

C U SHAH UNIVERSITY

Course: B.Tech (Mech)

Sem: IV

Subject: Mechanical Measurement & Metrology (4TE04MMM1)

Section I

Q-1

- (a) Define the terms: Range and Span 02
- (b) Define the term Sensitivity. A spring scale requires a change of 25 kgf in the applied weight to produce 5 cm change in the deflection of the spring scale. Determine the static sensitivity. 02
- (c) Give any three requirements of a strain gauge. 02
- (d) Define the term force in measurement. 01

Q-2

- (a) Write a short note on Pitot static tube for flow measurement. 05
- (b) Draw and discuss the construction and working of Bell type pressure gauges. 05
- (c) A single column manometer is using mercury of specific gravity 13.6 as manometric liquid. Calculate the rise in height of mercury column when pressure of 04

OR

Q-2

- (a) Write a short note on Interferometer. 05
- (b) Draw and explain the construction, working and governing equation for U tube double reservoir manometer. 05
- (c) A new control weight is to be made for a ring balance meter. Given that the average radius of the ring is 200 mm, tube diameter is 100 mm and the distance of the weight from the center is 270 mm, determine the value of control weight required in order that maximum deflection of the ring is 30° when a differential pressure of 200 mm water gauge is applied to the ring. 04

Q-3

- (a) Draw a block diagram of a measuring system for speed measurement using tachometer. 05
- (b) Describe the construction and working of Total radiation pyrometer. 05
- (c) Write a note on desirable characteristics of Thermocouple materials. 04

OR

Q-3

- (a) Give a broad classification of errors in measurement and explain the Observation type errors. 05
- (b) Discuss the errors and precautions in temperature measurement. 05
- (c) Write a short note on law of intermetallic metals of thermocouple with neat sketch. 04

Section II

Q-4

- Define the following terms:
- (a) Define the term Interchangeability. 02
 - (b) How the surface finish can be checked by surface photographs? 02
 - (c) What is the difference between error and correction factor? 02
 - (d) Define the term Repeatability. 01

Q-5

- (a) List the type of Vernier calipers and explain as per IS: 3651-1974. 05
- (b) Discuss in detail the Wringing of slip gauges. 05
- (c) Discuss with neat sketches any two applications of Sine bar. 04

OR

Q-5

- (a) Draw and discuss the Vernier Depth gauges. 05
- (b) Describe the various parts and their specifications. 05
- (c) Write a short note on Sigma comparator. 04

- Q-6 (a) Write a short note on Plain ring gauges. 05
(b) Discuss the effective diameter measurement for screw thread using Thread micrometer. 05
(c) Write a short note on Dividing heads and Circular Tables. 04

OR

- Q-6 (a) Discuss construction, working and application of angle gauges with neat sketch. 05
(b) Derive equations of thickness and depth of gear teeth using constant chord method. 05
(c) What is the importance of alignment test? Discuss the leveling of the machine with neat sketch. 04