

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3162005****Date:17-12-2022****Subject Name:Electro Mechanical Measurement and Instruments****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Explain two basic methods for measurement with suitable examples. **03**
 (b) Write a short note on Digital Signal Processing. **04**
 (c) Explain significance of measurement in detail. **07**

- Q.2** (a) What are the stages of general measurement system? **03**
 (b) Briefly explain the selection criterion of transducers. **04**
 (c) With neat sketch explain construction and working of bourdon tube pressure gauge. **07**

OR

- (c) Explain generalized measurement system with all functional elements. **07**

- Q.3** (a) Draw the functional block diagram of digital data acquisition system. **03**
 (b) Explain any four modes of measurement. **04**
 (c) Explain three basic standards in detail with suitable examples. **07**

OR

- Q.3** (a) Briefly discuss wire type, foil type and semiconductor type strain gauges. **03**
 (b) An analog volt measuring instrument with a scale range of 0.00 V to 50.00 V shows a voltage of 20.65 V. The true value of the voltage is 20.70 V. Determine the values of absolute error and correction. Also express the error as a function of the true value and full scale deflection. **04**
 (c) Explain following characteristics of a transducer: **07**
 (i) Sensitivity (ii) Repeatability (iii) Accuracy (iv) Range (v) Precision
 (vi) Drift (vii) Dead zone

- Q.4** (a) Explain any one application of capacitive transducer for measuring physical parameter. **03**
 (b) Write a short note on hysteresis. **04**
 (c) Discuss various points for selection of measuring instrument. **07**

OR

- Q.4** (a) Write a short note on permanent magnet moving coil instrument. **03**
 (b) Explain any four dynamic characteristics of a measuring system. **04**
 (c) Explain static calibration process in detail. **07**

- Q.5** (a) Derive the expression for output voltage under the load condition of DC excited resistive translational potentiometer (Loading Effect). **03**
 (b) Explain hydraulic and pneumatic load cells. **04**
 (c) Derive the expression for zero order, first order and second order system. **07**

OR

- Q.5** (a) Compare thermocouple, RTD and thermistor. **03**
 (b) Write a short note on piezoelectric accelerometer. **04**
 (c) With sketch explain construction and working of rope brake dynamometer. **07**
