

4E1232

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B. Tech. IV-Sem. (Back) Exam., Oct.-Nov. - 2020

HSMC Mechanical Engineering

4ME3-04 Digital Electronics

AE, ME

Time: 2 Hours

Maximum Marks: 65

Min. Passing Marks: 23

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Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and one questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL \_\_\_\_\_

2. NIL \_\_\_\_\_

**PART - A****(Answer should be given up to 25 words only)****[5×2=10]****All questions are compulsory**

Q.1 Find the 2's compliment of the following numbers – [2]

(a)  $(935)_{12}$ (b)  $(267)_{12}$ 

Q.2 Realize NOR gate using AND gate. [2]

Q.3 Differentiate between Half wave and full wave rectifier. [2]

Q.4 State Barkhausen's criteria. [2]

Q.5 Draw the characteristics of Zener Diode. [2]

## PART - B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

Q.1 (a) Simplify the expression  $Y = \sum_m(7, 9, 10, 11, 12, 13, 14, 15)$  using the K-map method. [5]

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(b) Draw state diagram of D-Flip flop and explain working using present state - next state table and excitation table. [5]

Q.2 (a) Differentiate between inverting and non-inverting amplifier. [5]

(b) Explain how Op-Amp can be used as a comparator. [5]

Q.3 Explain construction & working of BJT. [10]

Q.4 Give a detail overview of Wein bridge oscillator. [10]

Q.5 What do you understand by modulation? What is need of modulation? Write three differences between AM & FM. [10]

Q.6 Simplify the following Boolean expression -

(a)  $Y = \bar{A}\bar{B}\bar{C} + \bar{A}B + \bar{C} + A\bar{B}\bar{C} + AB\bar{C}$  [5]

(b)  $Y = \overline{\bar{A}\bar{B} + ABC + A(B + A\bar{B})}$  [5]

## PART - C

(Descriptive/Analytical/Problem Solving/Design Questions) [1×15=15]

Attempt any one questions

Q.1 An 8 to 1 MUX has inputs A, B & C connected to the selection inputs  $S_2$ ,  $S_1$  &  $S_0$  respectively. The data inputs  $D_0$  through  $D_7$  are as follows – [15]

$$D_1 = D_2 = D_7 = 0;$$

$$D_3 = D_5 = I;$$

$$D_0 = D_4 = D;$$

$$D_6 = \bar{D}$$

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Determine the Boolean expression that the MUX implement.

Draw the necessary diagrams.

Q.2 Explain cellular concept and GSM system with suitable block diagram. [15]

Q.3 (a) Draw the pin configuration of IC 555 timer & explain each pin. [5]

(b) If an astable multivibrator has  $C_1 = C_2 = 1000\text{pF}$  and  $R_1 = R_2 = 20\text{k}\Omega$ , calculate the frequency of oscillation. [5]

(c) Determine the frequency of oscillation if the duty cycle  $D = 20\%$  & the ON period  $T_1 = 1\text{ms}$ . [5]