

Question No. 1 is compulsory.

- (1) Attempt any **THREE** questions from remaining.
- (2) Figures to the right indicate full marks.
- (3) Assume suitable data if necessary.

1. Answer the following:-

[20]

- (a) State and Prove De Morgan's theorems.
- (b) How keyboard debouncing is eliminated using flip flop?
Explain with suitable circuit diagram.
- (c) What are the merits and demerits of TTL family?
- (d) Simplify the following expression using K Map.
 $F = \sum (0,1,4,5,6,8,12)$.

2. (a) Convert :- i) $(2645.71)_{10}$ to Octal, Binary and Hexadecimal.
ii) Add $(83)_{10}$ and $(34)_{10}$ in BCD

[10]

- (b) Perform: - i) $(73)_{16} - (1C)_{16}$
ii) $(958)_{10} = (?)_{BCD} = (?)_{Hex}$

[05]

(c) Compare demultiplexer and decoder.

[05]

3. (a) Prove the following using Boolean algebra and draw the logic circuit.

[10]

- i. $\overline{A}BCD + \overline{A}BCD + ABD = BD$
- ii. $A.(A+B) = A$

(b) Design 2-bit comparator using gates.

[10]

4. (a) Design 4 bit Binary to Gray code converter.

[10]

(b) Implement full adder using logic gates.

[10]

5. (a) Design a Decade Counter (Binary Asynchronous) with timing diagram.

[10]

(b) What is Shift register? Explain the working of 4-bit bidirectional shift register.

[10]

6. Write note on: - (Any Four)

[20]

- (a) PAL and PLA.
- (b) Hamming code.
- (c) Johnson Counter.
- (d) Hazards in Combinational logic.
- (e) Basic dynamic RAM Cell.
