Roll No. ..... Total Pages : 3

BT-4/M-13 **8406–R**

DIGITAL ELECTRONICS (New)

Paper–ECE-204-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Starting from the logical equation $F = (A + BC)(B + \bar{C}A)$ minimize the function in POS and SOP forms and realize it with NAND and NOR gates respectively. 10

   (b) What do you mean by the Gray code? What are its applications? 5

   (c) What are the advantages and disadvantages of the Q-M method vis-a-vis the K-map? 5

2. (a) If register A holds $(257)_{10}$, register B holds $(1050)_{10}$ and register C holds their Sum, show the contents of register A, B and C in: (i) Binary form, (ii) BCD form, (iii) Hex. code. 10

   (b) Simplify the Boolean function using K-map $F(w, x, y, z) = \Sigma(1, 3, 7, 11, 15)$ and don't care conditions

   $d(w, x, y z) = \Sigma (0, 2, 5)$. 10

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UNIT–II

3. (a) Describe the operations performed by the following logic circuits: (i) Decoder, (ii) Encoder. 10

   (b) Draw the logic diagram and timing diagram of a 3-bit binary ripple-up counter and down counter using positive-edge triggered FFs. 10

4. (a) Carry out a method to convert a D flip-flop to a J-K flip-flop. 10

   (b) Explain the operation of a 4-bit bidirectional shift register with the help of a circuit diagram. 10

UNIT–III

5. (a) Sketch a 2-input ECL gate and explain its operation. 10

   (b) Compare the following Technologies:

   Bipolar and CMOS! 10

6. (a) What are the merits and demerits of the TTL family? 10

   (b) How do open-collector outputs differ from totem-pole outputs? 10

UNIT–IV

7. (a) Define the following parameters of DACs:

   (i) Resolution

   (ii) Accuracy

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(iii) Monotonicity

(iv) Settling time

(v) Offset voltage. 10

(b) Write short note on D/A converting. 10

8. (a) Give the principle of Counter type A/D converter. 10

(b) Write short note on Read only Memories. 10