

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VI MECHANICAL :SUMMER- 2022
SUBJECT : MECHANICAL MEASUREMENT & METROLOGY

Day : Tuesday
Date : 21-06-2022

S-13453-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N. B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labelled diagrams **WHEREVER** necessary.
- 4) Assume suitable data, if necessary.

- Q. 1** a) What are the standard test inputs used for analysis of dynamic systems? (05)
- b) Identify: The Sensor, Signal Conditioner and display elements in the measurement system of a digital thermometer. (05)

OR

- Q. 1** For measurement of friction factor (f), following relationship is used: (10)

$$f = \frac{\pi^2 D^3 \Delta p}{8\rho Q^2 L}$$

Where,

Δp : Pressure drop, ρ : Density, Q : Discharge, L : Length and D : Diameter.

Estimate the overall uncertainty in measurement of f for the following data:

Parameter	Nominal Value	Error
Q	0.003 m ³ /s	0.00001 m ³ /s
ρ	1000 kg/m ³	10 kg/m ³
Δp	80 Pa	2 Pa
D	20 mm	0.1 mm
L	1 m	0.001 m

- Q. 2** a) State the combinations of slip gauges to be used for measurement of a dimension 56.421 mm using a Normal Slip Gauge Set. (05)
- b) What are the different types of devices used in angular measurement in metrology? Give least count of each one. (05)

OR

- Q. 2** a) How are the standards classified in Metrology? State their advantages and limitations. (05)
- b) What do you understand by angle gauges? Give their application, advantages and limitation. (05)

- Q. 3** a) How is the process of measurement of speed using digital sensor conducted? (05)
- b) What are the different types of devices used in measurement of pressure? Give least count and specific application of each one. (05)

OR

- Q. 3** a) What are the components of Data Distribution System? (05)
- b) How is Wheatstone bridge circuit use in PT-100 RTD? (05)

P. T. O.

- Q. 4 a)** What do you understand by Hole basis and Shaft basis system? (05)
- b)** What do you understand by Interchangeability? Explain with suitable examples. (05)

OR

- Q. 4 a)** What are various terms related to tolerancing? (05)
- b)** What is the Taylor's Principle of Gauging? How are limit gauges classified? (05)

- Q. 5 a)** What are the different types of acceleration sensors? Give their characteristics. (05)
- b)** How does Ultrasonic Liquid Level Detector work? Give its applications, advantages and limitations. (05)

OR

- Q. 5 a)** How does LVDT work? Give its applications, advantages and limitations. (05)
- b)** Which type of proximity sensor is used in mall glass door opening and closing? State its range and working principle. (05)

- Q. 6 a)** How does Tool Maker's Microscope work? Give its applications, advantages and limitations. (05)
- b)** How is flatness testing conducted using interferometry? (05)

OR

- Q. 6 a)** How does Taylor-Hobson Talysurf work? Give its applications, advantages and limitations. (05)
- b)** Enlist the instruments required for measurement of various dimensions of screw thread? (05)

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