

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BTECH/IMSC
BRANCH: BT/CHEMICAL/CE/ME/PIE/FT/PHYSICS

SEMESTER : II
SESSION : SP/2025

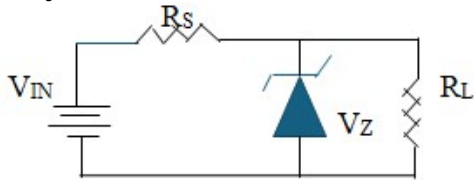
SUBJECT: EC24101 BASIC ELECTRONICS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	B
Q.1(a) Describe the formation of the depletion region in a PN junction diode.	[2]	CO1,	L 2
Q.1(b) Explain the working of the Zener diode acting as voltage regulator circuit with suitable diagrams.	[3]	CO2	3
Q.2(a) Find the maximum and minimum value of Zener diode current (I_Z) with a breakdown voltage (V_Z) of 50V. Input voltage (V_{IN}) ranging from 80V-120V connected to load resistance of $R_L=10K\Omega$ and $R_S=5K\Omega$.	[2]	CO2,	4 CO4
			
Q.2(b) Differentiate between Zener breakdown and avalanche breakdown in a diode with suitable diagrams.	[3]	CO2	3
Q.3(a) A bridge rectifier is driving a load resistance of 150 Ω . It is driven by a source voltage of 230 V, 50 Hz. Neglecting diode resistances; calculate average output voltage and average load current.	[2]	CO2,	3 CO4
Q.3(b) Derive the relationship between α , β and γ for a transistor.	[3]	CO2,	2 CO3
Q.4(a) Draw common emitter (CE) configuration, show its output characteristics, and explain the importance of these curves.	[2]	CO2,	2 CO3
Q.4(b) For a transistor in CE configuration, given that $V_{BB} = 5V$; $R_b = 200K$; $R_c = 3K$; $V_{CC} = 10V$; $\beta = 100$; the transistor is silicon, n-p-n with $I_{CC} = 20nA$. Find the transistor currents.	[3]	CO2,	2 CO4
Q.5(a) Explain the flow of charge carriers in an NPN BJT with the help of a labeled diagram.	[2]	CO2	2
Q.5(b) Determine the values of I_c , I_b and V_{ce} of a CE amplifier biased with voltage divider biasing circuit. The data given are, $R_1 = 75K\Omega$, $R_2 = 10K\Omega$, $R_c = 6K\Omega$, $R_e = 1K\Omega$, $\beta = 80$ and $V_{CC} = 12V$.	[3]	CO2,	2 CO4

:::28/02/2025 M:::