Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**B.E. Sem-III Regular / Remedial Examination December 2010**

**Subject code: 130902 Subject Name: Analog and Digital Electronics.**

**Date: 15 /12 /2010** **Time: 10.30 am – 01.00 pm**

**Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Draw the equivalent circuit with significance of each component of a practical OP-AMP. | **07** |
| | **(b)** | Define the following characteristics of Practical OP-AMP.<br>(i) CMRR (ii) PSRR (iii) Slew Rate (iv) Input Offset Voltage. | **07** |
| **Q.2** | **(a)** | Define the following general characteristics of logic families.<br>(i) Propogation Delay (ii) Noise Margin (iii) Fan-in and Fan-out (iv) Power Dissipation. | **07** |
| | **(b)** | What are SOP and POS forms of boolean expressions? Minimize the following expression using K-MAP.<br>$Y= \sum m(0,1,5,9,13,14,15) + d( 3,4,7,10,11)$ | **07** |
| | | **OR** | |
| | **(b)** | (i) Convert $(0.8)_{10}$ to equivalent binary.<br>(ii) Convert $(B9F.AE)_{16}$ to equivalent octal.<br>(iii) Convert $(2003.31)_{10}$ to equivalent hex. | **07** |
| **Q.3** | **(a)** | Draw the circuit of a differentiator using OP-AMP. What are the problems associated with the circuit? How are they overcome? | **07** |
| | **(b)** | Explain with the help of circuit diagram the basic operation of OP-AMP as a comparator. Also explain the operation of zero cross detector. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain the working of an IC-555 as a bistable multivibrator. | **07** |
| | **(b)** | List out the different performance parameters of a Power Supply. Describe the operation of a LM317 voltage regulator. | **07** |
| **Q.4** | **(a)** | Design a full adder using universal NAND gate. Also explain how four bit combined binary adder and subtractor circuit can be constructed using full adders.? | **07** |
| | **(b)** | Classify different types of digital to analog converters. With the neat circuit diagram, explain the operation of R-2R ladder digital to analog converter. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | With the neat diagram explain the working of decimal to BCD encoder. | **07** |
| | **(b)** | What is the application of gray code.? Design a binary to gray conversion combinational circuit. | **07** |
| **Q.5** | **(a)** | Distinguish between combinational and sequential circuit. What are the basic difference between truth table and a state table? Also explain the concept of state diagram using suitable example. | **07** |
| | **(b)** | What is the basic difference between synchronous and asynchronous counter? Design a four bit synchronous up counter using J-K flip flop. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | State and explain the triggering methods for a D- flip flop. | **07** |
| | **(b)** | Classify the various modes of operation of shift registers. Explain the serial in parallel out operation of shift register. | **07** |

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