[36]

Seat No.: _____

No. of Printed Pages: 2

# SARDAR PATEL UNIVERISTY

Bachelor of Science (Semester III) Examination - 2022

US03CELE52: INSTRUMENTAION AND DIGITAL ELECTRONICS

Date: 16/11/2022 (Wednesday)

Time: 10:00 A.M. to 01:00 P.M. Total: 70 Marks

---

NOTE:

1. Figure to the right indicate full marks of the questions.

**Q-1 Multiple Choice Questions** **[10]**

1. The full form of CRO is
   (A) Cathode Ray Oscillator (C) Cathode ray Tube
   (B) Cathode Ray Oscilloscope (D) None of these
2. The delay time for CRO is
   (A) 100 ns (C) 200 ns
   (B) 400 ns (D) 20 ns
3. The path of an electron travelling through an electric field of constant intensity and entering the field at right angle to the lines of flux is _____ in XY plane.
   (A) Circular (C) Parabolic
   (B) Elliptical (D) Linear
4. Radix or base of Hexadecimal number system is
   (A) 2 (C) 8
   (B) 4 (D) 16
5. $98_{16} + AB_{16} =$
   (A) $271_{16}$ (C) $171_{16}$
   (B) $143_{16}$ (D) $183_{16}$
6. The code which is used to reduce errors in binary arithmetic is
   (A) XS3 code (C) 8421 code
   (B) Gray code (D) 2421 code
7. We express 9 in XS3 code as
   (A) 1011 (C) 1001
   (B) 1100 (D) 1111
8. The fundamental operators of Boolean Algebra are
   (A) NAND, NOR and OR (C) AND, OR and NOT
   (B) XOR, NAND and NOR (D) None of the above
9. By forming octate we can reduce_____ variables in Karnaugh mapping.
   (A) 2 variables (C) 1 variable
   (B) 3 variables (D) 8 variables
10. According to Boolean Algebra $\bar{A} + AB =$
    (A) $\bar{A}$ + B (C) $A + \bar{B}$
    (B) $A + B$ (D) $\bar{A} + \bar{B}$

**Q-2 Short Answer Question (Attempt TEN out of TWELVE)** **[20]**

1. Define accuracy.
2. Name some systematic errors.
3. Draw electrostatic focusing system of CRO.
4. Convert the following Binary Numbers to decimal
   (i)10010101 (ii)11011100
5. Convert the following Hexadecimal to Binary
   (i) 7AB4 (ii) 9BC8



(P.T.O.)

6. Convert octal to decimal (i) 5674 (ii) 7654
7. Define Non weighted Binary Code
8. Define Reflective Code
9. Define Sequential Code
10. Define AND logic.
11. State utilities of De Morgan's theorem.
12. Construct AND, OR and NOT using NAND gate.

Q.3(A) The following value were obtained from the measurement of the value of resister: 147.2Ω, 147.4Ω, 147.9Ω, 148.1Ω, 147.1Ω, 147.5Ω, 147.6Ω , 147.4Ω, 147.6Ω and 147.5Ω Calculate [05]
a. The arithmetic mean,
b. The average deviation
c. the standard deviation
d. Probable error of the average of the ten readings.

Q.3(B) Name types of errors and write short note on Systematic error. [05]

**OR**

Q.3(A) Draw the block diagram of Oscilloscope and give function of each block. [08]

Q.3(B) Define Error. [02]

Q.4(A) Multiply the following Hexadecimal numbers 89BC x AA [03]

Q.4(B) Multiply following binary numbers using computer method1001 x 101 [03]

Q.4(C) Convert the following Hexadecimal A13B to decimal [02]

Q.4(D) Convert the decimal number 2352 to Hexadecimal. [02]

**OR**

Q.4(A) Multiply binary numbers 1001 x 110 using computer method [03]

Q.4(B) Multiply the following Hexadecimal numbers 94EC x A5 [03]

Q.4(C) Add the following decimal numbers using eight - bit two's complement arithmetic: (28)+(-154) [03]

Q.4(D) Convert Binary 1110010101 to Octal [01]

Q.5(A) Add 6748 to 5972 in BCD (8421) code [03]

Q.5(B) Add 247.6 to 359.4 in XS3 code. [03]

Q.5(C) Subtract 368 from 795 in XS3 code. [03]

Q.5(D) Convert Binary 110001010 to Gray code [01]

**OR**

Q.5(A) Add 247.6 to 359.4 in BCD (8421) code [03]

Q.5(B) Add 205.7 to 193.65 in XS3 code. [03]

Q.5(C) Subtract 168.2 from 705.3 in XS3 code [03]

Q.5(D) Convert Gray 110001010 to Binary code [01]

Q.6(A) Reduce given Boolean expression $\overline{\overline{AB} + ABC + A(B + \overline{AB})}$ using Boolean Laws [05]

Q.6(B) Find POS and SOP form of $F = \sum m(5,6,7,9,10,11,13,14,15)$ and find which is less costly? [05]

**OR**

Q.6(A) Reduce given Boolean expression $\overline{\overline{ABC' + A\,B + BC'}}$ using Boolean Laws. [05]

Q.6(B) Reduce SOP form and implement in NAND logic. [05]

$$Y = \sum m\,(0,2,3,6,7,8,10,11,12,14,15)$$