

Roll No.

Total No. of Pages 2

BT4 / J03

ITEC-294 : Digital Electronics

M.M. : 75

Note : Attempt any five questions

1. (a) Given the logic equations

$$f = ABC + \overline{BCD} + \overline{ABC}$$

(i) Make a truth table.

(ii) Simplify using k-map.

(iii) Realize f using NAND gates only.

(b) Design a binary to Gray code converter.

2. (a) What do you understand by variable entered k-map ?

Discuss with the help of an example.

(b) Draw the logic diagram of a 5 bit up-down synchronous counter with series carry.

3. (a) Design an encoder, satisfying the following truth table, using a diode matrix.

| Inputs | | | | Outputs | | | |
|--------|-------|-------|-------|---------|-------|-------|-------|
| W_3 | W_2 | W_1 | W_0 | Y_3 | Y_2 | Y_1 | Y_0 |
| 0 | 0 | 0 | 1 | 0 | 1 | | |
| 0 | 0 | 1 | 0 | 1 | 1 | | |
| 0 | 1 | 0 | 0 | 1 | 1 | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

(b) List various A/D and D/A chips. Describe the operations of each one of these.

4. (a) A 50 : 1 ripple counter is desired.

(i) How many Flip Flops are required ?

- (ii) If a 4-bit Flip Flops are available on a chip, how many chips are needed ?
How are they inter connected ?
- (iii) Indicate the feedback connections for the clear terminals.
- (b) What is the difference between pulse mode and fundamental mode asynchronous circuits ? Explain. (6)
5. (a) What do you mean by Asynchronous sequential circuits ? Using an example, discuss how various states are assigned. (7)
- (b) Draw the schematic diagram of a D/A converter. Use resistance values whose ratios are multiple of 2. Explain the operation of the D/A converter. (8)
6. (a) Using an example, discuss the difference between a Mealey and Moore machine. (6)
- (b) What is a High-Threshold Logic device ? Draw and discuss the working of a three input HTL NAND gate. (9)
7. Write short notes on the following :
- (a) QM method. (8)
- (b) Demultiplexes. (7)
8. (a) Draw and discuss the logic diagram for an 8 to 1 line multiplexes. (8)
- (b) What do you understand by Race-around condition in J-k Flip Flops ? How it can be avoided ? (7)