GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–III (NEW) EXAMINATION – WINTER 2020
Subject Code:3132003   **Date:04/03/2021**
Subject Name:Design Concepts in Basic Electronics
Time:10:30 AM TO 12:30 PM   **Total Marks:56**
Instructions:
1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Compare Digital System with Analog System in terms of their pros and cons.	**03**
	(b)	Give detail comparison of half-wave and full-wave rectifiers.	**04**
	(c)	Explain the collector feedback biasing with emitter resistance in details.	**07**
Q.2	**(a)**	Explain basic Gates with their truth tables.	**03**
	(b)	Derive the equations of I_{DC}, V_{DC}, I_{RMS}, V_{RMS} and PIV for full wave bridge rectifier.	**04**
	(c)	Explain NAND Gate as universal Gate.	**07**
Q.3	**(a)**	A diode in series with resister of 220Ω. If the voltage across the diode is 6 V, what is the current through the diode?	**03**
	(b)	Construct 3×8 Decoder.	**04**
	(c)	Explain forward bias and reverse bias V-I Characteristics for PN junction diode.	**07**
Q.4	**(a)**	What is barrier potential? Explain the effect of temperature on barrier potential.	**03**
	(b)	Simplify the Boolean Expression and implement the circuit using minimum number of Logic Gates.	**04**

$$A[\overline{\overline{(A + \overline{B})C} + \overline{A}\overline{B}}]$$

	(c)	Attempt the following;	**07**

1. Express $(-53)_{10}$ as 8 bit binary number using sign magnitude.
2. $(CA7)_{16} = ($_____$)_2$.
3. $(1011)_2 - (110)_2 = $ _____.
4. What is 2's complement of binary number 11010101?
5. Convert 269 decimal number to octal number by repeated division by 8 method.
6. IC 7404 is for _____ Gate.
7. A+AB = _____.

Q.5	**(a)**	Compare combinational circuits with sequential circuits.	**03**
	(b)	Explain biased negative clamper circuit.	**04**
	(c)	Simplify the following function using Karnaugh map method. Also implement the circuit for minimized function using logic gates.	**07**

$$F (A, B, C, D) = \sum\{1,2,3,5,7,9,10,11,13,14\}$$

Q.6	**(a)**	Draw discrete circuits for AND Gate and OR Gate using Transistor-Transistor logic.	**03**
	(b)	Explain the negative clamper with circuit diagram.	**04**
	(c)	Simplify the following function using Karnaugh map method. Also implement the circuit for minimized function using logic gates.	**07**

$$F (A, B, C, D) = \Pi\{0,2,3,5,9,10,12,15\}$$

Q.7	**(a)**	Explain Gated S-R Latch with waveforms.	**03**

(b) Design and explain 2-Bit Asynchronous (Ripple) Counter.　　**04**

(c) What are the configuration which increases the stability of Q-Point and explain any one of it.　　**07**

Q.8 **(a)** Explain Serial-In/Serial-Out shift register.　　**03**

(b) Design 1-Bit magnitude comparator.　　**04**

(c) Explain the Ideal, Second and Third approximation for diode in detail with example.　　**07**

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