Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2018

Subject Code:2132003 Date:01/12/2018

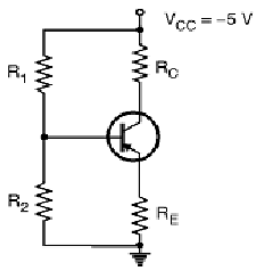
Subject Name:Design Concepts in Basic Electronics

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.**

Q.1	**(a)**	Explain in detail different types of breakdown in diode.	**03**
	(b)	What are the factors affecting the stability of Q point?	**04**
	(c)	Explain DC load line and Q-point for any transistor configuration. Also state the necessity of biasing and list biasing methods for transistor	**07**
Q.2	**(a)**	What is energy band diagram?	**03**
	(b)	Explain with circuit diagram positive clamper and negative clamper.	**04**
	(c)	Explain the input output characteristics of n-p-n transistor in CE configuration. Also indicate different regions.	**07**
		OR	
	(c)	A circuit receive a 4-bit excess-3 code. Design a minimal circuit to detect a decimal number 0,1,4,6,7 and 8	**07**
Q.3	**(a)**	Draw and explain internal construction of encoder.	**03**
	(b)	Explain in detail bidirectional shift register with parallel load	**04**
	(c)	Design a combinational logic to convert given BCD to seven segment display LED.	**07**
		OR	
Q.3	**(a)**	Write the points of difference between combinational and sequential logic.	**03**
	(b)	Draw the circuit diagram of D-type positive edge triggered flip flop	**04**
	(c)	Write a note on collector to base bias.	**07**
Q.4	**(a)**	What is ripple counter?	**03**
	(b)	Implement 32x1 Multiplexer using four 8x1 Multiplexer and one 4x1 Multiplexer	**04**
	(c)	A p-n-p germanium transistor is used in the self biasing arrangement with VCC = 5V, R1 = 27k, R2 = 3k, RE = 270 Ω, RC = 2k and β = 50. Find VCEQ and ICQ.	**07**

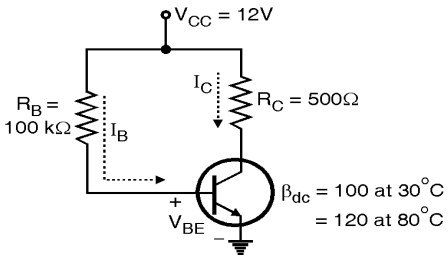


OR

Q.4 **(a)** Explain with example working of transistor as switch. **03**

(b) Design 3- bit up synchronous counter. **04**

(c) The fixed bias circuit of Fig. uses a silicon transistor. The component values are RC = 500 Ω and RB = 100 kΩ. βdc of the transistor is 100 at 30°C and increases to 120 at a temperature of 80°C. Determine the percent change in the Q point values over this temperature range. Assume that VBE and ICBO remain constant. **07**



Q.5 **(a)** Explain the requirement of compliment in digital logic. **03**

(b) Implement the following function with help of 8x1 Multiplexer. **04**
F (A,B,C,D) = ∑ (0,1,3,4,8,9,15)

(c) Explain with neat diagram Voltage divider bias **07**

OR

Q.5 **(a)** Why we require master slave or edge triggered flip flop **03**

(b) Write a short note on surface mount transistors. **04**

(c) Compare in detail RTL, DTL, TTL, ECL and CMOS. **07**

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