

- N.B.:** (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six**.
(3) Assume suitable data if necessary.
(4) Figures to the **right** indicate **full marks**,

1. (a) Implement the following using 2 input NOR gates. 10
(i) $Y = \overline{A}B + \overline{B}C$
(ii) $Z = A \oplus B$
(b) Convert JK - FF to T - FF and then SR - FF to JK - FF 10
2. (a) Explain working of TTL NAND gate circuit. Draw its transfer characteristics. 10
(b) Using Quine McClusky method, minimize the following expression - 10
 $F(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$
3. (a) Explain serial - in - serial - out shift register using SR Flip - Flop 10
(b) Draw and explain the static MOSRAM cell. Explain any one programming mechanism in detail. 10
4. (a) Explain master - slave JK Flip - Flop. 10
(b) Draw and explain functional block - diagram of IC 723 voltage regulator. 10
5. (a) (i) State and explain De-Morgans theorem. 10
(ii) Show $A\overline{B} + \overline{A}C = \overline{A}B + \overline{A}C + B\overline{C}$.
(b) Simplify the following expression using K-map and realize using AND-OR realization. 10
 $F(A, B, C, D) = \sum m(1, 3, 7, 8, 10, 12, 13, 15)$
6. (a) Design and implement a 3 bit synchronous up - counter using JK Flip-Flop. 10
(b) Convert BCD to Hexadecimal 5
(i) 492 (ii) 83
(c) Convert $A8B2_{16}$ to octal. 5
7. Write short notes on any three : 20
(a) ADC 0808
(b) IC 555
(c) ULM or multiplexer
(d) Combinational circuit hazards
(e) Fan - in and Fan - out.