

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-III Examination May 2012

Subject code: 130903

Subject Name: Electrical and Electronics Measuring Instruments

Date: 08/05/2012

Time: 02.30 pm – 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.

- Q.1** (a) Define and explain in brief the following terms related to measurement system : **04**  
(i) Accuracy (ii) Resolution (iii) Precision (iv) Error.
- (b) Derive the dimension of the following quantities using fundamental units of L M T I system : **03**  
(i) E.M.F. (ii) Magnetic flux density (iii) Permittivity.
- (c) What is a standard of measurement? Describe various standards of measurements. **04**
- (d) Describe primary standard of capacitance having concentric cylindrical structure. **03**
- Q.2** (a) What is galvanometer? Sketch and explain the construction and working of D'Arsonval type galvanometer. **07**
- (b) The Ayrton universal shunt has a total resistance of  $8\text{ K}\Omega$  and galvanometer has a resistance of  $4\text{ K}\Omega$ . Determine the multiplying power of shunt for  $2\text{ K}\Omega$ ,  $3\text{ K}\Omega$  and  $6\text{ K}\Omega$  tapping. **03**
- OR**
- (b) What are the shunts and multipliers? Mention their application. **03**
- (c) Describe in short the operating forces acting on indicating instrument for its proper functioning. **04**
- OR**
- (c) Describe in short the various effects utilize in the operation of indicating type analog instruments. **04**
- Q.3** (a) Sketch and explain the construction and working of 1- $\Phi$  electro-dynamometer type power factor meter. **07**
- (b) Describe the construction and working of Weston type frequency meter. **07**
- OR**
- Q.3** (a) Why PMMC type instruments are widely used? Discuss their merits and demerits. **07**
- (b) Sketch and explain the construction and working of attracted disc type Kelvin absolute electrometer. **07**

- Q.4 (a)** Describe in brief the various factors responsible for causing error in reading of dynamometer type wattmeter . **07**
- (b)** Show that in two wattmeter method of power measurement for 3- $\phi$  balanced load system, the total power consumed is the sum of reading of two wattmeters. **07**

**OR**

- Q.4 (a)** Describe the construction and operation of 1- $\phi$  induction type energy meter. **07**
- (b)** What are the causes of error in induction type energy meter? How these errors can be compensated? **07**

- Q.5 (a)** Explain with neat circuit diagram, the calibration of wattmeter using d. c. potentiometer. **07**
- (b)** Describe the construction and operation of co-ordinate type Gall Tinsley a. c. potentiometer. **07**

**OR**

- Q.5 (a)** Sketch and explain the block schematic of digital tachometer. **07**
- (b)** What are the advantages of electronic voltmeter? Describe transistorized d. c. voltmeter using high input resistance FET. **07**

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