(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3072 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2013-14

SWITCHING THEORY

Time : 3 Hours *Total Marks : 100*

Note :–Attempt **all** questions.

1. Attempt any **four** : **(4×5=20)**

   (a) Perform the following operation :

   (i) $(1011)_2 - (0100)_2$ using 1's complement method

   (ii) $(4)_{10} - (9)_{10}$ using 2's complement method

   (iii) Add $(569)_{10}$ and $(687)_{10}$ in BCD.

   (iv) Obtain the XS – 3 code for $(428)_{10}$

   (v) Encode the decimal number 46 to gray code.

   (b) A bit word 1011 is to be transmitted. Construct the even parity seven bit Hamming code for the data.

   (c) Write a short note about error detection and correction codes. Describe the cyclic codes.

   (d) Simplify the following logic expression :

   (i) $Y = \pi M (1, 3, 5)$

   (ii) $Y = \Sigma M (2, 4, 6)$

   (e) Minimize the following expression using the K-map :

   $Y = \Sigma m (1, 5, 6, 7, 11, 12)$

   (f) Distinguish between static and dynamic hazard.

2. Attempt any two : **(2×10=20)**

(a) Explain the block diagram of a combinational circuit. Design the full address using half address and verify its truth table.

(b) Implement the following boolean function using all 4:1 multiplexers :

$F(A, B, C, D, E) = \Sigma m(0, 1, 2, 3, 6, 8, 9, 10, 13, 15, 17, 20, 24)$.

(c) Give the comparison of PROM, PLA and PAL.

A combinational logic is defined by function–

$F_1 (A, B, C) = \Sigma m (3, 5, 6, 7)$

$F_2 (A, B, C) = \Sigma m (0, 2, 4, 7)$

Implement the circuit with PLA having 3 input, 4 product term and two output.

3. Attempt any two : **(2×10=20)**

(a) Differentiate between latches and flip flop. Design one input and one output D flip flop and draw the circuit for converting it into SR flip flop.

(b) Distinguish between synchronous and Asynchronous digital sequential circuit. Explain using example circuit of 3 bit binary counter.

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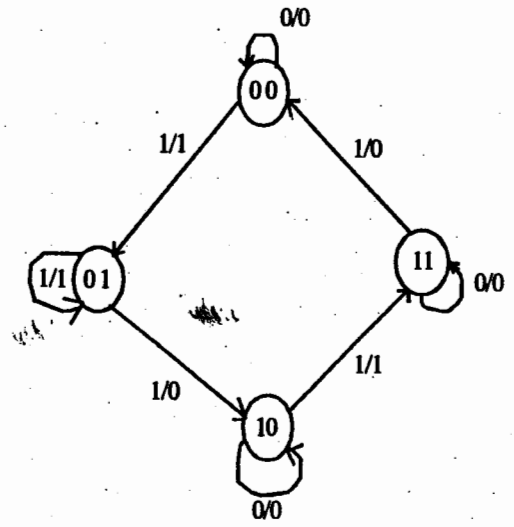
(c) For the following state diagram obtain state table, excitation table and design the circuit using J- K flip flop.



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4. Attempt any two : **(2×10=20)**

(a) Enlist the basic components of bipolar and unipolar logic family. Explain the various parameters of RTL logic.

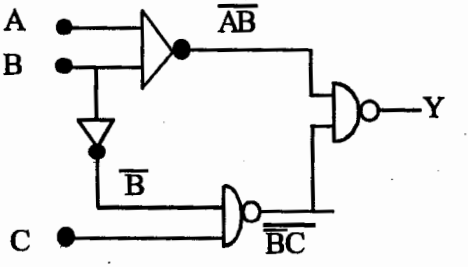
(b) Explain why the temperature sensitivity of HTL is significantly better than DTL. Compare the two with the help of a 3 input NAND gate circuit.

(c) Draw the interfacing circuit of CMOS and TTL and explain a TTL driving CMOS and a CMOS TTL. Find the fan out when a CMOS driving TTL series gates.

5. Attempt any **four** : **(4×5=20)**

(a) Distinguish between static and dynamic hazard.

(b) For the network shown in following diagram, write the transient disjunctive normal formula.



(c) Classify and characterize the various types of memories.

(d) Draw a dynamic CMOS shift register for one stage and draw its block diagram. Explain the operation.

(e) Draw the diagram of a 16-bit ROM-array.

(f) Explain the various types of ROM and how it is programmed.

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