



Seat No. _____

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SARDAR PATEL UNIVERSITY

III Semester

Course Code: US03CELE22

Instrumentation and Digital Electronics

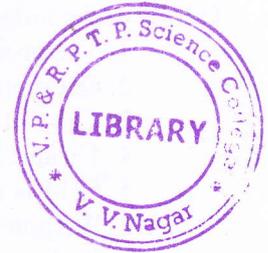
Date: 30/11/2021, Time: 3:00 to 5:00 pm

TOTAL MARKS 70

Q. 1 Multiple Choice Questions:

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1. ----- errors occurs mainly due to human mistake in recording and calibrating instrument.
 - (i) random error
 - (ii) systematic error
 - (iii) gross error
 - (iv) instrumental error
2. The delay time for CRO is
 - (i) 100 ns
 - (ii) 400 ns
 - (iii) 200 ns
 - (iv) 600 ns
3. 1's and 2's complement system is used to represent -----numbers
 - (i) Positive numbers
 - (ii) Negative numbers
 - (iii) Complex numbers
 - (iv) Irrational numbers
4. Octal number system has ----- unique symbols.
 - (i) 8
 - (ii) 16
 - (iii) 2
 - (iv) 4
5. The binary number for 99_{10} is
 - i) 0110 0011
 - ii) 1011 1100
 - iii) 1001 1110
 - iv) 1110 0011
6. $98_{16} + AB_{16} =$
 - (i) 271_{16}
 - (ii) 143_{16}
 - (iii) 171_{16}
 - (iv) 183_{16}
7. Weighted Binary codes
 - (i) Do not obey principle of positional weightage
 - (ii) Obey principle of positional weightage.
 - (iii) follow some definite rule
 - (iv) None of above
8. The Gray code for binary code 11001101_2 is
 - (i) 11100010
 - (ii) 10110111
 - (iii) 10101011
 - (iv) 11001100



9. According to Boolean Laws $A + \bar{A}B =$
- $\bar{A}+B$
 - $A + B$
 - $\bar{A}+AB$
 - $A + \bar{B}$
10. The fundamental operators of Boolean Algebra are
- NAND, NOR and OR
 - XOR, NAND and NOR
 - AND, OR and NOT
 - None of the above



Q2: True or False

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- The probable error 'r' is given by $\pm 0.6745 \sigma$.
- Octal number system has 8 unique symbols
- The full form of CRO is Cathode Ray Oscillator.
- 1's and 2's complement system is used to represent Positive numbers.
- 5211 is reflective code.
- Weighted binary codes obey principle of positional weightage.
- By forming doublet we can reduce one variable in Karnaugh mapping.
- According to Boolean algebra, $1+1=1$

Q3: Answer any 10 questions out of 12 questions briefly.

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- Draw block diagram of CRO.
- Name the different types of errors you know.
- Define accuracy and precision.
- Convert the following decimal numbers to binary: a)121 b)161
- Convert the following Hexadecimal to Binary a) 7AB4 b)9BC8
- Convert the following Binary Numbers to decimal:
a)10010101 b)11011100
- Define Reflective code with examples.
- Define Sequential code with examples.
- Define XS3 code.
- State utilities of De-Morgan's theorem.
- Construct AND, OR and NOT gate using NAND gate.
- Prove that Boolean Laws $\bar{A} + AB = \bar{A} + B$

Q4: Answer any 4 questions out of 8 questions elaborately.

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- 1(a) Define Error. 2
- 1 (b) The following value were obtained from the measurement of the value of resister: 6
147.2Ω, 147.4Ω, 147.9Ω, 148.1Ω, 147.1Ω, 147.5Ω, 147.6Ω, 147.4Ω, 147.6Ω 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.
2. Explain basic working of CRO. 8
- 3a. Multiply the following Hexadecimal numbers: 89BC x AA 3
- 3b. Multiply the following binary numbers using computer method: 1001 x 101 3
- 3c. Convert the following Hexadecimal to Binary: 2
(a) ABCD (b) 5CCB

- 4(a). Add the following decimal numbers using eight - bit two's complement arithmetic: $-154 - 66$ 3
- 4(b). Multiply the following Hexadecimal numbers $6A \times 2DD5$ 3
- 4(c). Subtract the following Hexadecimal numbers $1A92$ from $A7683$ 2
- 5(a) Add 6748 to 5972 in BCD (8421) code 3
- 5(b) Add 247.6 to 359.4 in XS3 code 3
- 5(c) Subtract 27.8 from 57.6 in XS3 code. 2
- 6(a) Add 5085 to 9322 in BCD (8421) code 3
- 6(b) Add 347.2 to 087.5 in XS3 code 3
- 6(c) Subtract 175 from 267 in XS3 code. 2
- 7(a) Reduce Boolean Expression $\overline{AB} + ABC + A(B + \overline{AB})$ 4
- 7(b) Reduce by mapping & implement in SOP NAND logic
 $F = \sum m(0, 2, 3, 6, 7, 8, 10, 11, 12, 15)$ 4
- 8(a) $\overline{ABC} + \overline{A} \overline{B} + BC$ 4
- 8(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? 4