Total No. of printed pages = 2

ECE 181303

Roll No. of candidate | | | | | | | | | | |

22/2/ 2021

B.E 3rd Semester End-Term Examination

ECE, ETE, PEIE

DIGITAL CIRCUITS

(New Regulation and New Syllabus)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer the following questions.

1. (a) Convert the followings: (2×2=4)

   (i) $(129)_{10}$ into octal equivalent.

   (ii) $(630.4)_8$ into binary equivalent.

   (b) Each of the following number is a signed binary number 01101, 10111 and 1101010. Determine the decimal value in each case, if they are in (3×2=6)

   (i) Sign-magnitude form

   (ii) 2's complement form

   (iii) 1's complement form

2. (a) Define SOP and POS term. Convert the Boolean expression $A\bar{B}C + \bar{B}CD + A\bar{C}D$ to SOP form. (7)

   (b) Simply the Boolean expression using K-Map $f(A,B,C,D) = \sum m(1,5,6,12,13,14) + d(2,4)$ (8)

3. (a) What is the difference between combinational and sequential circuits? (2)

   (b) How latches are different from flip-flops? What is race around condition? How can it be eliminated? (2+2+3)

   (c) Design a T Flip-Flop using S-R Flip Flop. (6)

[Turn over

4. (a) What is difference between asynchronous and synchronous counters? How many flip-flops are required to construct a BCD counter? (2+1)

(b) Design a Mod-5 ripple down counter using D-flip Flop. (7)

(c) Draw the circuit diagram for serial-in parallel-out shift register. (5)

5. (a) Explain the working of TTL NAND gate with neat diagram. (4)

(b) Design an inverter using CMOS logic. (3)

(c) Write short note on any *two*: (2×4=8)

(i) Moore and Mealy state machine.

(ii) Ring Counter.

(iii) Fan-in and Fan-out.

(iv) FPGA.