's equivalent resistance Calculate power absorbed by **10 Ω** resistor  	2 marks 2 marks 1 mark
Q3 B	what should be value of R for maximum power transfer? Find maximum power delivered to R. Calculate Thevenin's voltage Calculate Thevenin's equivalent resistance Calculate power absorbed by **R.**  **OR**	2 marks 2 marks 1 mark

	Compute current flowing through **10 Ω** resistor using **superposition principles**. Calculate current flowing through **10 Ω** resistor when current source is present. Calculate current flowing through **10 Ω** resistor when current source is present. Calculate Total current flowing through **10 Ω** resistor. 	2 marks 2 marks 1 mark