



- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw neat and labelled diagrams wherever necessary.
 3. Use of log table/calculator is allowed.

1. Either

- a) What is K-map? Explain pair, quads and octet in k-map with suitable example. Draw the k-map and simplify the following Boolean equation. 5+5

$$Y = \overline{A} \overline{B} \overline{C} \overline{D} + \overline{A} \overline{B} \overline{C} D + \overline{A} \overline{B} C \overline{D} + \overline{A} \overline{B} C D + A \overline{B} \overline{C} \overline{D} + A \overline{B} \overline{C} D + A \overline{B} C \overline{D} + A \overline{B} C D$$

OR

- b) Draw a logic diagram of 1:4 Demux and explain its working. 5+5
Design 1:8 Demux using 1:4 Demux and give its truth table.

2. Either

- a) What is decoder? Draw a logic diagram of 2-line to 4-line decoder and explain. Draw a block diagram of single digit display using IC 7447 and explain. 5+5

OR

- b) Explain the working of priority encoder using IC 74147 with suitable diagram. Explain half adder with logic diagram, truth table and Boolean equation. 5+5

3. Either

- a) Draw a logic diagram of RS flipflop using NOR gates and explain its working. Explain the concept of edge. and level triggering. 5+5

OR

- b) Explain the importance of preset and clear. 3+7
Draw a suitable diagram of JKMS flipflop and explain its working with timing diagram.

4. Either

- a) What is counter? Differentiate between up and down counter. 3+7
Draw a block diagram of 3-bit down counter and explain its construction and working. Give its timing diagram.

OR

- b) Explain the construction and working 3-bit synchronous counter. Explain the construction and working of 3-bit Johnson counter. 5+5

5.

- a) What do you mean by SOP and POS? Explain with example. 2½x4
- b) Explain the working of 4-bit binary adder. =10
- c) Draw a diagram of clocked RS flipflop and state its limitations.
- d) Explain the concept of modulus of counter.
