

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160620

Date:15-12-2022

Subject Name:Instrumentation and Sensors

Time:02:30 PM TO 05:00 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) Define: i) Transducer ii) Sensor.	03
(b) List various physical variables.	04
(c) Explain the principle and working of a strain gauge. Derive the expression of gauge factor.	07
Q.2 (a) What are the different types of signal and differentiate it.	03
(b) Explain types of instrumentation	04
(c) Explain the working principle of different types of flow sensors. Differentiate between Ultra Sonic and Electromagnetic type flow sensors.	07
OR	
(c) Explain the types of proximity sensors and describe their use as accelerometer and vibration sensor	07
Q.3 (a) Define and explain the static characteristics of an instrument.	03
(b) List Criteria for Sensor siting.	04
(c) Discuss in detail various types of errors associated in measurement and how these errors can be minimized?	07
OR	
Q.3 (a) Explain Piezometer with proper diagram.	03
(b) List Criteria for Sensor selection.	04
(c) Define the following terms in the context of normal frequency distribution of data (a) Mean Value, (b) Deviation, (c) Average deviation, (d) Variance, (e) standard deviation	07
Q.4 (a) List various pressure sensors and explain any one of them.	03
(b) Differentiate between types of sensors and their modes of operation.	04
(c) Draw the functional block diagram of measurement system. Mentions the purpose of measurement. What is the methods of measurement?	07
OR	
Q.4 (a) List any two light sensors.	03
(b) What is noise? & explain SNR.	04
(c) What are the main characteristics to choose Permanent installations and Temporary installations?	07
Q.5 (a) What is the importance of frequency domain analysis?	03

- (b) Explain Noise reduction with filters **04**
- (c) Explain the need for frequency domain analysis and its principles. **07**

OR

- Q.5**
- (a) Explain Fourier Transform? **03**
 - (b) Explain Time domain signal processing. **04**
 - (c) What is FFT and explain its application in civil engineering **07**