

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:3162005****Date:04/12/2021****Subject Name:Electro Mechanical Measurement and Instruments****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What are the applications of measurement? **03**
 (b) Compare Mechanical measurement with Electrical measurement. **04**
 (c) With block diagram explain Digital Data Acquisition System. **07**
- Q.2** (a) What are the applications of LVDT? **03**
 (b) Derive the output voltage expression of Wheatstone Bridge circuit for strain measurement. **04**
 (c) Give detail classification of Instruments. **07**
- OR**
- (c) Explain significance of measurement in detail. **07**
- Q.3** (a) Compare static characteristics with dynamic characteristics for instruments. **03**
 (b) Explain working of “Piezoelectric Accelerometer” **04**
 (c) An analog volt measuring instrument with a scale range of 0.0-10.0V shows a voltage of 5.23V. The true value is 5.29 V. Determine the values of absolute error and correction. Also express the error as a function of the true value and full scale deflection. **07**
- OR**
- Q.3** (a) What are the different modes of measurements? **03**
 (b) Compare eddy current dynamometer with rope brake dynamometer. **04**
 (c) Explain primary standards in details. **07**
- Q.4** (a) Explain methods for measurement with examples. **03**
 (b) Explain pros and cons of PMMC type instruments. **04**
 (c) What is static calibration? Explain steps for static calibration in detail. **07**
- OR**
- Q.4** (a) A Pressure gauge indicator showed a reading as 42 bar on a range of 0-50 bar. If the true value is 41.4 bar determine static error, static correction and relative static error. **03**
 (b) Write a short note on signal processing. **04**
 (c) Explain any seven static characteristics of an instrument. **07**
- Q.5** (a) What are the selection criterion of transducers for industrial applications? **03**
 (b) Explain working principle of hydraulic and pneumatic load cells. **04**
 (c) What are the sources of errors in measuring system? **07**
- OR**
- Q.5** (a) What are the different types of drift possible for an instrument? **03**
 (b) Explain hysteresis in measuring instrument with one example. **04**
 (c) Explain second order system and derive the expression for the same. **07**
