C.U.SHAH UNIVERSITY
Winter Examination-2015

Subject Name : Mechanical Measurement & Metrology
Subject Code : 4TE04MMM1   **Branch :B.Tech (Mech)**

Semester : 4   Date : 24/11/2015   Time : 2:30 To 5:30   Marks :70

Instructions:
(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

1)   The ease with which observations can be made accurately is referred to as
    (a) readability   (b) sensitivity
    (c) accuracy   (d) precision

2)   Systematic errors are
    (a) random   (b) regular repetitive in nature
    (c) unknown errors   (d) of unpredictable nature

3)   The maximum amount by which the result differs from the true value is called
    (a) correction   (b) discrepancy
    (c) error   (d) accuracy

4)   Which of the following can be used to scribe lines parallel to the edges of a part
    (a) Vernier calipers   (b) screw gauge
    (c) divider   (d) hermaphrodite caliper

5)   A feeler gauge is used to check
    (a) radius   (b) screw pitch
    (c) thickness of clearance   (d) unsymmetrical shape

6)   The thread micrometer measures
    (a) major diameter of the thread   (b) minor diameter of the thread
    (c) effective diameter of the thread (d) root diameter of the thread

7)   Circular scale of a micrometer is marked on
    (a) anvil   (b) barrel
    (c) ratchet   (d) thimble

8)   A piezometer is use to measure the
    (a) undisturbed fluid pressure   (b) gauge pressure in a static mass of fluid
    (c) pressure difference of two fluids (d) dynamic pressure of a moving stream

9)   In a Bourdon tube pressure gauge, incorrect readings may be encountered due to
    (a) hysteresis   (b) fatigue
    (c) creep   (d) drift

10) A dead weight tester is used for
     (a) calibrating pressure measuring instruments
     (b) testing the magnitude of a given weight
     (c) producing high pressure
     (d) accurate measurement of load

11) The fluid density does not affect the working of
     (a) orifice plate   (b) rotameter
     (c) electro-magnetic flow meter   (d) pitot-static probe traverse

12) The hot wire anemometer used for measuring gas velocities is a variable
     (a) resistance transducer   (b) inductance transducer
     (c) capacitance transducer   (d) frequency transducer

13) Thermo couples are generally used for temperature measurements upto
     (a) 500° C   (b) 1000° C
     (c) 1500° C   (d) 2000° C

14) A Prony brake dynamometer measures
     (a) crankshaft force   (b) crankshaft torque
     (c) engine brake power   (d) all of the these

Attempt any four questions from Q-2 to Q-8

Q-2   **Attempt all questions**
(a)   Draw the generalized measurement system and explain its functional elements.   **(7)**
(b)   What are the characteristics of random errors?   **(7)**

Q-3   **Attempt all questions**
(a)   Differentiate the following terms: **(7)**
     (i) Range and Span   (ii) Accuracy and Precision
(b)   Differentiate the following terms: **(7)**
     (i) Drift and Sensitivity   (ii) Hysteresis dead zone and dead time

Q-4   **Attempt all questions**
(a)   Draw the constructional details of Filled system thermometer and derive its governing equation.   **(7)**
(b)   Describe with neat sketch the calibration of thermometers.   **(5)**
(c)   List some desirable characteristics of a manomatric liquid.   **(2)**

Q-5   **Attempt all questions**
(a)   Write a short note on single column manometer.   **(7)**
(b)   Draw and derive the governing equation for Ring balance manometer.   **(5)**
(c)   Define the terms: (i) Optical pyrometer (ii) Radiation pyrometer   **(2)**

Q-6   **Attempt all questions**
(a)   Write a short note on Outside micrometer.   **(5)**
(b)   Explain wringing of slip gauges.   **(5)**
(c)   Discuss the limitations of Sine bars.   **(4)**

Q-7   **Attempt all questions**
- **(a)** Draw the schematic for working of sigma comparator and explain in detail. **(5)**
- **(b)** With neat sketch derive the equation for depth and width measurement of gear using constant chord method. **(5)**
- **(c)** With neat sketch explain the measurement of major diameter of internal thread. **(4)**

Q-8   **Attempt all questions**
- **(a)** Describe the various parts Bevel Protractor and with their specifications. **(5)**
- **(b)** Write a short note on Plain ring gauges. **(5)**
- **(c)** Explain the construction and working of LVDT in brief. **(4)**