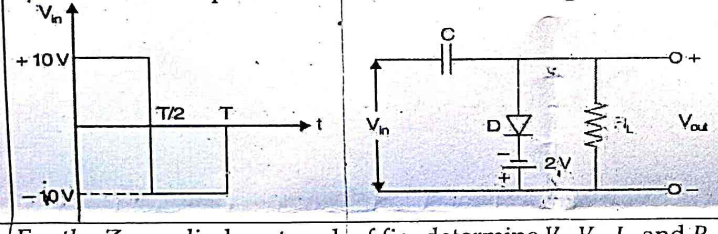
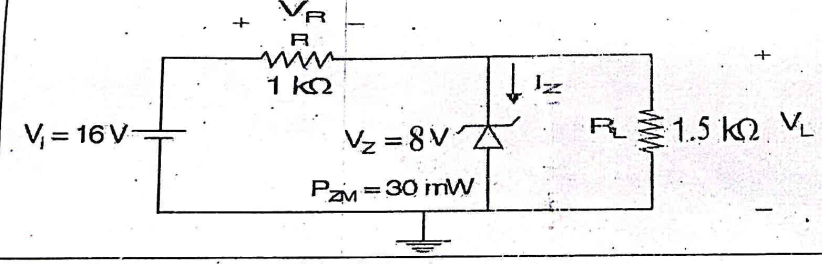
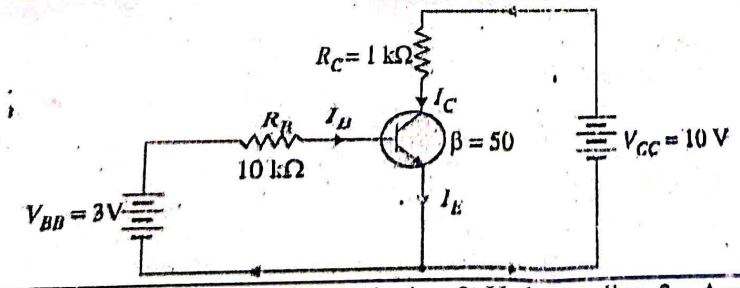
Sub Code: - BEC-106

B. TECH. ECE & ECE-IoT
Year: I, Semester: I
MINOR TEST (EXAMINATION): 2024-2025
ELECTRONIC COMPONENT TESTING AND MEASUREMENT

Time: 2 Hr. Max Marks: 20

Note: Answer all questions.

		Marks	CO	BL	PO	PI Code
Q1.	Attempt any **Two** parts of the following.					
a)	Explain the construction and working of a p-n junction diode with V-I characteristics.	4	CO1	1,2,3	1	1.3.1
b)	Draw and explain common emitter (CE) transistor configuration and give its input and output characteristics. Also define the current gain (β) of CE and derive the equation for collector current I_C.	4	CO1	1,2	1	1.3.1
c)	I. Define Stability factors: S, S' and S''. II. The reverse saturation current flowing in a certain PN-junction diode at room temperature is 2×10^{-7} A. Calculate the current flowing, when 0.1 V forward bias is applied.	4	CO2	1,2	1	1.3.1
Q2.	Attempt any **Two** parts of the following					
a)	Explain the working of bridge rectifier with proper diagrams.	3	CO1	1,2,3	1	1.3.1
b)	Sketch the output waveform for following circuit in Figure. 	3	CO2	1,2	1	1.3.1
c)	For the Zener diode network of fig. determine V_L, V_R, I_Z and P_Z 	3	CO3	1,2,3,4	1	1.3.1
Q3.	Attempt any **Two** parts of the following					
a)	Explain the construction and working principle of npn transistor. Why is it called Bipolar?	3	CO1	1,2,3,4	1	1.3.1
b)	With a neat circuit diagram and equations, explain the Fixed Bias of BJT with the stability factor (S).	3	CO2	1,2,3,4	1	1.3.1
c)	Determine the dc bias voltage V_{CE} and the current I_C for the following configuration. Assume $V_{CE(sat)} = 0.2V$. 	3	CO3	1,2,3,4	1	1.3.1

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

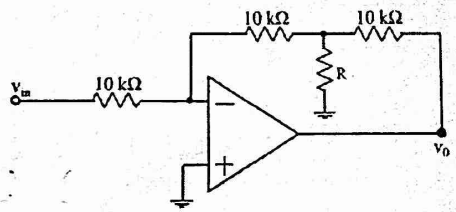
BEC -106

B. Tech. ECE & ECE-IoT
Year: I, Semester: I
Major Examination: 2024-2025
ELECTRONIC COMPONENT TESTING AND MEASUREMENT

Time: 3 Hrs. Max Marks: 50

Note: Attempt ALL questions. ALL questions carry equal marks.

			Marks	CO	BL	PO	PI Code
Q1.		Attempt any **Five parts** of the following.					
	a)	What is depletion layer and junction potential in an unbiased p-n junction?	2	CO1	1,2,3	1,2,3	1.3.1
	b)	Explain the two reverse breakdown mechanisms in a junction diode.	2	CO2	1,2,3	1,2,3	1.3.1
	c)	Explain the clipper circuit with suitable diagram.	2	CO1	1,2,3	1,2,3	1.3.1
	d)	Explain the working of LED.	2	CO2	1,2,3	1,2,3	1.3.1
	e)	What is base width modulation or early effect in BJT?	2	CO1	1,2,3	1,2,3	1.3.1
	f)	What is the difference between I_{CBO} and I_{CEO} in a BJT?	2	CO2	1,2,3	1,2,3	1.3.1
	g)	State the significance of operating point in Transistor biasing	2	CO2	1,2,3	1,2,3	1.3.1
Q2.		Attempt any Two parts of the following					
	a)	Differentiate between a JFET and a bipolar transistor. Further, explain the construction and working of a n-channel JFET with illustrative diagrams.	5	CO1	1,2,3	1,2,3	1.3.1
	b)	Define different JFET parameters and derive the relationship between them.	5	CO2	1,2,3	1,2,3	1.3.1
	c)	i. Differentiate between the characteristics of JFETs and D-MOSFETs. ii. A JFET has a drain current of 5 mA. If $I_{DSS} = 10\ mA$ and $V_{GS(off)} = -6V$, find the value of V_{GS}.	5	CO2	1,2,3	1,2,3	1.3.1
Q3.		Attempt any Two parts of the following.					
	a)	What is depletion-type MOSFET? Explain the working and operation of n-channel depletion-type MOSFET with diagrams and characteristics curves.	5	CO3	1,2,3	1,2,3	1.3.1
	b)	What is the basic difference between D-MOSFET and E-MOSFET. Further explain the working of n-channel enhancement-type MOSFET with diagrams and characteristics curves.	5	CO3	1,2,3	1,2,3	1.3.1
	c)	i. For a certain D-MOSFET, $I_{DSS} = 10\ mA$ and $V_{GS\,(off)} = -8V$. a. Is this a n-channel or p-channel b. Calculate I_D at $V_{GS} = -3V$ c. Calculate I_D at $V_{GS} = +3V$ ii. The datasheet for an E-MOSFET gives $I_{D(on)} = 500\ mA$ at $V_{GS} = 10V$ and $V_T = 1V$. Determine the drain current for $V_{GS} = 5V$.	5	CO3	1,2,3	1,2,3	1.3.1

Q4.		Attempt any Two parts of the following.					
	a)	What is an operational amplifier (Op-Amp)? Draw and explain the block diagram of Op-Amp.	5	CO3	1,2,3	1,2,3	1.3.1
	b)	An ideal op-amp is used in inverting mode with $R_1 = 1k\Omega$, $R_f = 15k\Omega$ and $V_{cc} = \pm 15V$. Calculate the output voltage for the following i/p **i)** $V_{in} = 250mV$ **ii)** $V_{in} = -300mV$ **iii)** $V_{in} = -2V$.	5	CO3, CO4	1,2,3	1,2,3	1.3.1
	c)	Draw and explain the block diagram of cathode ray oscilloscope (CRO).	5	CO6	1,2,3	1,2,3	1.3.1
Q5.		Attempt any Two parts of the following.					
	a)	List and explain different characteristics of an ideal op-amp.	5	CO5	1,2,3	1,2,3	1.3.1
	b)	In the circuit shown in Figure, assume that the op-amp is ideal. If the gain v_o/v_{in} is -12, find the value of R. 	5	CO5	1,2,3	2,3,4	1.3.1
	c)	Compare DSO with a Cathode Ray Oscilloscope (CRO). Further draw and label the block diagram of a Digital Storage Oscilloscope (DSO). Explain the function of each block.	5	CO6	1,2,3	2,3,4	1.3.1

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

CO – Course Outcomes

PO – Program Outcomes

PI Code – Performance Indicator Code