

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:3160915****Date:26/11/2021****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.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1**
- | | | |
|-----|---|-----------|
| (a) | Describe the working principle of Hall effect transducer. | 03 |
| (b) | What is standard of measurement? Describe various standards of measurement. | 04 |
| (c) | Define transducer and classify transducers on different basis. | 07 |

- Q.2**
- | | | |
|-----|--|-----------|
| (a) | Why PMMC instrument cannot be used for ac measurement? | 03 |
| (b) | Explain how strain gauges are used for the torque measurement. | 04 |
| (c) | Define following term. | 07 |
| | (i)Accuracy (ii)Drift (iii)Sensitivity (iv)Reproducibility (v)Precision (vi)Threshold (vii)Fidelity. | |

OR

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|-----|--|-----------|
| (c) | Explain principle and construction of RTD. | 07 |
|-----|--|-----------|
- Q.3**
- | | | |
|-----|--|-----------|
| (a) | State different methods used to measure low, medium and high resistance. | 03 |
| (b) | Draw the circuit diagram of Anderson's bridge. | 04 |
| (c) | Explain the working of electrodynamic type wattmeter. | 07 |

OR

- Q.3**
- | | | |
|-----|--|-----------|
| (a) | Why secondary of current transformer should not be open, when primary is energized? | 03 |
| (b) | Explain any one method for measurement of high resistance. | 04 |
| (c) | Describe the constructional detail of a moving iron instrument with the help of diagram. Derive the equation for deflection if spring control is used. | 07 |

- Q.4**
- | | | |
|-----|--|-----------|
| (a) | Write a short note on Systematic errors. | 03 |
| (b) | How the current range of PMMC instrument extended with the help of shunts? | 04 |
| (c) | Explain working of Kelvin's double bridge for measurement of low resistance with neat diagram. | 07 |

OR

- Q.4**
- | | | |
|-----|--|-----------|
| (a) | Draw circuit diagram of Schering bridge. | 03 |
| (b) | Explain construction of single phase induction type energy meter. | 04 |
| (c) | Explain measurement of unknown inductance with the help of Hay's bridge. Also draw phasor diagram. | 07 |

- Q.5**
- | | | |
|-----|--|-----------|
| (a) | What do you mean by piezoresistive effect? State types of strain gauges. | 03 |
| (b) | State the advantages and applications of D.S.O. | 04 |
| (c) | Explain construction and working principle of Megger. | 07 |

OR

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|------------|---|-----------|
| Q.5 | (a) Explain Clamp on meter. | 03 |
| | (b) Describe the different criteria for selection of transducers for a particular application. | 04 |
| | (c) Explain the construction and working principle of LVDT with neat sketch. Explain how the magnitude and direction of the displacement of core of LVDT can be detected. | 07 |

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3160915****Date:03/06/2022****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.
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) Define the following terms :
(1) True value (2) Threshold (3) Sensitivity (4) Zero drift | 04 |
| | (c) Explain in detail working principle and construction of LVDT. | 07 |
| Q.2 | (a) Differentiate between statistical and random errors. | 03 |
| | (b) A capacitive transducer with its plate separation of 0.05mm under static conditions has a capacitance of 5×10^{-12} F. Determine axial displacement, which causes change of capacitance of 0.75×10^{-12} F. | 04 |
| | (c) Explain seebeck effect.
Describe construction of thermocouple in detail with different materials used for the same. | 07 |
| | OR | |
| | (c) Define Gauge factor. Derive its expression. | 07 |
| Q.3 | (a) Define sensor, transducer & actuator. | 03 |
| | (b) Describe use of instrument transformers in the extension of range of measuring instruments. | 04 |
| | (c) Explain working principle and construction of Piezoelectric transducer. | 07 |
| | OR | |
| Q.3 | (a) A 250 : 5, CT is used along with an ammeter. If ammeter reading is 3.6 Amp, find out the line current. | 03 |
| | (b) Explain why CT secondary should not be open ? | 04 |
| | (c) Explain construction and working principle of I-phase induction type energy meter. | 07 |
| Q.4 | (a) Draw & explain construction of PMMC instrument. | 03 |
| | (b) Explain working principle of Hall effect transducer. | 04 |
| | (c) Draw circuit of Kelvin's double bridge method used for measurement of low resistance. Derive the condition for balance. | 07 |
| | OR | |
| Q.4 | (a) Explain various controls of power scope. | 03 |
| | (b) Draw circuit of Owen's bridge. Write its applications | 04 |
| | (c) Draw & explain block diagram of Digital storage oscilloscope. | 07 |
| Q.5 | (a) Write a brief note on Megger. | 03 |
| | (b) Compare Analog & digital multimeter. | 04 |
| | (c) Explain construction and working of Q - meter. | 07 |

OR

- Q.5**
- | | | |
|-----|---|-----------|
| (a) | What is clamp on meter ? Write its applications. | 03 |
| (b) | Discuss the loss of charge method for high resistance measurement. | 04 |
| (c) | Explain Maxwell's inductance capacitance bridge with connection diagram and phasor diagram also state balance condition for the same. | 07 |
