DIGITAL ELECTRONICS
Paper-ECE-204E

Time Allowed: 3 Hours]   [Maximum Marks: 100

Note: Attempt **five** questions in all, selecting at least **one** question from each Section.

SECTION-I

1. (a) Differentiate between :
     (i) Digital Signal and Analog Signal
     (ii) XOR gate and XNOR gate.   6

   (b) Convert $(0.65625)_{10}$ to binary.   4

   (c) What are the important characteristics of Gray code?   4

   (d) Express the following BCD numbers in
        (i) Straight binary form and (ii) Excess-3 code.
           10010011, 01100111.   6

2. (a) Realize or implement the following Boolean expression using basic gates:

$$Y = \overline{AC} + \overline{BC} + BC + AC$$
                                                    6

   (b) Minimize the following Logic function and realize using NOR gates:
        $F(A, B, C, D) = \pi M\ (1, 2, 3, 8, 9, 10, 11, 14) \cdot d\ (7, 15)$.   8

   (c) How is QM method of simplification different from K-map method?   6

SECTION-II

3. (a) Realize full subtractor using NAND gates only, if *I/P's* A, B and b_i are available
        in complemented.   6

   (b) Implement the following Boolean function using 8 : 1 multiplexer :
        $F(A, B, C, D) = \sum m\ (O, 2, 6, 10, 11, 12, 13) + \sum d\ (3, 8, 14)$ 8

   (c) Draw common anode and common cathode circuits of LED seven segment display
        and bring out the difference between them.   6

4. (a) Draw and explain working of a positive edge triggered J-K flip flop.
        Also explain the race around problem.   7

   (b) Discuss the application of Shift registers.   5

   (c) Design a synchronous counter with the following sequence:
        0001 → 0011 → 0101 → 0111 → 1001 → 1011 → 1101 → 1111 → 0001…….   8

SECTION-III

5. (a) Discuss the switching mode operation of p-n junction.   7

   (b) Explain the parameters used to characterize logic families.   7

   (c) How fan out is increased in DTL? Justify your answer.   6

6. (a) What is interfacing? What are the different schemes for CMOS and TTL interface? Explain one of them.   10

   (b) Compare CMOS and TTL families.   5

   (c) What are the applications of open collector output?   5

SECTION-IV

7. (a) What are the disadvantages of weighted register DAC?   6

   (b) Explain the important specifications of DAC.   6

   (c) An 8 bit ADC accepts an input voltage 0 to 10 V
     (i) What I/P voltage will cause all l's at the ADC output?
     (ii) What is the digital output code, if the applied I/P voltage is 5.2V?   8

8. (a) What is meant by the term 'architecture of PLD' ? Give some suitable examples.   8

   (b) Discuss the applications of PLAs.   5

   (c) What is programmable array logic? How does it differ from ROM?   7