# PARUL UNIVERSITY
## FACULTY OF ENGINEERING & TECHNOLOGY
### B.Tech. Summer 2018 – 19 Examination

Semester: 4                                                              Date: 13/05/2019
Subject Code: 03112252                                    Time: 2:00 pm to 4:30pm
Subject Name: Industrial Measurement Techniques-1    Total Marks: 60

**Instructions:**
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

| Q.1 | **Objective Type Questions** - (All are compulsory) (Each of one mark) | **(15)** |
|---|---|---|

1. Justify the need of 4-wire configuration over 2-wire configuration of RTD.
2. In McLeod gauge,
    a) High pressure fluid is expanded to a low pressure which is read by the monometer technique
    b) Low pressure fluid is compressed to a high pressure which is read by the bourdon technique
    c) High pressure fluid is expanded to a low pressure which is read by the bourdon technique
    d) Low pressure fluid is compressed to a high pressure which is read by the monometer technique
3. _____error is inherent with instrument and caused because of fault in mechanical structure.
4. List any two types of flow meter.
5. A magnetic flow-meter will not properly measure the flow rate of:
    a) Dirty water
    b) Milk
    c) Oil
    d) Acid
6. Ratio of change in the response of instrument to a change of input or measured variable is known as _____.
    e) Dead zone
    f) Precision
    g) Static Sensitivity
    h) Hysteresis
7. Define barometric pressure.
8. List any two the criterions to be taken into consideration while selecting a transducer.
9. Define 'Pressure'.
10. In radiation methods, the detector system is located at
    a) The top of the liquid filled tank
    b) The bottom of liquid filled tank
    c) Middle of the liquid filled tank
    d) Outside a liquid filled tank

11. Define Resolution of an instrument.
12. Dipsticks are used for the
    a) Pressure measurement
    b) Flow measurement
    c) Displacement measurement
    d) Level measurement
13. Which formulae is used to find the unknown temperature using thermocouple, if the given emf is not listed in thermocouple table?
14. State true or false: 'Thermistor is positive temperature coefficient device.'
15. List any two factors affecting flow of fluid.

**Q.2** Answer the following questions. (Attempt any three) **(15)**

A) PT-100 is a Platinum RTD whose resistance at $0^{\circ}C$ is $120\Omega$. If the resistance temperature co-efficient of Platinum is $3.91 \ X \ 10^{-3} \ /^{\circ}C$, then find its resistance at $95^{\circ}C$.

B) List undesirable characteristics of an instrument. Explain any one of them with neat diagram, wherever required.

C) Two Wheatstone bridge designs shown below. What is meant by the term 'a balanced bridge'? At what temperatures are the two bridges balanced? If the supply voltage is 20 V, what is the output from each bridge at a temperature of 65 ºC? What are the voltages at points D and B relative to ground for each of the bridge designs? Given, Temperature co-efficient of Platinum as $3.91 \ X \ 10^{-3} \ /^{\circ}C$



Option 1                    Option 2
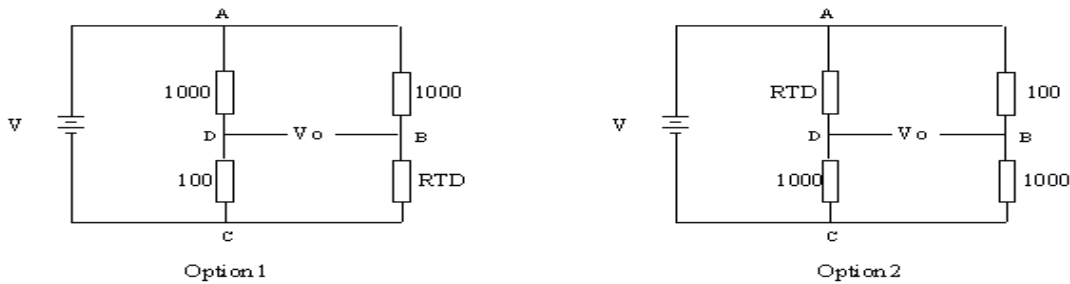
D) Illustrate how float chain type level measurement instrument works?

**Q.3 A)** Explain working principle of Vortex flow meter. **(07)**
**B)** Explain working principle and laws of thermocouple in detail. Draw necessary diagrams. **(08)**

**OR**

**B)** Explain working of C-type bourdon tube in detail. Also explain the ways to increase sensitivity of the same. **(08)**

**Q.4 A)** Write a short note on Rotameter. **(07)**

**OR**

**A)** How hydrostatic Pressure Head type level measurement device determines level? Explain the working of the same for both the conditions: Open tank and closed tank. **(07)**
**B)** List high-vacuum pressure measuring instruments. Explain any one in detail. **(08)**

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