Seat No.: _____ **Enrollment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– 1st / 2nd EXAMINATION– SUMMER 2016

Subject Code: ENG006 **Date:07/06/2016**

Subject Name: Measurement and Instrumentation

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

Instructions:

1. Q-1 is compulsory. Attempt **any five questions from Q-2 to Q-8**.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Objective type questions (1 to 25 has one mark for each right answer, 26 to 30 have two marks for each right answer) **35**

1. The errors committed by a person in the measurement are
a) gross errors b) random errors
c) instrumental errors d) environmental errors

2. The fundamental units in measurement are measure of
a) mass b) length
c) time d) all of the above

3. In instrument the smallest measurable input is known as
a) threshold b) resolution
c) dead zone d) accuracy

4. A potentiometer is basically a _____ instrument
a) deflection as well as null-type b) a digital
c) deflection-type d) null-type

5. A CRO can be used to measure
a) voltage b) waveform
c) frequency d) all of the above

6. A LVDT is
a) a displacement transducer b) an impedance matching transformer
c) a differential temperature sensor d) an auto transformer

7. A strain gauge has a gauge factor G= -100. The type of the strain gauge is
a) unbonded metal type b) bonded metal foil type
c) p-type semiconductor d) n-type semiconductor

8. The cross-sectional area of Bourdon tube is
a) circular b) elliptical
c) rectangular d) none of these

9. The pressure above the atmospheric pressure is called
a) vacuum pressure b) zero pressure
c) gauge pressure d) absolute pressure

10. Manometers are used to measure
a) temperature b) pressure
c) flow d) stress

11. LVDT falls in the category of _____ type transducer.
a) resistive b) capacitive
c) piezoelectic d) inductive

12. Torque can be measured by
a) dynamometers b) thermisters
c) inductive coil d) Pirani gauge

13. Non-contact type temperature sensor is
a) thermocouple b) RTD

c) radiation pyrometer d) none of these

14. In a thermocouple element heat energy transferred to the hot junction is converted to electrical energy by

a) Johnson's effect b) Seebeck effect
c) vinmore effect d) Faraday effect

15. An example of variable area device for measuring flow is

a) flow nozzle b) orifice meter
c) venture meter d) rotameter

16. An example of a positive displacement flow meter is

a) rotary vane type meter b) orifice meter
c) turbine type meter d) ultrasonic flow meter

17. _____ falls in the category of temperature measurement instrument that use principle of expansion of solids.

a) themocouple b) bimetallic thermometer
c) mercury –filled thermometer d) theemister

18. _____ error is a kind of systematic error.

a) instrumental b) gross
c) random d) observational

19. A reading is recorded as 53.0 m. The reading has

a) three significant figures b) four significant figures
c) five significant figures d) none of the above

20. Resistance can be measured with the help of

a) wattmeters b) voltmeters
c) ammeters d) ohmmeters and resistance bridges

21. Which of the following essential features is possessed by an indicating instrument?

a) deflecting device b) controlling device
c) damping device d) all of the above

22. What device is similar to an RTD but has a negative temperature coefficient?

a) strain gauge b) thermocouple
c) thermister d) negative-type

23. Another name of "fundamental units" is

a) base unit b) atoms
c) the metric system d) letter symbols

24. What causes the piezoelectric effect?

a) Heat b) a magnetic field
c) pressure on a crystal d) water running on iron

25. What is the moving part of a LVDT?

a) primary b) secondary
c) core d) diaphragm

26. The radius of a sphere is given as 40 ± 0.5 mm. The estimated error in its mass is

a) ± 3.75% b) ± 1.25%
c) ± 12.5% d) ± 0.125%

27. At the depth of 20 m in a water tank, the gauge and absolute pressure is _____ kg/cm^2 and _____ kg/cm^2.

a) 25, 35 b) 2.0, 4.2
c) 4.3, 2.53 d) 2.5, 3.53

28. In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was

a) unity b) 0.8 lagging
c) 0.8 leading d) zero

29. In a -3 phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be

a) unity b) 0.3

c) 0.5 d) zero

30. The output voltage of a typical thermocouple is

a) less than 100 mV b) greater than 1 V

c) thermocouples vary resistance, not voltage d) none of the above

Q.2	**(a)**	Define resolution, sensitivity, accuracy and precision with examples.	**04**
	(b)	What are fundamental and derived quantities in measurement? Write on SI system of units.	**03**
Q.3	**(a)**	Define term "transducer" and classify transducers with various aspects.	**04**
	(b)	Explain criteria for selection of transducers.	**03**
Q.4		Explain the working of CRO with necessary figure. Write on applications of CRO.	**07**
Q.5		How strain gauge is used in engineering application?	**07**
Q.6		How temperature is measured with thermocouple?	**07**
Q.7		Explain flow measurement with any one type of device.	**07**
Q.8		How angular displacement is measured with capacitive principle?	**07**

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