

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), April-May 2018

B. Tech in Mechanical Engineering, Semester - IV

Roll No.....

ME 411: Mechanical Measurement

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

1×10

- i. Error of measurement =
(a) True value - Measured value (b) Precision - True value
(c) Measured value - Precision (d) None of the above
- ii. The principle of 'Interchangeability' is normally employed for
(a) Mass production (b) Production of identical parts
(c) Parts within the prescribed limits of sizes (d) All of the above
- iii. The amount by which the actual size of a shaft is less than the actual size of mating hole in an assembly
(a) Clearance (b) Interference (c) Allowance (d) None of the above
- iv. A positive allowance will always result in a _____ fit.
(a) Clearance (b) Interference (c) both (a) and (b) (d) None of these
- v. The reliability of an instrument mean
(a) The life of the instrument
(b) The degree of repeatability within specified limits
(c) The time interval between two responses of the instrument
(d) None of these
- vi. Which among the following statements is correct about LVDT?
(a) It converts pressure into electrical output
(b) It converts strain into electrical output
(c) It converts linear displacement into electrical signal
(d) All of these
- vii. The use of a dead weight tester is to
(a) Calibrate pressure measuring instruments
(b) Produce high pressure
(c) Measure the load accurately
(d) Test the magnitude of given weight
- viii. For a thermistor, its resistance
(a) Does not change with change in temperature
(b) Increases with decrease in temperature
(c) Decreases with decrease in temperature
(d) None of these

- xi. Property of fluid that describes its internal resistance is known as:
 (a) Viscosity (b) Friction (c) Resistance (d) Internal energy
- x. The degree of closeness of the measured value of a certain quantity with its true value is known as
 (a) Accuracy (b) Precision (c) Standard (d) Sensitivity
- Q.2 Long answer type questions (4 questions @ 2.5 marks) 2.5×4
- Why mercury is preferred instead of water in pressure measuring devices?
 - What is bias error? Discuss with suitable example.
 - Why flow measurement is not very accurate?
 - Discuss the various types and application of autocollimator.
- Q.3A Discuss the construction and working principle of LVDT with neat sketch. 05
- Q.3B What is moving coil transducer? Discuss the working principle of potentiometer with neat sketch. 02+03
- Q.4A What is metrology? Discuss the need of measurement in detail. 01+04
- Q.4B What is bridge constant? Discuss the working principle of resistance strain gauge with neat sketch. 01+04
- Q.5A Describe the working principle of Toolmaker's microscope with neat sketch. 05
- Q.5B Define the sensitivity of the instrument. Differentiate between accuracy and precision followed by suitable diagram. 01+04
- Q.6A What is gauge factor? Differentiate between thermocouple and resistance temperature detector. 01+04
- Q.6B What are the line and end standard? Discuss the different types of fits with suitable example followed by neat sketch. 02+03
- OR**
- Q.6B Write short notes on following. 2.5+2.5
- (a) Manometer (b) Dead weight tester
- Q.7A Discuss the following term in regards to instrument with suitable example. 1.25×4
- (a) Linearity (b) Resolution
 (c) Repeatability (d) Reproducibility
- Q.7B What is barometer? Discuss the working principle of pressure gauge with neat sketch. 01+04
- Q.8A Discuss the working principle of rotameter with help of neat sketch followed by mathematical expression. Also discuss the advantage and disadvantage of rotameter. 06+04
- Q.9A Discuss the working principle of venture-meter with the help of neat sketch followed by suitable mathematical expression. 10
- Q.9B Discuss the working principle and application of following instrument followed by neat sketch. 05+05
- (a) Thermistor (b) Thermocouple