4E2149

Roll No. Total No of Pages: 4

# 4E2149

## B.Tech. IV-Sem (Main & Back) Exam; June-July 2016

## Bio Medical Engineering

## 4BM3 Digital Electronics

## BM, EX, EI, EC

**Time: 3 Hours**

**Maximum Marks: 80**
**Min. Passing Marks (Main & Back): 26**
**Min. Passing Marks (Old Back): 24**

***Instructions to Candidates:-***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No.205)*

1._____ 2._____

## UNIT-I

Q.1 (a) Perform the following operations- [4×3 =12]

(i) $(68)_{10} - (31)_{10}$ using BCD subtraction.

(ii) $(1101101 - 1010111)_2$ using 1's complement method.

(iii) $(22 - 31)_{10}$ using 9's complement method.

(iv) $(1101101)_{Gray} \rightarrow (\quad)_2$

(b) Write a short note on error correction & detection codes. [4]

## OR

Q.1 (a) Simplify the [4×2=8]

(i) $A\bar{B} + ABC + A(B + A\bar{B})$

(ii) $\left[A\,\bar{B}\,(C + B\,D) + \bar{A}\,\bar{B}\right]C$

(b) Find the value of x [2+2 = 4]

(i) $(23)_x + (12)_x = (101)_x$

(ii) $(1000)_x = (11_2)^3$

(c) Implement Boolean function $f = (w + \bar{x})(w + \bar{x} + z)(y + \bar{z})$ using NOR gate only.[4]

## UNIT-II

Q.2 (a) What do you understand by TTL logic. How open collector TTL is different from normal TTL circuit. [6+4=10]

(b) Write down the comparison between CMOS & TTL families. [6]

## OR

Q.2 (a) Draw & explain the working of DTL- NAND gate. [6]

(b) Explain the construction & operation of MOSFET. Implement the NAND & NOR gate using NMOS logic circuit. [4+6=10]

## UNIT-III

Q.3 (a) Obtain & realize the minimum SOP expression by using K map for f (A, B, C, D) [8]

$= \pi M (0, 2, 5, 7, 8, 10)$

(b) Write a short note on variable mapping. [4]

(c) Develop the truth table for. [4]

$f = \bar{A} B \bar{C} \bar{D} + \bar{A} B C \bar{D} + A \bar{B} \bar{C} D + \bar{A} \bar{B} \bar{C} \bar{D}$

OR

Q.3 (a) By using Quine- McCluskey method minimize the given output function. [8]

$f = \Sigma_m (0, 1, 4, 7, 8, 10, 12, 13, 14) + \Sigma_d (5, 9)$

(b) $AB\bar{C} + \bar{A} B\bar{C} + \bar{A} B \bar{C} + \bar{A} \bar{B} \bar{C}$ Convert into POS form. [4]

(c) Convert $f = \bar{A} B + \bar{C} + A B \bar{D}$ into canonical SOP form. [4]

## UNIT-IV

Q.4 (a) Draw & explain the logic diagram of binary Adder & substractor. [8]

(b) Write a short note on Diode switching matrix. [8]

OR

Q.4 (a) Design the combinational logic circuit for BCD to EX-3 code converter. [8]

(b) Implement the following: [4×2=8]

(i) Full adder using half adder only

(ii) $f (A, B, C) = \pi M (0, 4, 6, 7)$ using 8:1 $M_{ux}$

## UNIT-V

Q.5 (a) Draw the four bit binary ripple counter diagram using flip –flop that trigger on the positive edge. [8]

(b) Realization of [4×2=8]

(i) RS FF to JK FF

(ii) JK FF to D FF

**OR**

Q.5 (a) What do you understand by race around condition. How it over come in master slave JK FF. [8]

(b) Write a short note on shift registers. [8]

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