

---

**BITS, PILANI – DUBAI, ACADEMIC CITY, DUBAI  
FIRST SEMESTER 2006 – 2007  
TEST II (Closed Book)**

**TA UC 222 MEASUREMENT TECHNIQUES II**

**MAXIMUM MARKS: 20  
DATE: 13/12/07**

**WEIGHTAGE: 20%  
DURATION: 50 MINUTES**

---

1 A small temperature sensor operates as a first-order system and is stated to have a time constant of 0.1 s. if it is initially at a temperature of 100 degree centigrade and suddenly exposed to an environment temperature of 15 degree centigrade, how long will it take to indicate a temperature of 17 degree centigrade. If the temperature sensor is exposed to harmonic temperature source, for what frequency range will its amplitude response be within 10 percent? What will be the time delay under these circumstances?

[7 Marks]

2. a. Define Least count.

b. Define Calibration and Explain different types of calibration?

[1+2 Marks]

3. Explain the principle of capacitor transducers with neat sketch. What are the applications of it?

[3 Marks]

4. a. A certain resistor draws 110.2V and 5.3A. The uncertainties in the measurements are  $\pm 0.1V$  and  $\pm 0.07V$  respectively. Calculate the power dissipated in the resistor and the uncertainty in the power.

[3 Marks]

b. Explain the working principle of attraction type moving Iron meter.

[4 Marks]

.....

**BITS,Pilani - Dubai campus - Academic City**

**First Semester 2007 - 2008**

**Course: ES UC 222 MEASUREMENT TECHNIQUES II (NON EEE)**

**TEST: 1[Closed book]**

**Max.Marks :20**

**Weightage: 10 %**

**[Common to All branches]**

**Date:11.11.07**

**Time: 50 min**

---

*Note: (i) Answer all Questions*

*(ii) Assume suitable values if required*

---

1. Explain the working principles of the following with neat sketches
    - a. Bourdon gauge (3)
    - b. U tube Manometer (2)
  2. a. The strain readings from a rectangular Rosette for  $0^\circ$ ,  $45^\circ$  and  $90^\circ$  elements are numbered A,B, and C are listed below:  $\epsilon_A = 0.010$ ,  $\epsilon_B = 0.020$  and  $\epsilon_C = -0.060$ . Find the principal strains, the orientation of principal stresses and the maximum shear stress if  $E = 205 \text{ GPa}$  and  $\mu = 0.3$ . (4)
    - b. Name the three types of resistance strain gauges (1)
  3. With neat sketches explain the following:
    - a. Optical radiation pyrometer (3)
    - b. Resistance Temperature Detector (2)
  4. a. The following data are related to an orificemeter.  
Diameter of the pipe = 240mm, Diameter of the orifice = 120mm, the specific gravity of the oil = 0.88, reading of the differential manometer = 400mm of mercury and coefficient of discharge of the meter = 0.65. Determine the rate of flow of oil. (4)
    - b. State the Bernoulli's theorem (1)
-