UPES
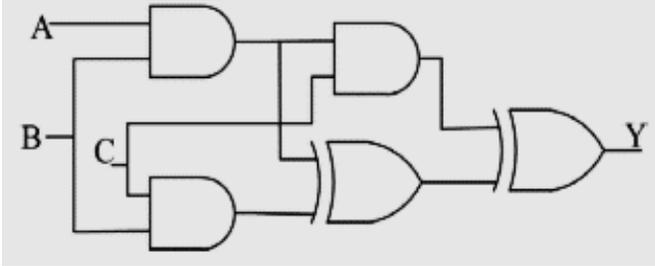
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Programme Name: **B.Tech (APEG, CERP, ME, APEUP)**   Semester   : I
Course Name   :   **Basic Electronics Engineering**   Time   : 3Hr
Course Code   :   **ECEG1002**   Max. Marks : 100
Nos. of page(s)   :   **03**
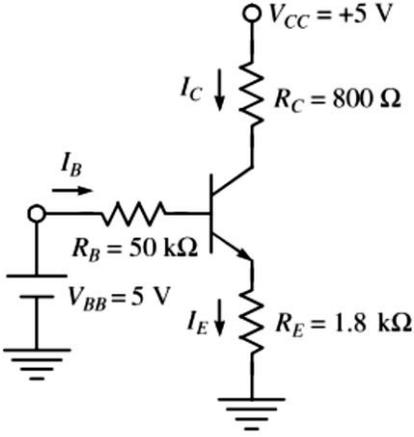Instructions   :   **Attempt all questions from Section (A) and (B) and only one from Section (C).**

SECTION A

S. No.		Marks	CO
Q1	Explain the behavior of diode in forward biasing. Sketch the required circuit diagram and its output V-I characteristic with related terminology.	7	CO1
Q2	Develop the simplified Boolean expression for the following digital circuit:	7	CO4
Q3	What names are applied to the two types of BJT transistors? Sketch the basic construction of each and label the various minority and majority carriers in each.	8	CO3

Q4	Simplify the following Boolean expressions:
	
	  a) $Y = (A + B + C).(A + B)$
	  b) $Y = AB + ABC + AB\bar{C}$
		8	CO4

SECTION B			
Q5	Explain the concept of dc and ac load line in case of transistor. What is the necessity of operating point and how it is located?	15	CO3

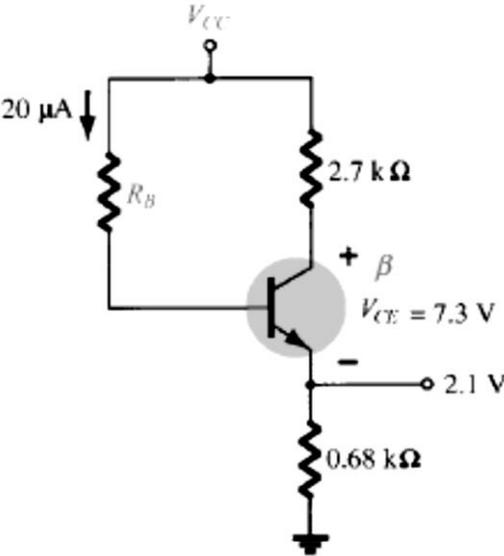| Q6	Consider the transistor (β = 50) circuit of Figure given below which has a resistance included between emitter and ground. Show that the transistor is operating in active mode. Calculate I_C, I_E and I_B.	15	

Q7	Convert the following numbers into corresponding number system
	
	    a. $(A28.1F)_{16} = ($ $)_{10}$
	    b. $(378.10)_{10} = ($ $)_{8}$
	    c. $(431.6110)_{8} = ($ $)_{16}$
	    d. $(1011000111)_{2} = ($ $)_{GRAY\ CODE}$
	    e. $(B65.6A)_{16} = ($ $)_{8}$
	    f. $(101011.1001)_{2} = ($ $)_{16}$
		15	CO4

SECTION C

Note: Attempt any one of the following:

Q8	Given the information provided in Fig. determine: **a.** β **b.** V_{CC}. **c.** R_B.	25	CO3

Q9	Use the Karnaugh map method to implement the minimum SOP expression for the logicvfunction specified in truth Table. Also solve the problem for a situation in which the last six binary combinations are not allowed.	25	**CO4**

Inputs				Output
A	**B**	**C**	**D**	**X**
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1