Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024**

**Subject Code:3160915 Date:25-11-2024**

**Subject Name:Electrical Measurement and Measuring Instruments**

**Time:02:30 PM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

| | | | Marks |
|---|---|---|---|
| **Q.1** | **(a)** | What do you understand by static and dynamic characteristics of a measuring instrument? | **03** |
| | **(b)** | Explain in detail working principle and construction of LVDT. | **04** |
| | **(c)** | Describe the constructional detail of a moving iron instrument with the help of diagram. Derive the equation for defection if spring control is used. | **07** |
| **Q.2** | **(a)** | Explain working principle of strain gauge. | **03** |
| | **(b)** | Define the following terms :<br>(1) True value (2) Threshold (3) Sensitivity (4) Zero drift | **04** |
| | **(c)** | Describe the working principle, construction and operation of R.T.D. Draw it's characteristics. | **07** |
| | | **OR** | |
| | **(c)** | Explain construction and working principle of I-phase induction type energy meter. | **07** |
| **Q.3** | **(a)** | Explain the different principles of working of capacitive transducers. | **03** |
| | **(b)** | Draw & explain the construction of PMMC instrument. | **04** |
| | **(c)** | Explain working of Kelvin's double bridge for measurement of low resistance with neat diagram | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain how strain gauges are used for the torque measurement. | **03** |
| | **(b)** | Explain working principle of Weston frequency meter. | **04** |
| | **(c)** | Describe construction of thermocouple in detail with different materials used for the Same. | **07** |
| **Q.4** | **(a)** | Explain why CT secondary should not be open ? | **03** |
| | **(b)** | Discuss the loss of charge method for high resistance measurement. | **04** |
| | **(c)** | Draw & explain block diagram of Digital storage oscilloscope. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | How is the instrument range extended by Instrument Transformers? | **03** |
| | **(b)** | Draw the circuit diagram of Anderson's bridge. | **04** |
| | **(c)** | Explain working principle and construction of Piezoelectric transducer. | **07** |
| **Q.5** | **(a)** | Write a brief note on Megger. | **03** |
| | **(b)** | Explain working principle of Hall effect transducer. | **04** |
| | **(c)** | Explain Maxwell's inductance capacitance bridge with connection diagram and phasor diagram also state balance condition for the same. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | What is clamp on meter ? Write its applications. | **03** |
| | **(b)** | Draw circuit of Owen's bridge. Write its applications | **04** |
| | **(c)** | Explain measurement of unknown capacitance with the help of Schering bridge. Also draw phasor diagram. | **07** |

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