

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 152402

Date: 29-11-2013

Subject Name: Electrical Measurement & Electronics Instrument

Time: 10.30 am - 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) Why the instrument transformers are used ? Explain the effect of secondary winding Burden on errors in CT. **07**
- (b) Define following terms :- **07**
- 1) Repeatability, 2) Accuracy, 3) Precision,
 - 4) Resolution , 5) Linearity, 6) Johanson Noise,
 - 7) White noise.
- Q.2** (a) Explain principle and operation of PMMC Instrument. Derive torque equation for it. **07**
- (b) What are static and dynamic characteristics in measurement system? State various static and dynamic characteristics of measuring instrument. **07**
- OR**
- (b) Derive dimensions for charge, current and EMF using ϵ (permittivity) as forth fundamental dimension. **07**
- Q.3** (a) A moving coil galvanometer (reflecting type) has former of a non conducting material. the current sensitivity of the instrument is 0.001 micro amp/mm at one meter. The period of undamped oscillations is 6 second. If the displacement constants of the instrument is 0.005 N-M/A, calculate: (1) control constant (2) inertia constant (3) total current resistance for instrument to be dead beat. **07**
- (b) Give comparison of PMMC and MI instruments. **07**
- OR**
- Q.3** (a) The coil of 300V moving iron voltmeter has a resistance of 500 ohm and an inductance of 0.8 henry. The instrument reads correctly at 50hz AC supply and takes 100mA at full scale deflection. What is the percentage error in the instrument reading when it is connected to 200V DC supply. **07**
- (b) Explain (1) Q-factor of inductor (2) D-factor of capacitor. **07**
- Q.4** (a) Give construction and working of 1 phase induction type energy meter **07**
- (b) Explain Op-Amp voltage follower voltmeter. **07**
- OR**
- Q.4** (a) Explain two wattmeter method for measurement of power in poly phase system. **07**
- (b) Explain working principle of rectifier type ammeter in detail. **07**
- Q.5** (a) Explain creep. Overload compensation & temperature compensation in single phase energy meter. **07**
- (b) State various method of low resistance measurement. Explain any one method for the same. **07**
- OR**
- Q.5** (a) Draw basic block diagram of a digital frequency meter. Discuss each block in details. **07**
- (b) Explain Maxwell's bridge with necessary diagrams. **07**
