

Dec.-22-0211

EC-503 (Electronic Logic Circuit Design)

B.Tech. 5th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

**Note :** Attempt five questions in all, selecting one question from each section A, B, C and D. Question no. 9 is compulsory.

#### SECTION - A

1. Design a mod-10 counter (Asynchronous) using J-K-Flip-Flops. (10)
2. (a) Draw the circuit of a 4 bit shift register and explain its operation. (5)  
(b) Discuss the application of a shift register as a 4-bit ring counter. (5)

#### SECTION - B

3. A sequential machine has one input line where 0's and 1's are being incident. The machine has to produce an output of 1 only when exactly two 0's are followed by a '1' or exactly two 1's are followed by a '0'. Using any state assignment and J-K Flip Flops, synthesize the machine. (10)
4. Discuss finite state model. Also discuss the capabilities and limitations of finite state machine. (10)

#### SECTION - C

5. Discuss: (a) Fundamental mode circuits.  
(b) Timing diagram, state diagram and flow tables. (10)

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6. Construct a primitive flow table for a fundamental mode circuit which has 2 I/P and single O/P, which becomes 1 only upon the occurrence of the last in the following sequence of I/P combination otherwise  $z=0$ ,  $x_1x_2$  : 00, 01, 11, 10. (10)

#### SECTION - D

7. Discuss the various type of hazards present in digital circuits. (10)
8. (a) What do you mean by decomposition? Explain the different type of decomposition. What are the conditions for serial and parallel decomposition? (5)  
(b) Discuss how to detect and eliminate hazards from an Asynchronous networks. (5)

#### SECTION - E (Compulsory)

9. Answer the followings:
  - (a) Distinguish between synchronous & Asynchronous circuits.
  - (b) What is the mode of 4 bit-ring counter?
  - (c) What is the difference between Asynchronous & Synchronous counters?
  - (d) What is the significance of state assignment?
  - (e) What is meant by state transition diagram?
  - (f) What are various applications of shift registers?
  - (g) What is the difference between PAL and PLA?
  - (h) What do you mean by gate delay?
  - (i) Comment on generation of strikes.
  - (j) What are the causes of the essential hazards developed in the digital circuits? (10×2=20)