

**SARDAR PATEL UNIVERSITY**  
**BSc. (III-Sem.) EXAMINATION**  
**Monday, 31<sup>st</sup> December, 2012**  
**2.30 - 5.30 pm**

**US03CELE02 : Instrumentation & Digital Electronics**

Total Marks : 70

- Q.1 Multiple choice Questions. (Each question carries one marks.) (10)
- (i) Radix (base) for hexadecimal number system is \_\_\_\_\_  
 (a) 8 (b) 10  
 (c) 16
  - (ii) Non weighted binary codes are \_\_\_\_\_  
 (a) 8421 & 2421 (b) 5211 & BCD Codes  
 (c) XS3 & gray codes
  - (iii) Boolean Algebra is \_\_\_\_\_  
 (a) Binary logic (b) Binary Algebra  
 (c) Mathematical Logic
  - (iv) Universal building blocks are \_\_\_\_\_  
 (a) AND & NOT (b) XOR & XNOR  
 (c) NAND & NOR
  - (v) Demorgan's Theorem states that \_\_\_\_\_  
 (a) break the line change the sign (b) break the sign change the line  
 (c) break the line & change the variables
  - (vi) Subtract 1 from 100 \_\_\_\_\_  
 (a) 011 (b) 101  
 (c) 100
  - (vii) The deviation from the true value of the measured variable is \_\_\_\_\_  
 (a) Accuracy (b) Precision  
 (c) error
  - (viii) 1's complement of .0101 is \_\_\_\_\_  
 (a) 1010 (b) 0111  
 (c) 1000
  - (ix) The heart of CRO is \_\_\_\_\_  
 (a) CRT (b) delay line  
 (c) Vertical deflection system
  - (x) Logic operator for AND gate is \_\_\_\_\_  
 (a)  $\cdot$  (b)  $+$   
 (c)  $*$
- Q.2 Attempt **Any Six** out of eight. (Each question carries two marks.) (12)
- (i) How BCD Addition is Performed ?
  - (ii) What is Positive and Negative logic system ?
  - (iii) What is NOT gate ?
  - (iv) Define Accuracy & Precision.
  - (v) List three sources of possible errors in instruments.
  - (vi) Name four possible weighted number systems.
  - (vii) Add 5 and 2. In XS3 form.
  - (viii) Draw the block diagram of CRO.
- Q.3 Explain types of errors in detail. (08)

**OR**

- Q.3 Ten measurements of the resistance of a resistor gave 101.2 ohm, 101.7 ohm, 101.3 ohm, 101.0 ohm, 101.5 ohm, 101.3 ohm, 101.2 ohm, 101.4 ohm, 101.3 ohm and 101.10 ohm Assume that only random errors are present, calculate Arithmetic means, Standard deviation of the reading and probable error. (08)
- Q.4 Explain Block diagram of CRO in detail with necessary diagram. (08)
- OR**
- Q.4 Explain the vertical deflection system. (08)
- Q.5(a) Multiply  $1101_2$  by  $1100_2$  using computer method. (04)
- (b) Divide  $43_{10}$  by  $6_{10}$  using computer method. (04)
- OR**
- Q.5(a) Explain 1's complement & 2's complement method. (04)
- (b) Explain various number systems in detail. (04)
- Q.6(a) Explain the procedure to convert binary to gray & gray to binary conversions. (04)
- (b) Explain the procedure for XS3 addition & XS3 subtraction. (04)
- OR**
- Q.6(a) Explain weighted and Non-weighted binary codes in detail. (05)
- (b) Add 255 with 277 in BCD form. (03)
- Q.7(a) Explain two input AND gate using transistors & resistors. (05)
- (b) Explain NOT gate using transistor. (03)
- OR**
- Q.7(a) Explain two input OR gate using diodes. (03)
- (b) Explain two input NAND gate using discrete components. (05)
- Q.8(a) Find the SoP and PoS form of  $y = \sum m (0,1,2,3,10,11,12,13,14,15)$  (05)
- (b) Map the expression. (03)
- $$f = \bar{A} \bar{B} C + A \bar{B} C + \bar{A} B \bar{C} + A B \bar{C} + A B C$$
- OR**
- Q.8(a) List the Boolean laws. (05)
- (b) Reduce the expression. (03)
- $$AB + \bar{A}C + A\bar{B}C (AB + C)$$

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