

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2022 - 23 Examination

Semester: 4
Subject Code: 203122257
Subject Name: Sensors and Transducers

Date: 24/03/2023
Time: 2:00pm to 4:30pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) (15)

1. LM35 sensor IC is an example of ----- sensor.
2. Are IR radiations visible to human eyes?
Yes or No
3. The output generated by the piezoelectric sensor is -----.
4. In LDR sensor, if the intensity of light applied is less, its resistance value becomes -----
5. Application of Tactile sensors is -----.
- a. Elevator touch-sensitive buttons
- b. Smart mobile phones
- c. Cars
- d. Both a and b
6. What is the full form of LASER?
7. Define the Repeatability of measuring instruments.
8. The ----- of a system refers to the smallest change in the measurand that can be measured
9. The ratio of the output to input change for a given measuring system is referred to as-----.
10. Thermocouples
- a. Requires reference junction compensation
- b. Are most commonly used as temperature transducers
- c. Have an ion output voltage level
- d. All of the above
11. The transducer that converts measured data into the form of a pulse is called -----
transducers
12. Define Transducers.
13. The principles of operation of LVDT are based on the variation of -----.
14. Thermocouples are active transducers: true or false
15. When does a Piezoelectric crystal produce an e.m.f

Q.2 Answer the following questions. (Attempt any three) (15)

- A) A Quartz piezo-electric Crystal having a thickness of 2 mm and voltage sensitivity of 0.055 V-m/N is subjected to a pressure of 1.5 MN/m². Evaluate the voltage output. Give its applications.
- B) What is signal conditioning and why is it required?
- C) Explain the RVDT working principle with a diagram.
- D) Contrast the characteristics of RTD and Thermistor

Q.3 A) What is the working principle of a Photodiode based transducer, give an application with a diagram. (07)

B) What are the cold Junction compensation methods, explain to anyone with a diagram. (08)

OR

B) Explain the various characteristic features of strain gauge load cell and explain 6 lead load cell with a diagram. (08)

Q.4 A) An LVDT has a secondary voltage of 5 V and a range of ± 25 mm find a) The output voltage when a core is -18.75 mm away from the center b) The output voltage when the core is moving from -18.75 to -10mm. (07)

OR

A) What is meant by LIDAR? Explain its various components, functionalities, and applications (07)

B) Mention applications of various sensors in Automobile industries. (08)