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 Subject Code: BTEC-402A Regular Re-appear-

Time allowed: 3 Hrs Important Instructions:

Max Marks: 60

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

PART A (2×10)

Q. I. 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.

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- (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 $Y = \Pi M (0, 1, 4, 6)$ and realize using NOR CO I gates. Also determine whether hazard occurs in this circuit. If yes, find the condition under which it occurs and give the timing diagrams.

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 CO II

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

COII

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

OR

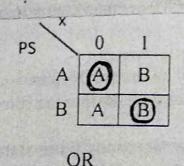
What do you understand by finite-state machines? Describe relative CO III advantages and disadvantages of various types of finite-state machines.

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.

OR

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

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



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