

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM  
(AUTONOMOUS)**

**III B.Tech II Semester Regular/Supplementary Examinations, April - 2024**

**ELECTRICAL MEASUREMENTS AND INSTRUMENTATION  
(EEE)**

Time: 3 hours

Max. Marks:70M

**Answer ONE Question from each Unit**

**All Questions Carry Equal Marks**

| Q. No.            | Questions  | BTL | CO  | Marks |
|-------------------|--|-----|-----|-------|
| <b>UNIT – I</b>   |  |     |     |       |
| 1.                | a) Describe the constructional details and working of a moving iron attraction type instrument.  | K2  | CO1 | 7M    |
|                   | b) Explain the following control mechanisms used in indicating instruments: i) Gravity control ii) Spring control.   | K2  | CO1 | 7M    |
| <b>OR</b>         |  |     |     |       |
| 2.                | a) Explain the construction and working of a current transformer with a neat equivalent circuit.   | K2  | CO1 | 7M    |
|                   | b) A basic D Arsonval movement with an internal resistance of 50 ohm and a full scale deflection current of 2mA is to be used as a multi range voltmeter. Design the series string of multipliers to obtain the voltage ranges of 0-10V, 0-50V, 0-100V and 0-500V.   | K3  | CO1 | 7M    |
| <b>UNIT – II</b>  |  |     |     |       |
| 3.                | a) Explain the construction details of electro-dynamometer type wattmeter and derive torque equation?  | K2  | CO2 | 7M    |
|                   | b) A 3-phase, 415V motor has a power factor of 0.5. Two watt meters connected to measure the power show the input to be 30 KW. Find the reading in each instrument.  | K3  | CO2 | 7M    |
| <b>OR</b>         |  |     |     |       |
| 4.                | a) Explain the working of electro-dynamometer type single phase power factor meter with a neat diagram.  | K2  | CO2 | 7M    |
|                   | b) Draw a connection diagram of Crompton potentiometer and bring out its salient features. How is it standardized?   | K3  | CO2 | 7 M   |
| <b>UNIT – III</b> |  |     |     |       |
| 5.                | a) Explain the measurement of Low resistance by using Kelvins double bridge.   | K2  | CO3 | 7M    |
|                   | b) Explain the working of Hay's bridge for measurement of inductance and derive the necessary equation under balanced condition.   | K2  | CO3 | 7M    |
| <b>OR</b>         |  |     |     |       |
| 6.                | a) The four arms of a Wheatstone bridge are as follows:<br>AB=100 $\Omega$ ; BC=1000 $\Omega$ ; CD=4000 $\Omega$ ; and DA=400 $\Omega$ . The galvanometer has a resistance of 100 $\Omega$ , sensitivity of 100 mm/ $\mu$ A and is connected across AC. A source of 4 V d.c is connected across BD. Calculate the current through the galvanometer and its deflection if the resistance of arm DA is changed from 400 $\Omega$ to 401 $\Omega$ . | K3  | CO3 | 7M    |
|                   | b) Explain the working of Wagner Earth device and give its significance  | K2  | CO3 | 7M    |

**UNIT – IV**

|    |    |   |    |     |    |
|----|----|---|----|-----|----|
| 7. | a) | Explain about the construction and operation of LVDT in detail. | K2 | CO4 | 7M |
|    | b) | Explain the following: i) Thermocouples ii) Thermistors.        | K2 | CO4 | 7M |

**OR**

|    |    |  |    |     |    |
|----|----|--|----|-----|----|
| 8. | a) | What is strain gauge and Derive the expression for gauge factor for it?  | K3 | CO4 | 7M |
|    | b) | What is a Hall effect Sensors and give its advantages and disadvantages. | K1 | CO4 | 7M |

**UNIT – V**

|    |    |  |    |     |    |
|----|----|--|----|-----|----|
| 9. | a) | Explain the working of Integrating type Digital Voltmeter.                             | K2 | CO5 | 7M |
|    | b) | Explain the operation of Digital Tachometer with the help of functional block diagram. | K2 | CO5 | 7M |

**OR**

|     |    |  |    |     |    |
|-----|----|--|----|-----|----|
| 10. | a) | Explain the measurement phase difference and frequency by using Lissajous Patterns of CRO. | K2 | CO5 | 7M |
|     | b) | Explain with the help of a functional block diagram Digital multimeter.                    | K2 | CO5 | 7M |