sem-III / Digital Electronics / INST / 31-05-14

QP Code : NP-18622

(3 Hours) **[Total Marks :80**

N.B. : (1) Question **No.1** is **compulsory.** Attempt **any 3** out of remaining questions.
(2) **All** questions carry **equal** marks.
(3) Assume **suitable** data is **necessary**.

1. Answer any **four** out of following. **20**
   (a) What is Race around condition? what are solutions for this condition?
   (b) Explain difference between combinational and sequential circuit.
   (c) Implement XNOR logic gate using only NAND gates and only NOR gates.
   (d) Implement half adder using logic gates.
   (e) Explain difference between demultiplexer and decoder.

2. (a) Perform following conversions / arithmetic operations. **10**
   (1) $(97AC.\ 21)_{16}$ $(?)_{10}$
   (2) $(895.01)_{10}$ $(?)_{8}$
   (3) $(110111011101.1101)_2$ $(?)_{16}$
   (4) $(23)_{10}$-$(11)_{10}$ using 2's complement.
   (5) $(16)_7 + (13)_7$
   (b) Minimize following logic function using K-map and implement with logic gates.
   $F=\Sigma m(5,6,7,13,14,15)$ **10**

3. (a) Implement full adder using logic gives. **10**
   (b) Implement following function using one 8:1 mux. **10**
   $F=\Sigma m\ (2,3,7,8,10,12,13)$

4. (a) Design MOD-5 Assynchronous counter using JK flipflop. **10**
   (b) Design Ring Courter using D flipflop. **10**

5. (a) Convert 1. SR flipflop to D flipflop **10**
   2. SR flipflop to T flipflop
   (b) Prove following using boolean laws
   1. $\overline{\overline{AB}.\overline{(B+C)}} = \overline{B}\,\overline{C}$
   2. $\overline{\overline{AB}.\overline{(C+D)}.\overline{AB}} = \overline{A}+\overline{B}+C+D$

6. Write short notes on **any four**. **20**
   (a) S.R flipflop
   (b) Comparison of TTL and CMOS
   (c) PAL and PLA
   (d) Serial input and serial output register
   (e) Hamming code.

Con. 9818-14.