

- b) What are different converter specifications?  
 c) Write a short note on different types of ROM.  
 d) What is the need of Analog to digital converter? Explain Ramp type A/D converter in detail.

OR

A combinational circuit is defined by the function

$$F_1(A, B, C) = \Sigma m(4, 5, 7)$$

$$F_2(A, B, C) = \Sigma m(3, 5, 7)$$

Implement this circuit with a PLA having 3 inputs, 3 product terms and 2 outputs.

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Roll No .....

**EX-403****B.E. IV Semester**

Examination, June 2016

**Digital Electronics Logic Design - I***Time : Three Hours**Maximum Marks : 70*

- Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.  
 ii) All parts of each question are to be attempted at one place.  
 iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.  
 iv) Except numericals, Derivation, Design and Drawing etc.

**Unit - I**

1. a) Convert the following:  
 i)  $(42.4)_{10} = (?)_2$   
 ii)  $(56.67)_8 = (?)_{16}$   
 b) Perform the subtraction using 2's compliments  
 i)  $48.05 - 23.16$   
 ii)  $23 - 56$   
 c) State and prove Demorgan's theorem. Define minterms and maxterms.  
 d) Simplify the following function using K-map

$$F(A, B, C, D) = \Sigma m(0, 2, 3, 5, 6, 7, 8, 9)$$

$$+d(10, 11, 12, 13, 14, 15)$$

Implement the reduced expression with any of the universal gate.

[2]

OR

Find the essential prime implicants in the case of given function.

$$F(x_1, x_2, x_3, x_4) = \sum(2, 3, 6, 7, 8, 9, 13, 15)$$

### Unit - II

2. a) What do you understand by combinational circuit?
- b) What are encoders? Where they are used?
- c) What is full adder? Implement a full adder using two half adders and one OR gate.
- d) What is multiplexer? Implement the following function using  $8 \times 1$  multiplexer.

$$F(A, B, C, D) = \sum(0, 1, 3, 4, 8, 9, 15)$$

OR

A combinational circuit is defined by the following three function

$$F_1 = A'B' + ABC'$$

$$F_2 = A'+B$$

$$F_3 = AB + A'B'$$

Design the circuit with a decoder and gates.

### Unit - III

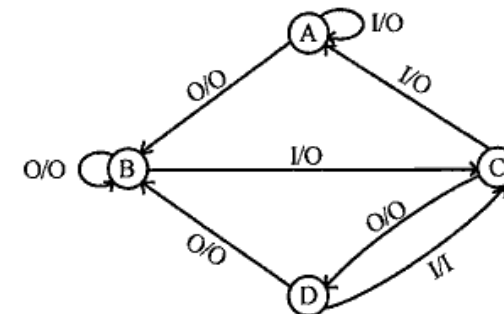
3. a) What is the difference between synchronous and a asynchronous sequential circuit?
- b) Explain J and K flip flop with truth table and logic diagram.

[3]

- c) What do you understand by Race-Round condition?
- d) Explain in detail the analysis of clocked sequential circuit with suitable example.

OR

Deduce the sequential circuit of the following state diagram using D flip flop.



### Unit - IV

4. a) What is the difference between serial and parallel transfer? What type of registers are used in each case.
- b) What are shift registers? Where they are used?
- c) Explain BCD counter in brief.
- d) Design a 3 bit binary UP/DOWN counter using JK flip flop.

OR

Explain Johnson counter in detail.

### Unit - V

5. a) Explain in brief
  - i) Address multiplexing
  - ii) Memory Decoding