B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

MECHATRONICS ENGINEERING

U07MH303: Digital Electronics

Time: Three Hours   **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. When two inputs of NAND gate are A and B, what is the output

   A) $(AB)'$ B) $(A+B)'$ C) $A+B'$ D) $A'+B$

2. binary equivalent of $(0.25)_{10}$

   A) 1.01   B) 0.01   C) 0.10   D) 0.11

3. Half adder adds

   A) 4 bits   B) 3 bits   C) 2 bits   D) 6 bits

4. ROM circuit is combination of

   A) decoder and OR gates.   B) decoder and NOT gates.

   C) decoder and AND gates.   D) decoder and NAND gates.

5. Which flip-flop used to avoid race around condition

   A) RS FF   B) D FF   C) JK FF   D) MS FF

6. Decade counter is also called as

   A) mode-5 counter.   B) mode-10 counter.   C) mode-6 counter.   D) mode-12 counter.

7. The hazards occurs only in

   A) counters   B) shift registers   C) asynchronous circuits   D)synchronous circuits

8. In fundamental mode of asynchronous circuit the input change only when the circuit is

   A) Unstable   B) Stable   C) Bistable   D) Unique stable.

9. ASM chart is similar to

   A) state diagram   B) state reduction   C) state deduction   D) state assignments

10. State machines are also called

    A) logic circuit   B) sequences circuits   C) asynchronous circuits.   D) counter circuits

PART B (10 x 2 Mark = 20 Marks)

11. What are the universal gates? Why do they called so?

12. State the Demorgan's theorems.

13. Draw a logic circuit diagram of full adder.

14. Distinguish between PAL and PLA.

15. List out the applications of shift register?

16. State the difference between the synchronous sequential and asynchronous sequential circuit.

17. Define static-1 hazards.

18. Define the race and cycle?

19. Explain time consideration in Algorithmic State Machines (ASM).

20. What are the ASM blocks and explain in brief.

PART C (5 x 14 = 70 Marks)

21. a) (i) Convert $(701.35)_8$ to hexadecimal number   (6)

    (ii) Minimize the following function using karnaugh map method.   (8)
         $f(A,B,C,D) = \sum m(5, 6, 7, 12,13) + \sum d (4,9,14,15)$

(OR)

    b) Minimization the following function using tabular method
         $f(A,B,C,D) = \sum m (0,2,3,6,7,8,10,12,13)$

22. a) (i) Design and draw the full subtrcator circuit.   (7)

    (ii) Implement the following Boolean function using 8 x1 MUX

         $F(P,Q,R,S) = \sum m (0,1,3,4,8,9,15)$ (7)

(OR)

    b) Implement the following functions using PLA.

       $A (x,y,z) = \sum m (1,2,4,6)$

       $B (x,y,z) = \sum m (0,1,6,7)$

       $C (x,y,z) = \sum m (2,6)$

23. a) (i) Draw and explain the operation of JK flip flop.   (7)

    (ii) Design and draw the 4 bits synchronous counter.   (7)

(OR)

b) Explain briefly the different types of RAM.

24. a) Explain design procedure of fundamental mode method of asynchronous sequential Circuits.

(OR)

b) Design an asynchronous sequential circuit with two inputs X and Y and with one output Z. Whenever Y is 1, input X is transferred to Z. when Y is 0, the output remain same for any change in X.

25. a) Explain design procedure for Algorithmic State Machines.

(OR)

b) Explain the implementation of multiplexers using algorithmic state machines.

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