PRS/KS/24/20033

Bachelor of Science (B.Sc.) Semester—I Examination

ELECTRONICS (Fundamentals of Digital Electronics)

Optional Paper – 2

Time : Three Hours] [Maximum Marks : 50

Note :— (1) All questions are compulsory and carry equal marks.

(2) Draw labeled diagrams wherever it is necessary.

EITHER

1. (A) Explain the 1's complement and 2's complement method of subtraction of binary numbers using suitable example. How negative numbers are represented in the binary number system ? 6+4

OR

(B) What are codes ? What are BCD codes ? What are the different unweighted codes ? Explain Excess-3 codes in detail. 1+4+1+4

EITHER

2. (A) What is Boolean algebra ? What are logic gates ? Explain all the basic logic gates. Realize all the basic gates using NOR and NAND gates. 1+1+3+5

OR

(B) State and prove associative and distributive laws of Boolean algebra. State and prove De' Morgan's laws. List all the OR Laws. 4+4+2

EITHER

3. (A) What is K-map ? What are its advantages ? Explain the different terms associated with K-map. Solve the following using K-map : 2+1+3+4

$$F(A,B) = \sum m(0,2,3)$$

OR

(B) What is Multiplexer ? Explain the design and working of 4 : 1 Multiplexer using logic gates. What are the advantages and applications of Multiplexers ? 2+4+2+2

EITHER

4. (A) What is Flip-flop ? What are the uses of Flip-flop ? List the different types of Flip-flop. Explain the construction and working of clocked RSFF with preset and clear inputs using NAND gates. 2+2+2+4

OR

(B) What is racearound condition ? Sketch and explain the construction and working of JK master slave Flip-flop using NAND gate. How the racearound condition is removed in this Flop-flop? 1+4+4+1

5. Attempt any **ten** : 1×10=10

(a) Compute : $(DAD)_{16} = (?)_{2}$

(b) What is the base of Octal number system ?

(c) Convert $(55)_{10}$ to the BCD code.

(d) Draw the truth table of XNOR gate.

(e) Draw the symbol of XOR gate.

(f) Solve the following Boolean expression :

$A + AB = ?$

(g) What is meant by SOP ?

(h) Draw the logic circuit of Half adder.

(i) List the types and number of gates required to design Half subtractor.

(j) Draw a logic diagram of basic NAND latch.

(k) What are the different types of clocks used for triggering of Flip-flop ?

(l) What is meant by propagation delay in Flip-flop ?