WEST BENGAL STATE UNIVERSITY

B.Sc. Honours/Programme 2nd Semester Examination, 2020

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.

GROUP-A

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

   (a) What is the significance of "unity gain buffer"?

   (b) Why Ex-OR gate is called controlled inverter?

   (c) State any four characteristics of an ideal OPAMP.

   (d) State the difference between latch and flip-flop.

   (e) What do you mean by race around condition in JK Flip-Flop?

   (f) Subtract the binary no. 11010 from 10110 using 2's compliment method.

   (g) Define CMRR. Why does an op-amp have high CMRR?

   (h) Explain the terms 'bit', 'nibble', 'byte' & 'word'.

GROUP-B

Answer any *two* questions from the following 15×2 = 30

2. Draw and explain the operation of the following circuits, 5×3 = 15

   (a) Non-inverting amplifier

   (b) Integrator

   (c) Zero-crossing detector.

3. (a) Minimize the following boolean function using Karnaugh map: 4+3+4+4
   $F(A, B, C, D) = \sum m\ (1, 3, 4, 6, 8, 9, 11, 13, 15)$

   (b) Convert the decimal number 14959 into a hexadecimal number.

   (c) Consider the function $F(A, B, C, D) = \sum(1, 3, 4, 11, 12, 13, 14, 15)$. Implement the function using 8X1 MUX.

   (d) Implement the function $f(w_1, w_2, w_3) = \sum m(0, 1, 3, 4, 6, 7)$ by using a 3-to-8 binary decoder and an OR gate.

4. (a) What do you mean by offset-voltage and offset-current? 2+2

   (b) What type of feedback is used in an OPAMP adder? Justify your answer. 1+1

   (c) Draw the circuit diagram of a difference amplifier using an OPAMP and find an expression for the output voltage. 1+2

   (d) Explain how OPAMP can be used as (i) a comparator and (ii) a Schmitt trigger. 3+3

5. (a) Draw the circuit diagram of a two input positive logic OR-Gate using diode and explain its operation. 1+2

   (b) State and prove De Morgan's theorem. 1+4

   (c) What is a de-multiplexer? How can a decoder circuit be used as a de-multiplexer? 1+2

   (d) What is a shift-register? Explain the operation of 4-bit shift-register. 1+3

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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