



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi &amp; Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade &amp; Recognized Under Section 2(f) &amp; 12(B) of the UGC act, 1956

## III B.Tech I Sem Supply End Examination, August 2022

### Measurements and Instrumentation

(EEE)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

#### PART- A

(10\*2 Marks = 20 Marks)

- |       |   |    |     |     |
|-------|---|----|-----|-----|
| 1. a) | Describe the method of damping used in PMMC instrument.   | 2M | C01 | BL2 |
| b)    | A 1mA d'Arsonval movement has a resistance of 100 $\Omega$ it is to be converted to a 10V voltmeter. The value of multiplier resistance?  | 2M | C01 | BL3 |
| c)    | What are the applications of potentiometer?   | 2M | C02 | BL1 |
| d)    | A DC potentiometer is designed to measure up to about 2V. With a slide wire of 800mm. A standard cell of EMF 1.18V obtain balance at 600mm. A test cell is seen to obtain balance at 680mm. the EMF of the test cell? | 2M | C02 | BL3 |
| e)    | What are the difference between LPF and UPF wattmeter's?  | 2M | C03 | BL1 |
| f)    | 1-phase energy meter is operating a 230V, 50HZ supply with a load of 20A for 2hours at UPF. The meter makes 1380 revolutions in that period the meter constant?   | 2M | C03 | BL3 |
| g)    | Define sensitivity of the bridge?   | 2M | C04 | BL1 |
| h)    | Why is vibration galvanometer widely used as detector for operation of AC bridges?  | 2M | C04 | BL1 |
| i)    | Define gauge factor for a transducer?   | 2M | C05 | BL1 |
| j)    | What are the advantage and disadvantage of thermistors?   | 2M | C05 | BL1 |

#### PART- B

(10\*5 Marks = 50 Marks)

- |   |    |  |    |     |     |
|---|----|--|----|-----|-----|
| 2 | a) | Derive the expression for the forces of attraction between the plates in a parallel plate electrostatic voltmeter? | 5M | C01 | BL6 |
|   | b) | Explain the working principle of PMMC instrument with a neat sketch.   | 5M | C01 | BL4 |

OR

- |   |     |   |     |     |     |
|---|-----|---|-----|-----|-----|
| 3 |     | Describe the working of a Quadrant electrometer. Derive the deflection in the case of | 10M | C01 | BL2 |
|   | i)  | Heterostatic connection   |     |     |     |
|   | ii) | Idiostatic connection.  |     |     |     |

- 4 a) Draw the circuit diagram of a basic slide wire D.C potentiometer. explain its working? 5M C02 BL4  
 b) Obtain the difference between current transformer and potential transformer? 5M C02 BL2

**OR**

- 5 Explain the construction and working principle of a polar type potentiometer with a neat sketch? 10M C02 BL4
- 6 a) A 220V, 5A Energy meter is tested at its marked ratings. The resistance of the pressure coil circuit is 8800ohm and that of current coil is 0.1ohm. calculate the power consumed when testing the meter with,  
 i) Direct loading arrangement  
 ii) Phantom loading with current coil circuit excited by a 6V battery. 5M C03 BL3
- b) Explain the working of the tri-vector meter, with neat diagram? 5M C03 BL4

**OR**

- 7 Explain the various types of errors occurring in an energy meter and also the method of compensation to overcome these errors. 10M C03 BL4
- 8 a) Draw the circuit of Kelvin double bridge used for measurement of low resistance? 5M C04 BL1  
 b) Explain the capacitance measurement using Schering bridge? 5M C04 BL4

**OR**

- 9 Draw the circuit diagram and phasor diagram of Anderson bridge under balanced conditions. Also derive the equations under balance conditions? 10M C04 BL6
- 10 a) Write short note on the following. 5M C05 BL1  
 i) N.T.C Thermistor.  
 ii) P.T.C Thermistor.  
 b) Define passive and active transducers and give an example each? 5M C05 BL1

**OR**

- 11 Explain the construction details and working principle of LVDT with a neat sketch. What are the advantage and disadvantage? 10M C05 BL4

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