Roll No. ....

OLE-24043

B. Tech. 3rd Sem. (IT) Examination – April, 2021

DIGITAL ELECTRONICS

Paper : EE-204-F

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

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is *compulsory*. All questions carry equal marks.

1. (a) Difference between counters and registers.

　　(b) Hamming codes.

　　(c) Design a single bit magnitude comparator to compare two alphabets C and D.

　　(d) Sate the difference between Mealy and Moore state machines.

　　(e) How a D flip-flop covert into T flip-flop.

(f) Discuss free state assignment.

(g) Simply :

$$F = \overline{A}(\overline{B} + \overline{C}) + BC + A\overline{C}$$

(h) Error detecting and correcting codes. $2.5 \times 8 = 20$

SECTION – A

2. (a) Minimize the function using Quine-Mcluskey method.

   $Y(ABCDE) = \Sigma(0, 1, 4, 7, 9, 11, 21, 26, 30) + d(3, 12, 18)$

   10

   (b) Explain how will you obtain Boolean expression for a logic diagram and logic diagram for a Boolean expression with the help of examples.   10

3. (a) (i)   Multiply $(110.10)_2$ by $(11.01)_2$.   10

   (ii) Convert $(10101011)_2$ to its gray code.

   (iii) Add $+ 112_{10}$ and $+ 65_{10}$ using 2_s compliment arithmetic.

   (iv) Add the following hexa decimal number :

   (i) 1256 + 3DFF (ii) 21F + BFC

   (b) Solve the functions using k-map. For SoPsPoS.
 $f(ABCD) = \pi\ (0,2,3,5,8,9,11)$ 10

SECTION – B

4. (a) What do you mean by Multiplexer ? Realize 32:1 Multiplexer using two 16:1 Multiplexer.   10

(b) What is an adder ? Explain its logic diagram with truth table.   5

(c) Differentiate combinational and sequential logic circuits.   5

5. (a) Explain the function of Demultiplexer in detail with its diagram.   10

(b) What are encoders and where are they used ? Draw and explain a decimal to BCD encoder.   10

SECTION – C

6. (a) What are counters ? How we use them in digital system ? Explain asynchronous and synchronous counters with diagrams.   10

(b) Design a shift register counter to generate a sequence length of 8 having self start feature.   10

7. (a) Explain the working of Master Slave JK flip flop and what is race-around condition. How it can be removed.   10

(b) Design a Mod-5 Synchronous counter using J-K flip-flop and draw its state diagram.   10

SECTION – D

8. (a) Explain different types of Hazards in combinational circuit. **10**

(b) For state diagram in figure, obtain the state table and design the circuit using minimum number of JK flip flops. **10**
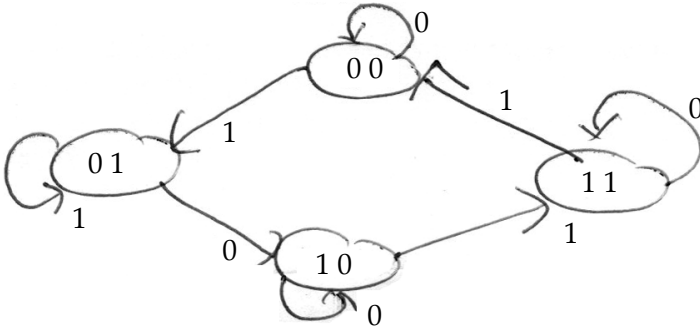
9. (a) Differentiate between RAM and ROM including their advantages, disadvantages and applications.

10

(b) Write a short note on the followings :

(i) Asynchronous sequential logic.

(ii) Reduction of states.

(iii) ASMs. **10**

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