



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