Q.P. Code: 00003962

[Time:2.30 Hrs.] [Marks:75]

Please check whether you have got the right question paper.
N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q.1 Attempt **any three** of the following: 15

a. What is Digital System? Explain with its features.
b. Write a short note on Error detecting and correcting codes.
c. Convert Hexadecimal number (BD.CF) to binary and decimal.
d. Explain universal product code with its advantages.
e. Subtract using One's Complement & Two's Complement $(8-10)_{10}$
f. Convert $(13)_{10}$ to BCD, Gray code and Excess-3 code.

Q.2 Attempt **any three** of the following: 15

a. What are the universal gates? Why they are so called?
b. State and prove De Morgan theorem and realize it using basic gates.
c. Simplify the following using K-map and realize it using
   2 input gates $f (A, B, C, D) = \sum m (1,2,9,10,14,15)$
d. Explain EX-OR and Ex-NOR gate with truth tables and circuit diagrams in detail.
e. Minimize the following POS equation using K-map. $f (A,B,C) = \prod M (1,3,6,7)$
f. Simplify the Boolean function $f (PQRS) = \sum m (2, 6, 8, 9, 10, 11, 14, 15)$ with Quine-McCluskey method.

Q.3 Attempt **any three** of the following: 15

a. Explain the concept of Encoder and Decoder.
b. Explain Half Adder with truth table and circuit diagram in detail.
c. Write a short note on Full Subtractor with truth table and circuit diagram.
d. Explain Comparators with its two types.
e. Write a short note on 8 to 3 parity encoders.
f. Explain Binary to Gray code converter with a suitable example.

Q.4 Attempt **any three** of the following: 15

a. Explain the term Multiplexer and working of 8: 1 Multiplexer.
b. Explain Master Slave J-K Flip flop in detail.
c. Explain the term Demultiplexer and working of 1: 4 demultiplexer.
d. Design the logic circuit of D Flip Flop.
e. What is Flip-Flop? Write down its applications.

f. Explain Race-Around condition in flip-flop?

Q.5   Attempt **<u>any three</u>** of the following: 15

a. Draw and Explain Ripple Counter.
b. Explain the term Register with their mode of operations.
c. Explain the concept of Synchronous Counter with circuit diagram.
d. Design mod – 4 regular sequential synchronous up counters by using T FF.
e. Explain the features and functions of IC7495.
f. Write a short note on Johnson Counter.