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BT-3/D-23 43140

DIGITAL ELECTRONICS

ES-207A

Time : Three Hours] [Maximum Marks : 75

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

Unit I

1. (a) Differentiate between the following : 5

   (i) Positive and negative logic

   (ii) Positive and negative logic.

   (b) List various logic operations. Mention gates corresponding to them. Explain, how NAND gate can be used to perform OR operation. 5

   (c) Convert decimal numbers into BCD (i) 46, (ii) 327.89, (iii) 20.30. 5

2. (a) State and prove (i) Duality Theorem (ii) De-Morgan's theorem. 5

(b) Write the rules of minimization using K-Map. Minimize the given expression using K-Map : $F(A, B, C, D) = \Sigma(1, 2, 4, 5, 7, 8, 9, 11, 13, 14)$. Realise the obtained expression using logic gates. **10**

Unit II

3. (a) Draw logic diagram of full adder. Explain its working. **8**

(b) Design an octal to binary encoder. **7**

4. (a) What is a multiplexer ? Explain working of an n : 1 multiplexer. **8**

(b) Design a 4 bit comparator. **7**

Unit III

5. (a) Differentiate between the following : **5**

(i) Latch and flip-flop

(ii) Level triggering and edge triggering.

(b) Explain working of JK flip-flop. Discuss race around problem of JK flip-flop. Also describe how Master-Slave flip-flop overcomes this problem. **10**

6. (a) Explain application of shift register as ring counter. **5**

(b) Design a synchronous mode 5 counter. Use JK flip-flops for designing the counter. **10**

Unit IV

7. Explain working of the following : 10

   (i) R-2R ladder type DAC

   (ii) Successive Approximation type ADC.

8. (a) Draw diagram of a memory cell. Explain either read OR write operation with timing waveforms in memory cell. 10

   (b) Write a note on ROM. 5