Note: 1. All questions are compulsory.
2. Figure should be neat and labeled.
3. Write side indicates full marks.

Q.1 Attempt any 2 from the following. (10 M)

1. Solve the following.
    I. $(153.45)_{10} = (?)_2$
    II. $(465.32)_8 = (?)_{10}$

2. Solve the following.
    I. $(0101111)_2 + (0111001)_2 + (1010111)_2 = (?)_2$
    II. $(1011)_2 * (1110)_2 = (?)_2$

3. Find 1's and 2's compliment for the following.
    I. $(21)_{10}$
    II. $(48)_{10}$

4. Represent the following number in signed magnitude, BCD, Excess-3, Gray code.
    I. $(251)_{10}$
    II. $(238)_{10}$

Q.2 Attempt any 2 from the following. (10 M)

1. Construct Basic Gates using NAND gates.
2. Explain De'Morgons 1st law.
3. Prove the following.

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

4. Realize the equation, Draw the K-Map & circuit diagram by using SOP method.

$$F(A,B,C,D) = \sum m \ (0,1,2,3,,8,9,10,11,12,13)$$

Q.3 Attempt any 2 from the following. (10 M)

1. Write short note on Full Adder.
2. Write short note on half Subtractor.
3. Write short note on Binary to Gray Code Convertor.
4. Draw 8:1 Multiplexer for the following.

$$y = \sum m \ (1, 2, 4, 5, 6, 7)$$

Q.4 Attempt any 2 from the following. (10 M)

1. Write short note on Counters.
2. Write short note on D-type and T-type Flip-Flop.
3. Write short note on Shift Registers.
4. Explain Clocked S-R Flip-Flop.

Q.5 Attempt any 2 from the following. (10 M)

1. Write short note on Optical Disk.
2. Write short note on Secondary Memory.
3. Write short note on Hard Disk.

4.Write short note on Cache Memory.

Q.6 Attempt any 2 from the following. (10 M)
1. Write short note on Real Time Operating System.
2. Write short note on Linux Operating System.
3. Write short note on Single User/Single tasking Operating System
4. Write short note on Multi User/Multitasking Operating System.

Q.7 Attempt any 3 from the following. (15 M)
1. .Solve the following using 2's compliment method.
   I. $(13 - 9)_{10}$
2. Write short note on XOR gate.
3. .Draw 8:1 mux for the following.

   $Y= \sum m (0, 1, 2, 3, 4, 6)$

4. Explain Clocked J-K Flip-Flop.
5. Write short note on Primary Memory.
6. Write short note on I/O Devices.