

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VII EXAMINATION – SUMMER 2026****Subject Code:3160915****Date:22-05-2026****Subject Name:Electrical Measurement and Measuring 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.

MARKS

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|------------|---|-----------|
| Q.1 | (a) Describe different types of systematic errors. | 03 |
| | (b) Explain various dynamic characteristics of a measurement system in brief. | 04 |
| | (c) For a measuring system, explain these static characteristics:
1) Precision and Accuracy; 2) Sensitivity; 3) Linearity. | 07 |
| Q.2 | (a) Discuss in brief the working principle and materials for thermocouple. | 03 |
| | (b) Give classification of transducers. | 04 |
| | (c) Discuss the measurement of displacement using capacitive transducer. | 07 |
| | OR | |
| | (c) Explain measurement of speed using hall effect transducer and variable reluctance transducer. | 07 |
| Q.3 | (a) Explain the role of shunts in extending the range of ammeters. | 03 |
| | (b) Discuss application of strain gauge for pressure measurement. | 04 |
| | (c) Explain construction and working principle of electrodynamic type wattmeter. | 07 |
| | OR | |
| Q.3 | (a) 1) Why moving iron instruments can be used with both a.c. and d.c.?
2) Why the scale is non-uniform in moving iron instruments? | 02 |
| | (b) Discuss position sensing using optical encoder. | 04 |
| | (c) Explain construction and working principle of Single-phase induction type energy meter. | 07 |
| Q.4 | (a) Explain the basic working principle of power factor meter. | 03 |
| | (b) Discuss use of Wheatstone Bridge for measurement of medium resistance. | 04 |
| | (c) Draw relevant circuit and phasor diagrams and explain measurement of self inductance using Hay's Bridge. | 07 |
| | OR | |
| Q.4 | (a) Explain working principle of LCR meter. | 03 |
| | (b) Discuss the difficulties encountered in measurement of high resistance. | 04 |
| | (c) Draw relevant circuit and phasor diagrams and explain measurement of capacitance using Schering Bridge. | 07 |

- Q.5** (a) Draw neat diagram showing essential parts of Megger. **03**
(b) Discuss the role of instrument transformers in extending range of current and voltage measuring instruments. **04**
(c) Enlist various types of DVM and explain any one in detail with the help of suitable block diagram. **07**

OR

- Q.5** (a) Explain the construction and working of Clamp on meter. **03**
(b) Draw the block diagram of digital multimeter and explain in brief. **04**
(c) Draw & explain block diagram of Digital storage oscilloscope. **07**
