

Roll No .....

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

Examination, June 2015

**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 codes:
  - i)  $(895.23)_{10} = ( )_2$
  - ii)  $(110101.011)_2 = ( )_8$
- b) Convert the following
  - i)  $(1011010111)_{\text{gray}} = ( )_2$
  - ii)  $(11010111)_2 = ( )_{\text{gray}}$
- c) Express the function  $Y = A + \overline{BC}$  in
  - i) Canonical SOP and
  - ii) Canonical POS form
- d) Simplify the logical expression  $ABCD + \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C + \overline{A}B\overline{C}$  using k-map.

OR

Find the minimal sum of products for the Boolean expression  $f = \Sigma(1,2,3,7,8,9,10,11,14,15)$  using the Quine-McCluskey method.

**Unit - II**

2. a) Design a half adder using logic gate.
- b) Draw the block diagram of parallel adder.
- c) Design full adder using two half adders.
- d) Design a BCD adder.

OR

Implement the logic function  $f(A,B,C,D) = \Sigma(0,1,3,4,8,9,15)$  using multiplexer.

**Unit - III**

3. a) Draw the circuit of edge triggered R-S flip-flop.
- b) What is the need of master slave flip-flop.
- c) Differentiate between synchronous and asynchronous sequential circuit.
- d) Draw the circuit of JK flip-flop and explain its working.

OR

Draw and explain master slave flip-flop using NAND-gate and explain its working.

**Unit - IV**

4. a) What is ripple counter?
- b) What is modulus counter?
- c) Differentiate between the performance of asynchronous and synchronous counters.
- d) Design a MOD-5 counter using JK flip-flop.

OR

Design a MOD-7 counter using T flip-flop.

**Unit - V**

5. a) What is RAM?
- b) What is ROM?
- c) Name the types of ROM and explain briefly.
- d) Explain the principle working of PLA.

OR

Discuss the principle working of R/2R D to A converter.

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