বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

BCA

1st Semester Examination 2021

DIGITAL ELECTRONICS

PAPER—1104

Full Marks : 70

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group – A

Answer any *four* questions. 4×15

1. (a) Implement XOR logic gate using NOR Gates.

(b) Prove that :

$$AB + C\left(\overline{AB + AC}\right) = AB$$

(c) Implement $f(A,B,C) = \sum_m (0,2,4,6,7)$ using 4 : 1 multiplexer.

4+4+7

2. (a) Simplify the following expression using K-map method and implement the same using logic gates :

$f = \sum(0,2,5,7,8,10,13,15)$

(b) Minimize the following Boolean expresions using Boolean laws.

(i) (A + B) (A + $\bar{B}$)

(ii) ABC + A$\bar{B}$C + AB$\bar{C}$ (5+5)+5

3. (a) What is encoder ?

(b) Design a 8 X 3 Encoder and explain its operation with a truth table.

(c) What is parity generator ? Design and explain 8 bit parity generator circuit. 2+6+7

4. (a) What is flip-flop ? Compare level clocking and edge triggering.

(b) Design and explain a D-flipflop.

(c) What is the advantage and disadvantage of D-flip-flop ? 5+6+4

5. (a) Design and explain a 4 bit ripple up counter.

(b) Design a Gray to Binary code converter.

(c) What is shift-register ? 6+7+2

6. Write short notes on any *three* of the following : 3×5

(a) Digital comparator.

(b) Universal gates.

(c) MOD-10 counter.

(d) J-K master slave flip-flop.

(e) Full adder.

7. (a) Design MOD-7 counter by D-flip flop.

(b) Implement J-K flip flop using SR flip flop. 8+7

8. (a) Explain bidirectional shift register.

(b) Design a 1×16 decoder using 1×4 decoders. 8+7

Group – B

Answer any *one* question. 1×10

9. (a) State associative and distributive low.

(b) Distinguish between sequential and combinational circuit.

(c) What is prime implicant ? 4+4+2

10. (a) Define race around condition.

(b) Compare between flipflop and latch.

(c) What is parity checker ?

(d) What is gray code ? 2+4+2+2

(Internal Assessment : 30)