

Reg No:

Name:

Eight Semester B.Tech Degree Examination
(2013 Scheme)

13.804: PROCESS INSTRUMENTATION (H)

Time: 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **2** marks.

1. Explain the terms accuracy and sensitivity.
2. Compare and contrast between resistance type devices and thermocouples for temperature measurement.
3. Discuss Seebeck, and Thomson effect and its application in temperature measurement.
4. Discuss the working principle of variable area flow meters.
5. Define order of a system and give examples for 1st and 2nd order systems.
6. Explain the working principle of an inclined tube manometer.
7. Write notes on viscosity measurement devices.
8. Illustrate the working of a McLeod gauge.
9. Explain pressure measurement in corrosive fluids.
10. Explain any four symbols used in instrumentation diagrams.

(2 x 10 = 20)

PART – B

Answer **one** full question from **each** Module.

Module – I

11. Explain with a neat sketch the construction and operation of optical pyrometers. (20)
12. a). Describe with a neat sketch the working of industrial mercury-in-glass thermometer.(12)
b). Mention any five industrial thermocouples and their range of operations. (8)

Module –II

13. a). Sketch and explain an instrument used for high pressure measurement. (10)
b). Explain the principle of operation of Knudsen gauge with the help of a neat sketch. (10)
14. List various types of manometers used for differential pressure measurement. Discuss about the advantages and disadvantages of each. (20)

Module – III

15. Explain with a neat sketch, the working of
a). Elbow flow meters (6)

- b). Impact meters (6)
- c). Rotameters (8)

16. Explain in detail about the construction, installation and operation of orifice meters giving important considerations. (20)

Module –IV

17. a). Explain the principle of chromatography. Discuss about its applications. (10)

b). With the help of neat sketches explain the principle and instruments for measurement of density and humidity. (10)

18. a). Develop P&I diagram of a gas vessel which has natural gas entering through an inlet header and leaving through an outlet gas header. The diagram should include the following.

i). An inlet valve that is manually controlled on the gas inlet head.

ii). Pressure transmitter and pressure indicator to indicate inlet gas pressure.

iii). A flow transmitter and flow indicator to measure and indicate the inlet flow, also show instrumentation for high and low flowrates alarm.

iv). A pressure safety valve to release excess pressure to a flare system.

v). A handle valve on the gas outlet header.

vi). A pressure transmitter, pressure indicator & controller and control valve for monitoring and controlling gas vessel pressure.

vii). An alarm to indicate high vessel pressure.

viii). A check valve on the outlet header.

ix). A pressure transmitter, pressure indicator on the outlet header to indicate outlet pressure. (10)

b). Explain the principle and working of Thermogravimetric analysis. (10)

(20x4 = 80)
