SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | Total number of pages:[2]
Total number of questions:06

B.Tech. || ECE || 4th Sem

Digital System Design

Regular / Re-appear

Subject Code: BTEC-402A

Paper ID:

Time allowed: 3 Hrs **Max Marks: 60**

Important Instructions:

- **All questions are compulsory**
- **Assume any missing data**

PART A (2×10)

Q. 1. Short-Answer Questions: All COs

(a) Discuss any two advantages of programmable logic devices.
(b) Draw block of a PAL device and label it properly.
(c) What do you understand by the term ASM chart ?
(d) "Multiplexers can be used in system controller implementations." Justify this statement.
(e) Differentiate between Moore and Mealy machines
(f) List two essential properties that a digital system must have in order to be classified as a sequential circuit
(g) What is importance of next state decoder in sequential circuit design ?
(h) With the help of an example, define the role of detailed flow diagram in sequential logic.
(i) Discuss features of asynchronous finite-state machines. What are their advantages as compared to synchronous finite-state machines ?
(j) What do you understand by Race-free state assignment ?

PART B (8×5)

Q. 2. Minimize the logic function Y = ΠM (0, 1, 4, 6) and realize using NOR gates. Also determine whether hazard occurs in this circuit. If yes, find the condition under which it occurs and give the timing diagrams. CO I

OR

Design a BCD-to-seven segment decoder using: (a) PROM, and (b) PLA. CO I

Q. 3. With the help of an example, describe use of ASM charts in designing state machines. CO II

OR

Design a four-way traffic light controller using direct-addressed multiplexer. CO II

Q. 4. Explain, using a suitable example, design steps for traditional synchronous sequential circuits. CO III

OR

What do you understand by finite-state machines ? Describe relative advantages and disadvantages of various types of finite-state machines. CO III

Q. 5. A synchronous sequential circuit is to be designed having a single input X and single output Y to detect single change of level (from 0 to 1 or from 1 to 0) in a 3-bit word and produce an output Y = 1, otherwise Y = 0. When a new 3-bit word is to come, the circuit must be at its initial (reset) state and there should be a time delay of one clock cycle between the words. CO IV

OR

Design a sequence detector circuit to detect a serial input sequence of 1010. It should produce an output 1 when the input pattern has been detected. CO IV

Q. 6. What are different types of hazards ? Determine whether essential hazard exists in the flow table of figure below. Assume initial stable state (A) CO IV

PS \ x	0	1
A	(A)	B
B	A	(B)

OR

Define a primitive state diagram and construct the primitive flow table for a rising-edge triggered D flip-flop. CO IV