

B.E. Instrumentation Engineering Third Semester
IN304 - Sensors & Transducers-I

P. Pages : 2

Time : Three Hours



GUG/W/18/1511

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) List and explain dynamic characteristics of sensor/transducer. 8
b) Explain in detail classification of transducers. 8

OR

2. a) Write a short note on sources of errors. 8
b) List and elaborate the criteria's to select sensor/ transducer. 8
3. a) Sketch and elaborate application of LVDT as secondary transducer for force measurement. 8
b) Derive expression for finding gauge factor in strain gauge. 8

OR

4. a) A strain gauge is bonded to beam 0.1m long and has a cross sectional area 4cm^2 . Youngs modulus for steel is 209 GN/m^2 . The strain gauge has an unstrained resistance of $270\ \Omega$ and gauge factor as 2.3. When a load is applied, the resistance of gauge changes by $0.013\ \Omega$. Calculate the change in length of the steel beam and an amount of force applied to beam. 8
b) Write a short note on torsion bar dynamometer. 8
5. a) Explain Potentiometer of displacement sensor in detail. 8
b) Write a short note on thickness measurement using ultrasonic method. 8

OR

6. a) Elaborate applications of Precision measuring instrument (gauges) 8
b) Discuss Hall effect transducer in detail with neat diagram. 8
7. a) Classify Encoder. Explain any one in detail. 8
b) Explain working and applications of any accelerometer. 8

OR

8. a) Write a short note on shaft speed measurement. 8
b) What is jerk meter? Explain it with its typical applications. 8

9. a) Write short note on **any two.**

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i) pH measurement.

ii) Conductivity measurement.

iii) Smoke detectors.

OR

10. a) Explain in detail construction, working and applications of leak detector.

8

b) Elaborate SPL meter in detail for measurement as sound.

8

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