

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Odd Mid Semester Examination for Academic Session 2025-26

COURSE NAME: B.Tech

BRANCH NAME: A, B, C, D, E, F, G & H

SEMESTER: 1st

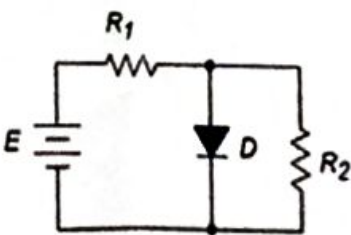
SUBJECT NAME: BASIC ELECTRONICS

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. Symbols carry usual meaning.

Q1.	Answer all Questions.	[2 × 3]
a)	What makes Si preferable to Ge, and GaAs preferable to Si, as semiconductor materials?	- CO1
b)	What is the depletion region in a p-n junction diode? How does it vary with applied bias?	- CO1
c)	Justify why a BJT is called a <i>bipolar</i> device. Express the mutual relation between collector, emitter and base currents of the BJT.	- CO1
Q2.		[8]
a)	A Si diode has reverse saturation current of 10nA at 25 °C. Calculate the current through the diode for a forward bias voltage of 1.2V. Also compute the static and dynamic resistance of the diode.	- CO1
b)	Find the current through R_1 , R_2 and voltage across R_1 , R_2 . Given $E=10V$, $R_1 = 1K\Omega$, $R_2 = 3 K\Omega$. Assuming diode (D) to be (i) Ideal Diode, (ii) Ge Diode	
		
OR		
a)	With neat sketch, compare the output characteristic of transistor in common base configuration with a common emitter configuration. Mention their output current expression and application.	- CO1
b)	Sketch the circuit symbols for n-p-n & p-n-p transistors. Mention the doping and width profile of a transistor. Justify your answer.	
Q3.		[8]
a)	Elaborate the working principle of centre-tapped full wave rectifier with neat diagrams.	- CO1
b)	Explain the ripple factor and PIV of rectifier. Calculate the following parameters of	

a HWR and FW bridge rectifier. Assume, $V_m = 16V$ for the output waveform
(i) DC voltage (ii) rms voltage (iii) ripple factor (iv) PIV

OR

- a) With respect to common base output characteristic of a transistor, explain the biasing and different operating regions.
- b) Derive relationship between the current amplification factors of CB and CE configuration. The β value for a transistor in common base configuration is 110. Find the collector current (I_C). Given the emitter current (I_E) is 13 mA and I_{CBO} is $250\mu A$.

- CO1

Q4.

[8]

- a) Determine V_o and I_D for the below networks.

- CO1

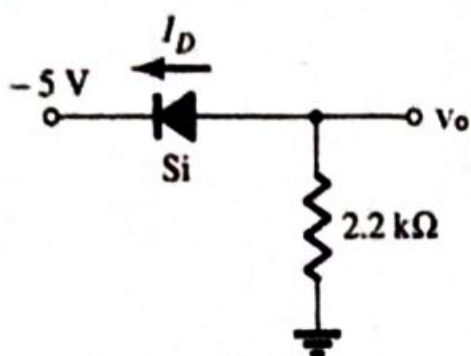


Fig. i

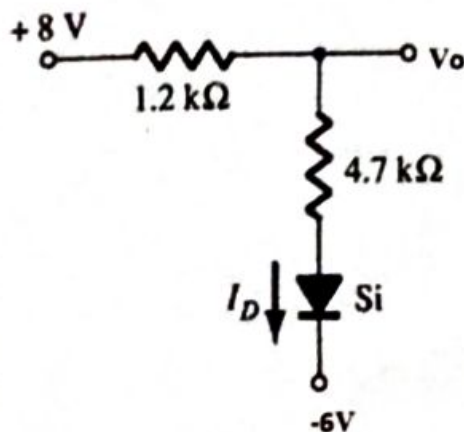


Fig. ii

- b) What are extrinsic semiconductors? Discuss the construction method and properties of extrinsic semiconductor.

OR

- a) What is the major difference between a bipolar and a unipolar device? For a BJT explain the validity of the below current equation.

- CO1

$$I_C = I_{\text{majority}} + I_{\text{minority}}$$

- b) With neat diagram, discuss the action of an BJT as a switch.