CBCS SCHEME

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18EI45

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Process Instrumentation

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Briefly discuss about the primary effects which can be employed for the measurement of temperature. **(06 Marks)**

b. With a neat sketch, discuss liquid filled mechanical thermometers. **(10 Marks)**

c. Briefly explain the principle and characteristics of quartz thermometer. **(04 Marks)**

OR

2 a. Define seebeck effect. Describe the working of following thermocouple circuits. **(10 Marks)**
i) Basic circuits
ii) Measurement with Auxillary junction.

b. With a neat diagram, explain the construction and working of optical pyrometer. **(10 Marks)**

Module-2

3 a. Derive the expression for flow rate measurement based on Bernoull's theorem with a neat figure. **(10 Marks)**

b. With a schematic diagram, explain the working of rotameter with necessary equations. **(10 Marks)**

OR

4 a. Discuss the principle and working of transit time ultrasonic flow meter with neat sketch. Derive an expression for flow velocity. **(10 Marks)**

b. Characterize the important features and working of vortex shedding flow meter with neat schematic. **(10 Marks)**

Module-3

5 a. Define vibration. Discuss typical characteristics of vibration. **(10 Marks)**

b. With a schematic diagram, discuss the working of bonded strain gauge accelerometer and analyse its performance with necessary equations. **(10 Marks)**

OR

6 a. Discuss the principle and working of ball type liquid density meter with a neat sketch. **(10 Marks)**

b. Describe the construction and working of electromagnetic suspension type gas density sensor. **(10 Marks)**

Module-4

7 a. Define the following terms :
   i) Absolute viscosity
   ii) Consistency
   iii) Apparent viscosity
   iv) Kinematic viscosity. **(08 Marks)**

   b. List the uses of viscosity measurement in modern applications. **(04 Marks)**

   c. With a schematic diagram, explain the working of cone and plate type viscometer. **(08 Marks)**

OR

8 a. Define Turbidity. Describe the construction and working of light scattering turbidity meter. **(10 Marks)**

   b. Discuss the principle and working of differential pressure continuous capillary viscometer. **(10 Marks)**

Module-5

9 a. With a neat sketch, discuss the construction and working principle of Dry and wet bulb psychrometers. **(10 Marks)**

   b. With a schematic diagram explain the operating principle and working of electrolytic hygrometer. **(10 Marks)**

OR

10 a. With a neat diagram, explain the operation of liquid sample stripping method in electrolytic hygrometer. **(10 Marks)**

   b. With schematic diagram and necessary equations, discuss the principle and working of nuclear moisture gauge. **(10 Marks)**

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