Department of Applied Mechanics
AML 700 (Experimental Methods for Solids and Fluids)
Major Test (II semester, 2009-2010)

Time: 2 hours Maximum Marks: 80

Q1

Indicate whether the following statements are true or false. Justify your answer in one or two sentences.

(i) Metals and sintered materials (oxides etc.) show similar variation of their resistance with temperature.

(ii) To measure the temperature of a liquid bath accurately, the level of submergence of an Hg-in-glass thermometer in the bath makes a difference.

(iii) Accuracy of pressure measurement using a U-tube manometer is influenced by the diameter of the tube.

(iv) Pitot tube is suitable for measuring low as well as high velocity of a fluid.

(v) An optical interferometer is suitable for measuring only small displacements.

(vi) A proving ring is used to measure strain in a manner similar to Newton's rings.

(vii) McLeod gauge is a modified U-tube manometer used for measuring very low pressures.

(viii) It is advised to have an instrument slightly under-damped instead of over-damped if the input is expected to be applied very quickly.

(1 ½ x 8 = 12)

Q2

Discuss how the change in resistance (ΔR) of metals and alloys can be utilized in the following measurements:

(i) Very low pressure (ii) Temperature upto 600 °C

(iii) Fluid velocity (iv) Longitudinal Strain

Name the instrument and the elaborate the phenomenon of the change in resistance when the appropriate input is given to the instrument.

(3 x 4 = 12)

Q3

(a)Name the instruments which work on the following laws /principles. Also give some typical applications of the instruments.

(i) Boyle's Law (ii) Seebeck Effect

(iii)Doppler's frequency shift

(6)

(b)Draw a schematic diagram of the instrument, (i) or (ii) in Q.3 (a), as suggested by you and discuss its working.

(7)