

B.E. Instrumentation Engineering (Model Curriculum) Semester-IV
IN404 - Industrial Instrumentation

P. Pages : 2

Time : Three Hours



GUG/W/23/14017

Max. Marks : 80

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- Notes : 1. All questions carry marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.

1. a) What is Pyrometry? Illustrate construction and working principle of radiation pyrometer in detail. State its advantages, disadvantages and applications. **8**
- b) What is a Temperature Transmitter? Why should we use a temperature transmitter? Discuss the application with advantages of using temperature transmitters. **8**

OR

2. a) Demonstrate with circuit diagram how temperature is measured using Thermocouple. **8**
- b) Discuss in detail Helical and Spiral Bimetallic Thermometer with neat diagram. **8**
3. a) The McLeod gauge is used for vacuum pressure measurement with P-vacuum pressure to be measured, V-Volume of vacuum gas before compression, A_c -Area of cross section of measuring capillary and h-the difference in height of Mercury in reference and measuring capillary. Prove that $P = \frac{A_c h^2}{V}$. **8**
- b) Sketch and discuss in detail construction and working principle of Pirani pressure gauge. State its advantages, disadvantages and applications. **8**

OR

4. a) Sketch and explain in detail construction and working principle of Bourdon Tube. State its advantages, disadvantages and applications. **8**
- b) Sketch and discuss in detail construction and working principle of Thermocouple vacuum gauge. State its advantages, disadvantages and applications. **8**
5. a) Illustrate the working principle and construction of Hot wire anemometer. Also state its advantages, disadvantages and applications. **8**
- b) Draw and explain in detail construction and working principle of Orifice meter. State its advantages, disadvantages and applications. **8**

OR

6. a) Illustrate the working principle and construction of Pitot tube. What are some practical limitations faced by a pitot-static tube? Discuss how it can be overcome. 8
- b) Sketch and explain the working principle of Electromagnetic flow meter in detail. List its advantage and disadvantage. 8
7. a) Sketch and explain the working principle of Optical Fiber Sensors in detail. 8
- b) Write a short note on: 8
- i) Smart Sensors
 - ii) Nano Sensors

OR

8. a) Describe the Air bubbler technique for level measurement with suitable diagram. 8
- b) Illustrate the usage of smart sensors in various industry sectors. State its characteristics and advantages. 8
9. a) Describe the working principle of conductivity meter with suitable diagram. State the different industrial usage of conductivity meter. 8
- b) Sketch and explain hair hygrometer in detail. List its advantages and disadvantages. 8

OR

10. a) Discuss with neat diagram the piezoelectric humidity meter. List its advantages and disadvantages. 8
- b) Discuss with neat diagram the measurement of pH value using pH meter. 8
