2020

Full Marks: 70

Time: As in the programme

The questions are of equal value.

Answer all the questions.

1. Answer the following questions: - **[4 x 3.5 = 14]**

(a) $(1111100000101101)_2 = (\quad)_8 = (\quad)_{10}$

(b) $F(D,E,F,G) = \sum m(1,3,4,7,10,11) + d(0,2,5)$

(c) $F(P,Q,R,S) = \pi M(1,2,3,4,5,11,12,13,14,15)$

(d) $(110000011100001001)_2 = (\quad)_{16} = (\quad)_{10}$

OR

Reduce the following function using Quine McCluskey method for a seven variable digital system.

F(A,B,C,D,E,F,G) = $\sum$ **(0,2,3,6,7,14,15,30,31,62,63,126,127)** **[14]**

2. Find the decimal equivalent in IEEE 754 single format that is close to the given floating-point binary number:

01000011111110000000000000000000 **[14]**

OR

(a) Subtract $(-1)_{10}$ from $(-4)_{10}$ in binary. **[3]**

(b) Distinguish between Sign Magnitude and 2's Complement Representation. **[4]**

(c) Can we use half adders for adding $(0011)_2$ and $(0001)_2$? If yes, then explain the addition using half adders. If no, then state the adder that can be used for adding them and also design the adder (write the truth table, K-maps and draw the circuit diagram). **[7]**

3. **(a)** Distinguish between Multiplexer and Demultiplexer. **[6]**

(b) Design a decoder that will convert 3-bit binary code to gray code. Write the truth

table and draw the K-maps. Also draw the circuit diagram. **[8]**

OR

What do you mean by Mod-n Counter? Construct a 4-bit synchronous Mod-10 counter using T Flip Flop. Draw the circuit diagram neatly. Also, draw the timing diagram when the counter uses a negative clock with positive-edge triggering. **[14]**

4. (a) Describe the different Disk Performance parameters. **[6]**

(b) Why RAM is called as a volatile memory? Differentiate between DRAM and SRAM. **[8]**

OR

Write short notes on the following: **[4 x 3.5 = 14]**

(a) Optical Disk

(b) Magnetic Tape Systems

(c) Semiconductor Memory

(d) Magnetic Disk

5. (a) Design an 8 x 1 Multiplexer using 4 x 1 Multiplexer. **[4]**

(b) Add (0.473×10^5) and (0.55×10^2) by using floating-point arithmetic. **[5]**

(c) Differentiate between Serial-In-Serial-Out (SISO) and Parallel-In-Serial-Out (PISO) registers. **[5]**

OR

Explain Unsigned Binary Division in detail with a neat and labeled flowchart. Divide $(5)_{10}$ by $(3)_{10}$ in four bits using Unsigned Binary Division. **[14]**
