GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2021

Subject Code:3132003   **Date:21-02-2022**
Subject Name:Design Concepts in Basic Electronics
Time:10:30 AM TO 01:00 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.**

Q.1	**(a)**	Differentiate between analog system and digital system.	**03**
	(b)	Explain the Base Curve for common emitter configuration.	**04**
	(c)	Attempt the following:	**07**

    1. Perform binary addition for numbers $(10111)_2$ and $(01011)_2$.
    2. $(AF2)_{16}$ = (_____)$_2$.
    3. $(001011)_2$ = (_____)$_8$.
    4. What is 1's complement of binary number 10011011?
    5. Convert decimal number 356 to BCD number.
    6. Convert $(101100111)_2$ to Grey code.
    7. A+A = _____ as per Boolean algebra.

Q.2	**(a)**	Explain forward bias condition for PN junction diode.	**03**
	(b)	Explain edge triggered SR flip-flop with waveforms.	**04**
	(c)	Explain significance of digital system with block diagram.	**07**

OR

	(c)	Explain NOR Gate as universal Gate.	**07**
Q.3	**(a)**	Explain positive bias series clipper with circuit diagram and waveform.	**03**
	(b)	Briefly explain intrinsic material and extrinsic material.	**04**
	(c)	Give detail explanation of Ideal, Second and Third approximation for Transistor.	**07**

OR

Q.3	**(a)**	Prove (A+B)(A+C) = A+BC using Boolean algebra.	**03**
	(b)	Explain error detection using parity bit.	**04**
	(c)	Explain AND Gate, OR Gate and NOT Gate in detail with their truth tables and discrete circuits based on TTL.	**07**
Q.4	**(a)**	Explain Voltage Tripler circuits with circuit diagram.	**03**
	(b)	Derive the equations of I_{DC}, V_{DC}, I_{RMS} and V_{RMS} for full wave bridge rectifier.	**04**
	(c)	Explain half wave and full wave rectifiers with circuit diagrams and wave forms.	**07**

Q.4 **(a)** Simplify [A(B+C')'+A'(B+C)']' using Boolean Algebra.   **03**

(b) Use the K-map to minimize the following SOP expression and find its binary **04** value.

AB'C + A'BC + A'B'C + A'B'C' + AB'C'

(c) Design and explain Serial In/Serial Out Shift Register.   **07**

Q.5 **(a)** Explain 4×1 Multiplexer.   **03**

(b) Express the Boolean Function F = (X'+Y)(X+Z)(Y+Z) in a product of maxterm. **04** The Function has three variable X, Y and Z.

(c) Design and explain 2-bit Magnitude Comparator.   **07**

OR

Q.5 **(a)** A diode in series with resister of 200Ω. If the voltage across the diode is 8 V, **03** calculate the current through the diode.

(b) Explain biased negative clamper circuit.   **04**

(c) Explain emitter feedback bias for transistor.   **07**

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