B.E. Instrumentation Engineering Fourth Semester

IN 403 - Sensors and Transducers-II

P. Pages : 2 **GUG/W/18/1576**

Time : Three Hours * 1 2 4 0 * Max. Marks : 80

Notes : 1. Same answer book must be used for each question.
2. All questions carry marks. as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What is cold junction compensation. How it can be obtained? **8**

b) Define different temperature scales. **4**

c) A thermistor has a resistance temperature coefficient of -5% over a temperature range of 25ºC to 50ºC. If the resistance of the thermistor is 100Ω at 25ºC. What is the resistance at 35ºC. **4**

OR

2. a) Draw and discuss any non contact type temperature measurement technique. **8**

b) Illustrate construction and working of bimetallic strip thermometer. Also list its typical applications. **8**

3. a) Enlist different elastic elements used for pressure measurement. Draw and describe any one in short. **8**

b) Discuss McLeod gauge for vacuum pressure measurement. **8**

OR

4. a) Write in short differential pressure measurement in short. **8**

b) Define calibration. Explain dead weight tester as pressure calibrating instrument. **8**

5. a) Water is pumped through a 75mm diameter pipe with a flow velocity of 760 mm/sec. Find :- **6**

i) Volume flow rate

ii) Mass flow rate.

Density of water is 1000 kg/m^3

b) Select and discuss flow sensor for metering the household water supply. **10**

OR

6. a) A pitot tube properly placed just in front of the submarine is connected to a manometer. The pressure difference in the manometer is 25 kN/m^2. Find the speed of submarine if the density of sea water is 1026 kg/m^3. **8**

b) Write a short note on- Electromagnetic flow meter. **8**

7. a) Define the following **4**

i) Dew point

ii) Relative humidity

iii) Specific humidity

iv) Absolute humidity

b) Discuss bio sensors in brief. **6**

c) In a hall, the amount of water vapour present is 500 gms. When an amount of 1500 gms of water has been sprayed by a cooler, the hall gets saturated and dews just started forming. Calculate the relative humidity inside the hall just before the cooling operation started. **6**

OR

8. a) Sketch and explain in detail working of Psychrometer for measurement of humidity. **9**

b) What is smart sensor? Explain in brief IC sensors. **7**

9. a) Describe the operation of the air bubbler level measurement system. **8**

b) Choose the level sensor for measuring level if the liquid is corrosive or explosive. Explain its working in short. **8**

OR

10. a) Determine the hydrostatic pressure of the liquid in a closed tank if the height of the liquid is 15m. The external pressure on liquid is 1 kg/cm^2 **6**

b) Illustrate the construction and working principle of torque tube unit. Draw a neat diagram. **10**

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