

This question paper contains 3 printed pages.]

Your Roll No.

1401

A

B.Sc. (Hons.)/II
ELECTRONIC SCIENCE—Paper—2.3 (X)
(Digital Electronics)

Time : 3 Hours

Maximum Marks : 38

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt Five questions in all, including
question No. 1 which is compulsory.*

1. (a) What range of unsigned and signed decimal numbers can be represented by 8-bits ? 2
- (b) Subtract $(16.5)_{10}$ from (35.4) using 1's and 2's complement methods. 2
- (c) Show that if $x, y = 0$ then $x \oplus y = x + y$ 2
- (d) How many steps are there in a 10-bit DAC ? What is its % resolution ? 2
- (e) What is the advantage of E²PROM over EPROM ? 2

[P.T.O.]

2. (a) Design a logic circuit to convert excess - 3 code to 8421 BCD code. 3

(b) Minimise the given function using Quine–McCluskey method and implement using only NAND gates. 4

$$F = \sum_m (0, 1, 3, 7, 14) + \sum_d (2, 11, 15)$$

3. (a) Design and implement an octal to binary priority encoder. 4

(b) Draw a block diagram and explain how to construct a 1×16 demultiplexer using several 1×4 demultiplexers. 3

4. (a) Draw the output wave forms of each FF for a 3-bit Johnson counter. 3

(b) Draw the logic circuit of a 4-bit PISO register. Give the logic levels on all the input lines to store 1101 in parallel. What will be the contents of the register after 3 clock pulses if the data stored is shifted serially ? 4

5. (a) Design and implement the circuit for a 3-bit up-down synchronous counter using T-type FFS. 5

(b) How many FFS will be complemented in a 10-bit binary ripple counter to reach the next count after the following count : 2

(i) 1101101100

(ii) 0011110101

6. (a) Explain the working of an EPROM cell. 3
- (b) Draw the basic structure of a 256×4 static RAM arranged in 32×32 matrix format. 4
7. (a) What is wired logic ? What type of gates are required to implement wired logic ? 1
- (b) Explain the operation of a CMOS NOR gate. 4
- (c) Give two main differences between TTL and CMOS logic families. 2