Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016**

**Subject Code:2130903 Date:06/01/2017**

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

**Time:10:30 AM to 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.**

| | | | MARKS |
|---|---|---|---|
| **Q.1** | | **Short Questions** | **14** |
| | **1** | Define true value. | |
| | **2** | Define resolution. | |
| | **3** | Define drift. | |
| | **4** | Define sensitivity. | |
| | **5** | List out the various methods of providing damping torque in an indicating instrument | |
| | **6** | State application of instrumentation amplifier. | |
| | **7** | List out different errors in wattmeter. | |
| | **8** | What is Guard circuit? | |
| | **9** | State methods for measurement of high resistances. | |
| | **10** | Define energy. | |
| | **11** | State application of strip chart recorder. | |
| | **12** | What is a wave analyzer? | |
| | **13** | Define telemetry. | |
| | **14** | Define active transducer. | |
| **Q.2** | **(a)** | Explain two wattmeter method used to measure power of a 3-phase balanced load. | **03** |
| | **(b)** | Describe the various types of errors in measurement system. | **04** |
| | **(c)** | Describe the constructional detail of an attraction type moving iron instrument with help of diagram. Derive the equation for defection if spring control is used. | **07** |
| | | **OR** | |
| | **(c)** | Prove that deflection of electrodynamometer type wattmeter is proportional to power consumed. | **07** |
| **Q.3** | **(a)** | Describe the construction and working of thermocouple instrument. | **03** |
| | **(b)** | Explain the electrodynamometer type wattmeter. | **04** |
| | **(c)** | Draw the circuit of a Kelvin's Double Bridge used for measurement of low resistance. Derive the condition for balance. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Define the terms "Indicating instruments", "Recording instruments" and "Integrating instruments". Give suitable example for each case. | **03** |
| | **(b)** | Draw neat sketch of single phase electrodynamometer type power factor meter. Explain its working. | **04** |
| | **(c)** | Derive the expression for bridge sensitivity for a Wheatstone Bridge with equal arms. Find also the expression for current through the galvanometer for small unbalance. | **07** |
| **Q.4** | **(a)** | Explain working principal of Q meter. | **03** |
| | **(b)** | Describe how to make extension of range of voltmeter. | **04** |
| | **(c)** | Derive the equations of balance for Anderson bridge. Draw the phasor diagram for conditions under balance. | **07** |

**OR**

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|---|---|---|---|
| **Q.4** | **(a)** | Explain with diagram, the bonded type of strain gauge. | **03** |
| | **(b)** | Explain the function of following component in induction type energy meter.<br>(i) Driving system (ii) Moving system (iii) Breaking system (iv) Counting mechanism | **04** |
| | **(c)** | Derive the equations of balance for Owen's bridge. Draw the phasor diagram for conditions under balance. | **07** |
| **Q.5** | **(a)** | Explain the working of digital volt meter with schematic block diagram. | **03** |
| | **(b)** | What are the different types of telemetry system? Explain any one system. | **04** |
| | **(c)** | Explain the construction and principle of working of a linear variable differential transformer (L.V.D.T). | **07** |

**OR**

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|---|---|---|---|
| **Q.5** | **(a)** | Describe digital storage oscilloscope with schematic block diagram. | **03** |
| | **(b)** | Explain the term "Total harmonic distortion'' and describe Tuned circuit harmonic analyzer. | **04** |
| | **(c)** | Explain the principle of operation and construction of RTD. | **07** |

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