## 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

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(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.

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## 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.

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

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## Unit IV

7. Explain working of the following :     1**0**
   - (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.     1**0**

   (b) Write a note on ROM.     5