

Roll No.

Total Pages : 04

BT-3/D-20

43133

DIGITAL ELECTRONICS

ES-207A/ES-205A

Time : Three Hours]

[Maximum Marks : 75

Note : All questions in Part A and Part B are compulsory. Attempt any *four* questions from Part C, selecting *one* question from each Unit.

Part A

1. Answer the following questions : **5×3=15**
- (i) Explain the working of AND operation using NOR gate.
 - (ii) What is a BCD code ? What are its advantages and disadvantages ? Express the following numbers into BCD 874, 347.
 - (iii) Explain designing and working of half subtractor.
 - (iv) State the difference between positive edge triggering, negative edge triggering and level triggering of flip-flops.
 - (v) Write down the specifications of D/A converters.

(5)L-43133

1

Part B

- 2. Write the significance of gray code. Design a 4 bit gray to binary code converter. Express 27 in gray code. **5**
- 3. What is a demultiplexer ? Explain the working of $1 : n$ demultiplexer using logic diagram. **5**
- 4. Differentiate between a flip-flop and a Latch. Explain the working of J-K flip-flop. Also explain the problem associated with JK flip-flop. **5**
- 5. Draw the basic circuit of a ROM cell. Explain its working. **5**

Part C

Unit I

- 6. Explain the steps of minimization in Q-M method. Using Q-M method, obtain the minimal expression for $F = \sum m(6, 7, 8, 9, 13, 15) + d(10, 11, 12, 14)$. Also realize the expression using NAND gate only. **10**
- 7. (a) Write in detail the characteristics of digital logic gates. Explain them.
- (b) Explain working of CMOS NAND gate. **10**

(5)L-43133

2

Unit II

- 8. (a) State and explain the working of BCD adder with its logic diagram. **6**
- (b) What is encoder ? Design a 8 : 3 encoder. **4**
- 9. What do you mean by multiplexer ? Explain the working of $n : 1$ mux. Design a multiplexer tree for 32 : 1 mux using 8 : 1 and 2 : 1 mux. **10**

Unit III

- 10. (a) Design a mod 10 asynchronous counter.
- (b) Design a synchronous mod-6 counter. Use JK flip-flop for designing the counter. **10**
- 11. (a) What do you mean by register ? Draw and explain the logic diagram of serial in serial out shift right register.
- (b) Explain, how SR flip-flop can be converted into JK flip-flop ? **10**

Unit IV

- 12. What are different types of memories ? Explain them. **10**

(5)L-43133

3

- 13. What do you mean by PLD ? Discuss different types of PLD. Implement the following Boolean functions using PLA :

$$f_1(A, B, C) = \sum m(1, 2, 4, 6), f_2(A, B, C) = \sum m(0, 1, 5, 7), f_3(A, B, C) = \sum m(1, 2, 3, 5, 7). \quad \mathbf{10}$$