Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER– 1st / 2nd (SPFU) EXAMINATION – WINTER 2016

Subject Code: ENG006 **Date: 25/01/2017**

Subject Name: Measurement and Instrumentation

Time:02:30 PM TO 5:00 PM **Total Marks: 70**

Instructions:

1. **Question no.1 to 25 carry 1 mark and 26 to 30 carry 2 marks.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

PART I: OBJECTIVE SECTION **35 Marks**

INSTRUCTION: Question no.1 to 25 carry 1 mark and 26 to 30 carry 2 marks.

1 Work is defined as that
(A) Force*mass (C) Force*distance
(B) Force* time (D) None of this.

2 Watt is Unit of
(A) Charge (C)Resistance
(B) Current (D) Power

3 Velocity is defined as that
(A) Length/time (C) Work/time
(B) Mass*time (D) Mass*velocity

4 LVDT is which type of Transducer
(A) Primary Transducer (C) Secondary Transducer
(B) Parallel Transducer (D) None of the these

5 Random error is also known as
(A) Instrumental error (C) Observational error
(B) Environmental error (D) None of the above

6 Full form of the CRO
(A) Cathode Ray Oscilloscope (C) Cathode Ray Oscillator
(B) Carbon Ray Oscillator (D) Carbon Ray Oscilloscope

7 The accuracy of an instrument is measured in terms of its
(A) Noise (C) error
(B) Resolution (D) Precision

8 Flow Measurement is done by using
(A) Venturi meter (C) LVDT
(B) Hygrometer (D) RTD

9 The unit of electrical current is
(A) Ampere (C) Henry
(B)Watt (D) Volt

10 The CRO is used to measure

(A) Voltage signal magnitude
(B) Voltage signal angle
(C) Voltage signal frequency
(D) All of the above

11 Which quantity measure the Multimeter

(A) Voltage
(B) Resistance
(C) Current
(D) All of the above

12 In a strain measuring using a strain gauge, the output is,

(A) Voltage
(B) Impedance
(C) Resistance
(D) Either A or B

13 Voltmeter using thermocouple measure

(A) rms value
(B) Peak value
(C) Average value
(D) Peak to peak value

14 RTD is used for

(A) Temperature Measurement
(B) Force Measurement
(C) Humidity Measurement
(D) Displacement Measurement

15 The input impedance of a CRO is

(A) Zero
(B) Around 1000 ohm
(C) Around 100 ohm
(D) Around one mega ohm

16 A device which Converts a physical quantity to an equivalent electrical quantity

(A) Transformer
(B) Rectifier
(C) Transducer
(D) Circuit Breaker

17 Sensitivity of a Thermocouple is expressed

(A) mV/C
(B) mA/C
(C) μV/C
(D) μA/C

18 Single phase induction type energy meters is known as

(A) kW meter
(B) joule meter
(C) Wh meter
(D) None of the above

19 Piezo Electric transducers are

(A)Passive transducer
(B)Inverse transducer
(C) Digital transducer
(D) Pulse transducer

20 A potentiometer may be used for

(A) Mesurement of Current
(B) Mesurement of Resistance
(C) Calibration of voltmeter
(D) All of above

21 Induction wattmeter can be used in
(A) ac circuit only (C) both ac and dc circuit
(B) dc circuit only (D) ac 3 phase only

22 Hygrometer used for
(A) Pressure Measurement (C) Flow Measurement
(B) Humidity Measurement (D) Displacement Measurement

23 The household energy meter is
(A) An indicating instrument (C) A recording instrument
(B)An integrative instrument (D) None of the above

24 Single phase energy meters measure electric energy in
(A) kW (C) kWh
(B) joule (D) None of the above

25 A moving coil instrument has a resistance of 0.6 Ω and full scale deflection at 0.1 A. To convert it into an ammeter of 0-15 A range, the resistance of shunt should be
(A) 0.6 Ω (C) 0.1 Ω
(B) 0.06 Ω (D) 0.004 Ω

26 A piezoelectric force transducer has a charge sensitivity of 20 pC/N. It is connected to a charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of amplifier is
(A) 1 mV/pC (C) 2.5 mV/pC
(B) 1.5 mV/pC (D) 4 mV/pC

27 An LVDT is used to measure displacement. The LVDT feeds a Voltmeter of 0-5 V range through a 250 gain amplifier. For a displacement 0.5 mm the output of LVDT is 2 mV. The sensitivity of instrument is
(A) 0.1 V/mm (C) 1 V/mm
(B) 0.5 V/mm (D) 5 V/mm

28 A digital voltmeter has a read out range from 0 to 999 counts. If the full scale reading is 9.999 V, the resolution is
(A) 1 V (C) 1 mV
(B) 0.01 V (D) 1 μV

29 A dynamometer wattmeter is connected in ac circuit. The reading will be
(A) V-A product (C) peak power
(B) average power (D) instantaneous power

30 Dummy strain gauges are used for

(A) A calibration of strain gauge
(B) Increasing bridge sensitivity
(C) compensation of temperature variation
(D) All of the above

PART 2: SUBJECTIVE SECTION **35 Marks**

Attempt Any Five questions:

Q-1	Define the terms: 1) True Value 2) Resolution 3) Drift 4) Dead Zone 5) Sensitivity 6) Accuracy 7) Precision	07
Q-2	Explain Types of errors.	07
Q-3	Explain Classification of Transducers in details.	07
Q-4	Explain LVDT.	07
Q-5	Draw and explain Schematic diagram of CRO.	07
Q-6	Describe the working of induction type single phase energy meter.	07
Q-7	What are the advantages of S.I Units?	07

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