

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

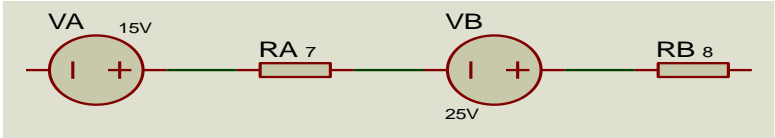
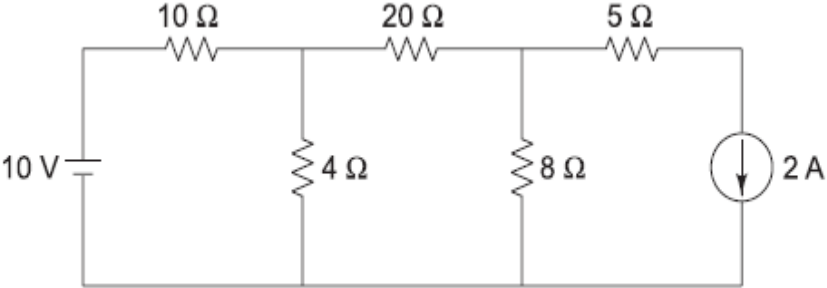
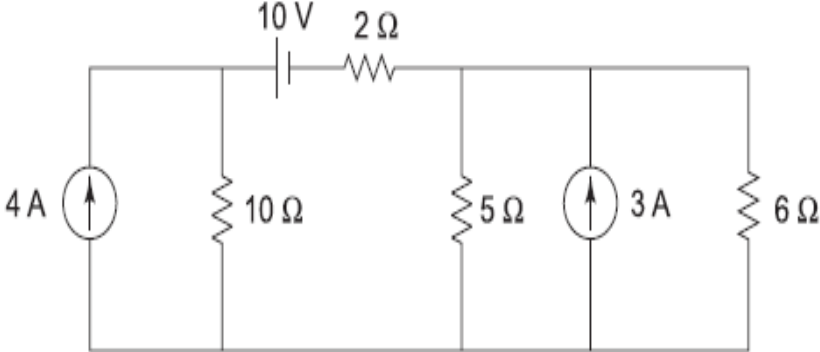
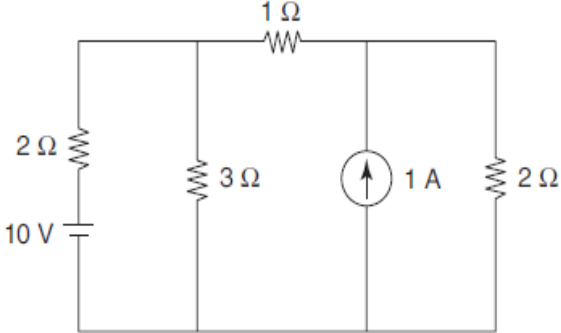
Semester: I

Full name of the course: Elements of Electrical and Electronics Engineering

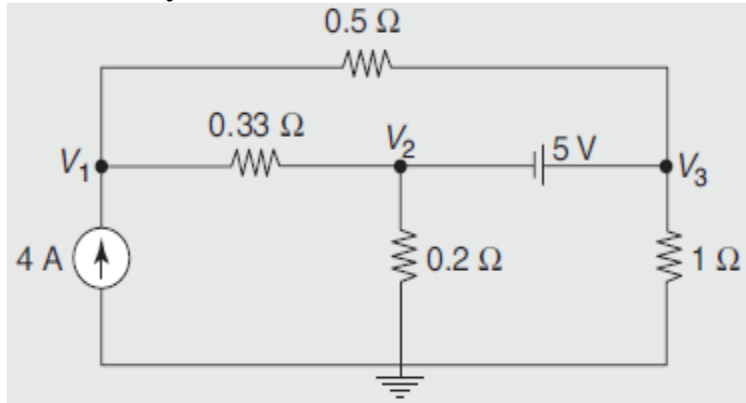
Course Code: 116U06C107

Duration: 1hr.15 min (attempting questions) +20 min (uploading) Max. Marks: 30

Q. No	Questions	Marks
Q1	<p>I. An AC signal represented by $v=25 \sin (100\pi t)$ 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</p> <p>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</p> <p>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</p> <p>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}</p> <p>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</p> <p>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° out of phase with input voltage and has positive DC shift D. 180° out of phase with input voltage and has zero DC shift</p> <p>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. $\frac{R}{\sqrt{3}}$ B. $3R$ C. $\sqrt{3}R$ D. $\frac{R}{3}$</p> <p>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</p>	10 marks (1 MARK EACH)

	<p>IX. An ideal current source has _____. A. Zero internal resistance B. A small internal resistance C. Infinite internal resistance D. A large internal resistance</p>	
	<p>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</p>	
<p>Q2 A</p>	<p>Calculate voltage drop across 8 Ω resistor in the given following electrical network using Mesh Analysis.</p>  <p style="text-align: center;">OR</p> <p>Calculate current flowing through 5 Ω resistor in the given following electrical network using Nodal Analysis.</p> 	<p>5 marks</p>
<p>Q2 B</p>	<p>Calculate current flowing through 3 Ω resistor in the given following electrical network using Super-Mesh Analysis.</p>  <p style="text-align: center;">OR</p>	<p>5 marks</p>

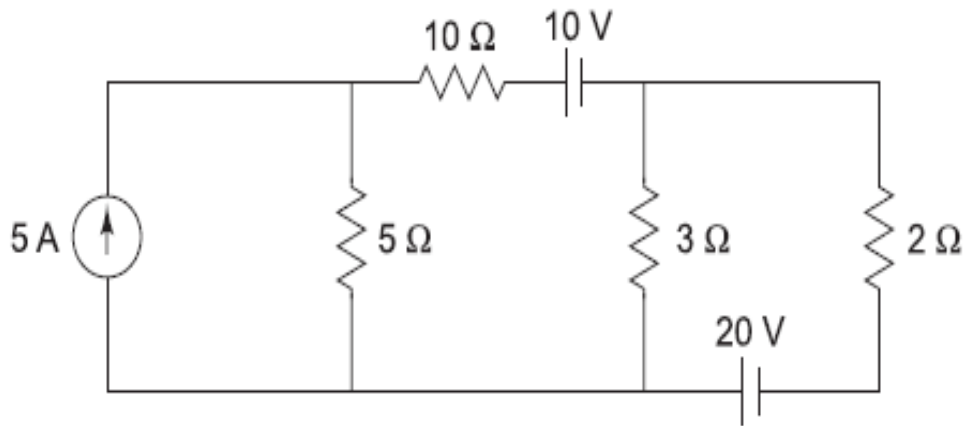
Calculate node voltages V_1 , V_2 and V_3 in the given following electrical network using **Super-Node Analysis**.



Q3
A

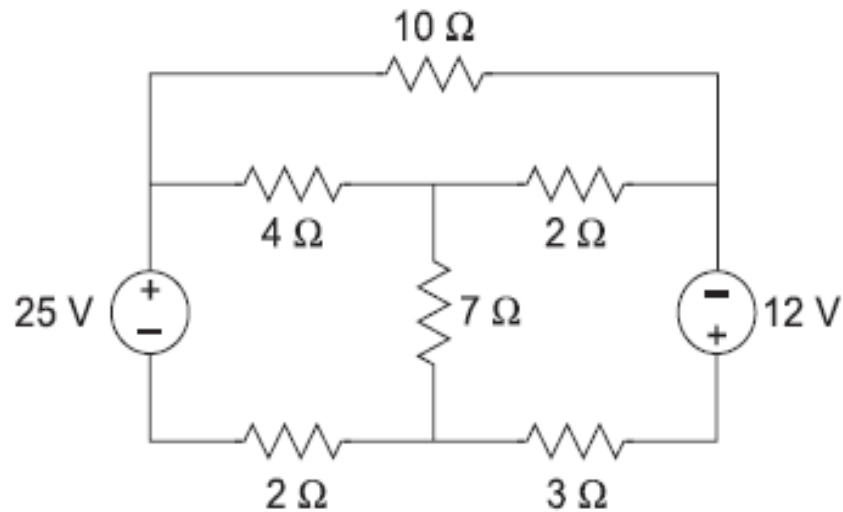
Calculate current flowing through $2\ \Omega$ resistor in the given following electrical network using **Norton's Theorem**.

5 marks



OR

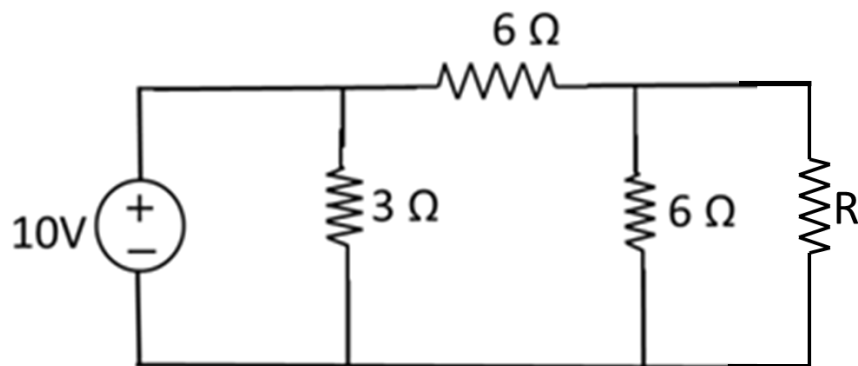
Calculate power absorbed by $10\ \Omega$ resistor in the given following electrical network using **Thevenin's Theorem**.



Q3
B

what should be value of R for maximum power transfer? Find maximum power delivered to R.

5 marks



OR

Compute current flowing through 10 Ω resistor using **superposition principles**.

