Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - 1/2 EXAMINATION - WINTER 2025

Subject Code: BE01000111/BE01R00111 **Date: 30-12-2025**

Subject Name: Basic Electronics Engineering

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	A BJT has emitter current and collector current of the value 10 mA and 9.8 mA respectively, determine current gains for CB and CE configurations.	**03**
	(b)	Explain forward and reverse bias operation of a P-N junction diode with depletion region.	**04**
	(c)	Draw CB configuration using NPN transistor and discuss its input and output characteristics with I_{CBO}, r_i, ro, and current gain α.	**07**
Q.2	**(a)**	Define knee voltage, bulk resistance and PIV for a P-N junction.	**03**
	(b)	Draw Bridge rectifier circuit and input and output waveforms. Also derive output voltages V_{dc} & V_{rms} .	**04**
	(c)	Draw circuit for voltage Doubler, Tripler & Quadrupler and explain their operation.	**07**
		OR	
	(c)	Differentiate between Avalanche and Zener breakdown and discuss circuit of Zener as a voltage regulator.	**07**
Q.3	**(a)**	Explain biased negative clipper with necessary waveforms.	**03**
	(b)	Discuss Choke input filter with its limitations.	**04**
	(c)	Discuss load line, operating point, DC & AC load lines for BJT.	**07**
		OR	
	(a)	Describe positive clamper circuit with necessary waveforms.	**03**
	(b)	Describe RC filter and state ripple voltage formula.	**04**
	(c)	Discuss thermal stability of BJT with stability factors S, S', S''.	**07**
Q.4	**(a)**	Explain FET as a switch.	**03**
	(b)	Draw Hybrid equivalent model of transistor for CB, CE, CC configurations.	**04**
	(c)	Explain CE amplifier with derivation of input impedance, output impedance and voltage gain in terms of h parameters.	**07**
		OR	

	(a)	Explain FET as an amplifier.	**03**
	(b)	Compare CB, CE, CC amplifiers.	**04**
	(c)	Explain voltage divider bias circuit for BJT in detail.	**07**
Q.5	**(a)**	Discuss Solar cell in detail.	**03**
	(b)	Explain Varactor diode with applications.	**04**
	(c)	Explain Drain characteristics and Transfer characteristics of JFET in detail with all related terms as Transconductance g_m, drain resistance r_d, and amplification factor μ.	**07**

OR

	(a)	Describe LED with applications.	**03**
	(b)	Discuss Tunnel diode with its V/I characteristics and applications	**04**
	(c)	Explain MOSFET and draw the structure for D-MOSFET & E-MOSFET.	**07**

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