

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 151702

Subject Name: Sensors and Signal conditioning

Date: 24/06/2011

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.**

- Q.1 (a)** Explain in detail the Magnetostrictive phenomenon and magnetosrictive force transducer. **07**
- (b)** Explain Biquad Filter in detail. **07**

- Q.2 (a)** Define: **07**
1. Sensitivity
 2. Resolution
 3. Stability
 4. Linearity
 5. Precision
 6. Drift
 7. Fidelity
- (b)** Explain: **07**
1. Strain gauge Torque transducer
 2. Frequency measurement

OR

- (b)** Explain: **07**
1. Cathode Ray Tube(CRT) Readout system
 2. Describe the process of obtaining a PCM signal

- Q.3 (a)** Explain the piezo-electric phenomenon and suggest the materials that exhibit the phenomenon. **07**
- (b)** What are 'direct' digital transducer? Give an example and show how the output signals are obtained. **07**

OR

- Q.3 (a)** Draw a circuit of a Schmitt trigger and suggest its applications. **07**
- (b)** Explain the techniques of obtaining direct and indirect Frequency modulation. **07**

- Q.4 (a)** What is an Instrumentation amplifier and what is its role in instrumentation? Draw the scheme of connections and derive the expression for its gain. **07**
- (b)** Explain 'Photoelectric effect' and show how the phenomenon enables measurement of electro magnetic radiation. **07**

OR

Q.4 (a) Explain the operations of 'multiplexing' and 'de-multiplexing' and indicate their application in instrumentation. **07**

(b) Draw the basic scheme of a phase locked-loop and show how it enables frequency demodulation. **07**

Q.5 (a) Describe with the help of block diagram the various stages of a Data logger and indicate the function of each stage. **07**

(b) Draw the circuits of balanced and double balanced modulators and show how amplitude modulation is affected by them. **07**

OR

Q.5 (a) Explain the basic principle of hot wire Anemometry and show how gas flow rates in closed pipes can be measured satisfactorily? **07**

(b) Discuss the use of a Synchro transmitter control transformer pair and how the combination is used in position control systems. **07**
