2014 ME3112 Metrology And Instrumentation – Test 1

Max. Marks: 20 Approved tables are permitted Time: 60 minutes

All questions carry 2 marks each unless otherwise mentioned

1. Define the metrological traceability as per VIM. Identify the traceability chain for a micrometer used in the laboratory.
2. Suppose you find an old dial-gauge in a stock room. Suggest a method to estimate its (a) hysteresis (b) precision
3. A pressure measurement system has the following specifications: Range: 0 to 500 kPa Linearity error: 0.25% FSO Hysteresis error: 0.10% FSO Sensitivity error: 0.15% FSO Zero drift: 0.20% FSO Estimate the overall instrument error for this system based on the available information.
4. A load cell is calibrated in an environment at a temperature of 25°C and has the following deflection/load characteristic:

Load/kg	0	50	100	150	200
Deflection/mm	0.0	1.2	2.4	3.6	4.8

   Determine the zero drift and sensitivity drift coefficient, if when used in an environment at 32°C, its characteristic changes to the following:

Load/kg	0	50	100	150	200
Deflection/mm	0.2	1.6	3.0	4.4	5.8

5. Differentiate between uncertainty and error?
6. List any four objectives of this course.
7. What is Design of Experiments? How is experimentation different from observation?
8. Explain the problem of Correlated factors with an example.
9. Explain the idea of blocking in experimentation and its purpose.
10. Explain the strategy of sequential experimentation with respect to the number of factors and levels.