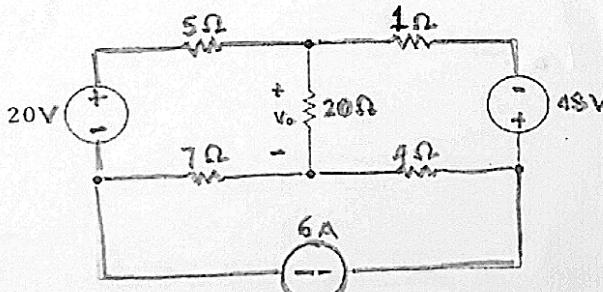
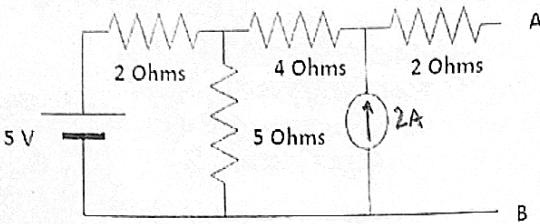
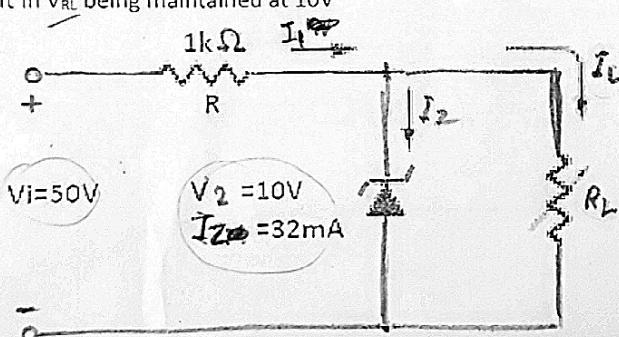


End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
 Course Name:<B.TECH>, Semester:<1st> Batch: <2024>
 (December, 2024)

Subject Code: BEC 101	Subject: Basics of Electrical and Electronics Engineering
Time :3 Hours	Maximum Marks :60

Note: Q1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1		(2.5*8=20)	CO Mapping
	a) Explain Kirchoff's first and second law		CO1
	b) Draw the equivalent circuit of practical voltage and current source		CO1
	c) Prove that RMS value of $v = V_m \sin \omega t$ is $\frac{V_m}{\sqrt{2}}$		CO2
	d) Prove the power in purely inductive or purely capacitive circuit is 0, if supplied with a voltage supply of $v = V_m \sin \omega t$		CO2
	e) What is a PN Junction? Explain the formation of depletion layer in a PN junction		CO1
	f) Compare Zener Breakdown and Avalanche Breakdown		CO1
	g) What are the various operating mode of BJT?		CO2
	h) Distinguish between holding and latching current.		CO2
UNIT I			CO Mapping
Q2	Find the voltage V_0 across 20 Ohm resistance using superposition theorem?	(10)	CO3
			
	Find Thevenin's Equivalent circuit across AB. What value of Load should be connected across AB so that maximum power transfer takes place through it? What is the value of Maximum Power transferred?	(10)	CO3

			
UNIT II			CO Mapping
Q4	Derive the expression of <u>resonance frequency</u> for a series RLC circuit, which is connected across an ac voltage source ($v=V_m \sin \omega t$). Also draw the <u>phasor diagram</u> and <u>derive</u> the following: (i) Total impedance (ii) Expression of current and (iii) Quality factor.	(10)	CO2
Q5	Draw the phasor-diagram of a circuit having two parallel branches, one having a series R-L circuit and the other having a series R-C circuit. Derive the condition of resonance and expression of resonance frequency.	(10)	CO2
UNIT III			CO Mapping
Q6	a) Draw the Energy bands in intrinsic and extrinsic silicon. b) Derive the diode current equation for p-n junction diode	(5,5)	CO2
Q7	For the circuit shown below, determine the range of R_L and I_L that will result in V_{RL} being maintained at 10V	(10)	CO3
			
UNIT IV			CO Mapping
Q8	a) Give and explain the current components of PNP transistor. b) A transistor operating in CB configuration has $I_C = 2.98\text{mA}$, $I_E = 3.00\text{ mA}$ and $I_{CO} = 0.01\text{ mA}$. What current will flow in the collector circuit for this transistor when connected in CE configuration with a base current of $30\mu\text{A}$?	(5,5)	CO4
Q9	With the help of neat diagram, explain the operation and characteristics of n-channel enhancement type MOSFET.	(10)	CO3