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Question Paper Code: AECB05



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

Four Year B.Tech III Semester End Examinations(Regular) - November, 2019

Regulation: IARE – R18

ANALOG AND DIGITAL ELECTRONICS

Time: 3 Hours

(Common to CSE | IT)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- (a) Explain about reverse saturation current of a PN junction diode with its VI-characteristics. [7M]
(b) Determine thermal voltage V_T at room temperature. Define static Resistance and Dynamic Resistance of a diode. [7M]
- (a) What is a full wave rectifier. Obtain the expression for ripple factor and efficiency of full wave rectifier. [7M]
(b) Explain the operation of a diode in forward bias and reverse bias with the help of a neat diagram. [7M]

UNIT – II

- (a) Draw the input and output characteristics of CB transistor configuration and mention various parameters there in. [7M]
(b) Deduce the relation between I_C , I_B and I_{CEO} in a BJT. [7M]
- (a) Draw the hybrid model for NPN transistor in CE configuration and specific VI equations. [7M]
(b) Find h_{rb} , h_{ib} and h_{ob} in terms of the CB h parameters. [7M]

UNIT – III

- (a) Express the Boolean function $F = AB + \bar{A}C$ in a product of maxterms forms. [7M]
(b) The message below coded in the 7-bit Hamming code is transmitted through a noisy channel. Decode the message assuming that at most a single error occurred in each code word? 10010010111001. [7M]
- (a) Convert the following expression to standard canonical form
i) $f = xz' + x'z$ to canonical SOP
ii) $F = (A+B)C'$ to canonical POS [7M]

- (b) Simplify the following expression to their minimal form
- i) $f = yz' + x'z' + x'y'$
 - ii) $F = x'yz + xz$ [7M]

UNIT – IV

7. (a) Explain the terms multiplexer and de multiplexer. Implement full subtractor using half subtractors? [7M]
- (b) Implement the function $F(A,B,C,D) = \sum m(1,3,5,7,12,14)$ with 8:1 MUX [7M]
8. (a) What is Gray code? Convert a 4-bit Gray to Binary converter? [7M]
- (b) Simplify the function $F(w,x,y,z) = \sum m(0,1,2,10,11) + d(8,9,14,15)$ using K-map method. [7M]

UNIT – V

9. (a) Design 3-bit asynchronous up counter using negative edge triggered T- flip flops. [7M]
- (b) Draw and explain the excitation table of SR flip-flop and JK flip-flop. [7M]
10. (a) Explain race around condition and discuss the methods to eliminate race around condition. [7M]
- (b) Define a Flip-Flop. Convert D flip-flop into JK flip-flop. [7M]