WEST BENGAL STATE UNIVERSITY

B.Sc. Honours/Programme 2nd Semester Examination, 2022

ELSHGEC02T/ELSGCOR02T-ELECTRONICS (GE2/DSC2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

1. Answer any ***five*** questions from the following: 2×5 = 10

   (a) What is virtual ground of an OP-Amp?

   (b) What are the assumptions made from ideal OP-Amp characteristics?

   (c) What is Karnaugh map?

   (d) What do you mean by binary coded decimal (BCD)?

   (e) Define positive and negative logic system.

   (f) What is the significance of "Slew rate"?

   (g) What is the Master-slave flip-flop? Why is it so called?

   (h) The sum and the difference of two binary numbers are 1110 and 10 respectively. Find the two numbers.

GROUP-B

Answer any *six* questions from the following 5×6 = 30

2. (a) Define common mode gain of an OP-Amp. 2+3

   (b) Describe the principle of an OP-Amp non-inverting adder with circuit diagram.

3. (a) State De Morgan's theorem. 2+3

   (b) Establish the following identities:

   (i) $(\overline{\overline{A}+B})+(\overline{\overline{A}+\overline{B}})=A$

   (ii) $\overline{AB}+\overline{A}+AB=1$

   (iii) $A+AB=A$

4. Define a register. Construct a 4-bit shift register using D-type flip-flop. 1+4

5. (a) Define minterm and maxterm. 1+2+2

   (b) Simplify the following function using Karnaugh map.

   (i) $F(ABCD) = \Sigma m(0, 2, 5, 7, 8, 10, 13, 15)$

   (ii) $F(ABCD) = \Sigma m(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$

6. Design a 4:1 multiplexer using logic gates and explain its operation by truth table.

7. (a) Convert $(364.07)_8$ to decimal. 2+3

   (b) Verify the Boolean identities.

   $$AB + \overline{A}C = (A + B)(\overline{C} + B)$$

8. (a) What is the function of the PRESET and CLEAR input of a flip-flop. $1\frac{1}{2}+1\frac{1}{2}+2$

   (b) Differentiate between asynchronous and synchronous counter.

9. (a) What is the difference between astable, monostable and bistable Multivibrator? $2\frac{1}{2}+2\frac{1}{2}$

   (b) Draw the simplified internal circuit diagram of 555 timer IC.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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