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**BJ—17—2016**

**FACULTY OF SCIENCE**

**B.Sc. (C.S.) (First Year) (First Semester) EXAMINATION**

**OCTOBER/NOVEMBER, 2016**

**(CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper S1.3**

**(Fundamental of Digital Logic)**

**(Wednesday, 23-11-2016)**

**Time : 10.00 a.m. to 1.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :— (i) All questions are compulsory.*

*(ii) Figures to the right indicate full marks.*

1. Attempt any *five* of the following : 15
  - (a) Explain basic gates (AND, OR, NOT)
  - (b) Explain universal gates (NAND, NOR)
  - (c) Explain min term, max term.
  - (d) Explain D-FF and T-FF.
  - (e) Explain multiplexer.
  - (f) Explain full adder.
  - (g) Explain half adder.
2. Attempt any *two* of the following : 10
  - (a) Explain and prove De Morgan's 1st and 2nd law.
  - (b) Explain commutative and distributive law and prove it.
  - (c) Explain universal property of NAND and NOR logic gates.
3. Attempt any *two* of the following : 10
  - (a) (i) Convert  $(110101)_2 = ( )_{10}$  ?  
(ii) Convert  $(739)_{10} = ( )_8$  ?

P.T.O.

- (b) (i) Convert  $(A3E)_{16} = ( )_{10}$  ?  
(ii) Convert  $(3241)_8 = ( )_2$  ?
- (c) (i) Subtract using 1's complement  
 $0111 - 0100$ .  
(ii) Convert gray code into binary code  
 $(110110)_{\text{Gray}} = ( )_2$  ?
4. Attempt any *two* of the following : 10  
(a) Minimize the following using K-map :  

$$f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$$
  
(b) Draw the K-map for :  

$$y = \bar{A}\bar{B}C + \bar{A}BC + A\bar{B}C + ABC$$
  
(c) Explain quad, pair, octate with example.
5. Attempt the following (any *two*) : 10  
(a) Explain SR flip-flop in detail.  
(b) Explain JK flip-flop in detail.  
(c) Explain JKMS flip-flop in detail.
6. Attempt the following (any *two*) : 10  
(a) Explain up counter in detail.  
(b) Explain down counter in detail.  
(c) Explain shift register in detail.
7. Attempt the following (any *two*) : 10  
(a) Explain A to D converter in detail.  
(b) Explain I/O buses in detail.  
(c) Explain block diagram of microprocessor.