

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2162005****Date:27/11/2018****Subject Name:Electro Mechanical Measurements & 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.

MARKS

- Q.1** (a) Explain the significance of “Signal Conditioning” in measurement system with suitable example. **03**
- (b) Differentiate between (i) Threshold and Resolution (ii) Repeatability and Reproducibility with suitable examples. **04**
- (c) Classify the transducers with suitable examples and neat sketches. **07**
- Q.2** (a) Explain the “Systematic Errors” in measurement with suitable examples. **03**
- (b) Derive the second order system expression with suitable example and neat sketch. **04**
- (c) Discuss the AC and DC errors encountered in moving iron instruments along with its remedies. **07**
- OR**
- (c) Discuss the various standards in measurement in detail. **07**
- Q.3** (a) What is “Thermopile” and discuss its advantages over thermocouple in measurement. **03**
- (b) Justify that Wheatstone bridge is not suitable for measurement of low and high resistance. **04**
- (c) List the various techniques for measuring vibrations and elaborate any one in detail. **07**
- OR**
- Q.3** (a) Explain why calibration is required for secondary standard instruments with suitable example. **03**
- (b) Discuss “Rope Brake Dynamometer” for measuring shaft torque. **04**
- (c) Explain the basic construction, working principle and operation of RTD. **07**
- Q.4** (a) Explain “Tertiary measurements” with suitable example. **03**
- (b) Explain how DC potentiometer is employed for calibrating DC voltmeter with neat diagram. **04**
- (c) With the help of suitable diagram explain that how differential arrangement of capacitive transducer gives the linear response. **07**
- OR**
- Q.4** (a) Compare the electrical instruments with mechanical instruments. **03**
- (b) With schematic diagram explain optical torsion meter. **04**
- (c) Derive the output voltage expression of full bridge (Wheatstone Bridge) circuit for strain measurement and give its advantages over half and quarter bridge circuits. **07**

- Q.5 (a) Explain different modes of measurements. **03**
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- (b) Explain that how the range of PMMC instruments can be extended as an ammeter with suitable diagram. **04**
- (c) Discuss the operation of “Proving Ring” type load cell in detail. **07**
- OR**
- Q.5 (a) Compare between Wire and Foil type strain gauges for measuring strain. **03**
- (b) Describe the working of “Piezoelectric Accelerometer”. **04**
- (c) Draw the functional block diagram of digital data acquisition system and explain the roll of each block. **07**

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