

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 152402****Date: 16-05-2013****Subject Name: Electrical Measurement and Electronic Instruments****Time: 10:30 pm 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.

- Q.1** (a) Explain the standards of measurement in detail. **07**
(b) Explain the types of errors in detail. **07**

- Q.2** (a) Explain the principle, construction and working of PMMC instruments. **07**
(b) Explain the construction and working of Electrodynamometer type instruments. **07**

OR

- (b) Explain series type ohm meter and its design in detail. **07**

- Q.3** (a) With neat diagram explain ramp type analog-to-digital converter. **07**
(b) Write Technical short note on: Digital Frequency Meter System. **07**

OR

- Q.3** (a) Give the classification of digital voltmeters. Explain dual-slope integrating type DVM with necessary block diagram. **07**
(b) Define Probe. List the types of probes and explain the construction and features of active probe. **07**

- Q.4** (a) Define burden of an instrument transformer. Explain the errors in CT. How the errors can be reduced? **07**
(b) A ring core current transformer of ratio 1000/5 A is operating at full primary current with a secondary burden of non-inductive resistance of 1.1 Ω . Its exciting current is 1 A at power factor of 0.45. Calculate (i) the ratio error at full load, assuming that there has been no compensation (ii) phase angle. **07**

OR

- Q.4** (a) Explain the basic aspects of PT. Give the comparison between CT and PT. **07**
(b) Moving coil millivoltmeter has a resistance of 20 Ω and a full scale deflection of 120° is reached when potential difference of 100 mV is applied across its terminals. The moving coil has the effective dimension of 3.1 cm X 2.6 cm and is wound with 120 turns. The flux density in the gap is 0.15 Wb/m². Determine control constant of the spring and suitable diameter copper wire for coil winding if 55 % of total instrument is due to coil winding, ρ for copper is $1.73 \times 10^{-8} \Omega\text{-m}$. **07**

- Q.5** (a) List the methods of measurement of medium resistance. Explain Wheatstone bridge method in detail. **07**
(b) Explain construction and operation of Dynamometer type Wattmeter. List its advantages and disadvantages. **07**

OR

- Q.5** (a) Explain circuit and vector diagram of Maxwell's bridge for inductance measurement. **07**
(b) Explain construction and operation of induction type single-phase energy meter. **07**
