Seat No :_____

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SARDAR PATEL UNIVERSITY
III Semester
Thursday, Date: 05/12/2019 2:00 to 5:00 pm

Course Code: | U | S | 0 | 3 | C | E | L | E | 0 | 2 |

Subject Title: Instrumentation and Digital Electronics

Total Marks: 70

Q-1 Multiple choice questions **10**

1. 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.
   (i) Circular
   (ii) Elliptical
   (iii) Parabolic
   (iv) Ractangular
2. The full form of CRT is
   (i) Cathode Ray transistor
   (ii) Capacitor Resistor Transistor
   (iii) Cathode Ray Tube
   (iv) Cathode ray oscilloscope
3. The delay time for CRO is
   (i) 100 ns
   (ii) 400 ns
   (iii) 200 ns
   (iv) 500 ns
4. $93_{16} + DE_{16} =$
   (i) 271_{16}
   (ii) 161_{16}
   (iii) 171_{16}
   (iv) 181_{16}
5. The binary number for 99_{10} is
   (i) 0110 0011
   (ii) 1011 1100
   (iii) 1001 1110
   (iv) 1110 0011
6. Non-Weighted Binary codes are those who
   (i) do not obey principle of positional weightage
   (ii) obey principle of positional weightage.
   (iii) obey some underlying principle
   (iv) None of above
7. The code which is used to reduce errors in binary arithmetic is
   (i) XS3 Code
   (ii) Gray Code
   (iii)8421 code
   (iv) 5211 code.

8. The universal building blocks of Boolean Algebra are
   (i) NAND, NOR
   (ii) XOR, NAND and NOR
   (iii) AND, OR and NOT
   (iv) None of the above
9. According to Boolean Laws $\overline{A+B}$=
   (i) $\bar{A}.\bar{B}$
   (ii) $A+B$
   (iii) $\bar{A}$+AB
   (iv) $A+\bar{B}$
10. By forming octate we can reduce ----------variables in Karnaugh mapping
   (i) 2 variables
   (ii) 3 variables
   (iii) 1 variable
   (iv) 0 variable

Q-2 Answer any **ten** questions in brief. **20**

1. Draw electrostatic focusing system of CRO.
2. List two ways in which systematic errors could be minimized.
3. Define accuracy and Resolution.
4. Subtract AAC_{16} from $B8027_{16}$
5. Add $38BB_{16}$ +$AC5F_{16}$.
6. Convert $38AC_{16}$ to octal.
7. Express 726_{10} in 2421 and 5211 codes.
8. Define weighted binary code giving example.
9. Define sequential code giving example.
10. Demorganize $\overline{A\bar{B}+\bar{A}C}$
11. State utilities of D' Morgan's theorem
12. Construct AND, OR and NOT gate from NOR gate.

Q-3a Write short note Systematic Errors 5

Q-3b The following value were obtained from the measurement of the value of resister: 5
147.2Ω, 147.4Ω, 147.9Ω, 148.1Ω, 147.1Ω, 147.5Ω, 147.6Ω, 147.4Ω,147.6 Ω and 147.5Ω .Calculate
a. The arithmetic mean,
b. The average deviation
c. the standard deviation
d. Probable error of the average of the ten readings.

OR

Q-3 Prove that path of an electron travelling through an electric field of constant intensity and entering the field at right angles to the lines of flux is parabolic in nature. 10

Q-4 a. Multiply **1001 x 101** using Computer Method 4
b. Multiply $94EC_{16}$ x $A5_{16}$ 3
c. Add -154 – 66 using 2's complement. 3

OR

Q-4 a. Multiply 1001 by 110 using Computer method. 4

b. Multiply $89BC_{16}$ x AA_{16} 3

c. Add 103 to -110 using 2's Complement system. 3

Q-5 a. Add 5085 to 9033 in BCD (8421) code 4

b. Add 37 to 28 in XS3 code 3

c. Subtract 168.2 from 705.3 in XS3 code. 3

OR

Q-5 a. Add 6748 to 5972 in BCD (8421) code 4

b. Add 247.6 to 359.4 in XS3 code 3

c.Subtract 27.8 from 57.6 in XS3 code. 3

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

b. Reduce using Boolean Laws i) $\overline{\overline{A\bar{B} + ABC + A(B + \bar{A}B)}}$ 5

OR

Q-6 a. Reduce in SOP form $F = \sum m(2,3,5,7,8,9,11,12,13,14,15)$ and implement in NAND logic. 5

b. Reduce using Boolean Laws $\overline{(\overline{A\bar{B}} + ABC)(\overline{A\bar{B}C})}$ 5