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Question Paper Code: 55502

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Electronics and Instrumentation Engineering

15UEI502 - INDUSTRIAL INSTRUMENTATION – II

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A Venturi meter has a meter constant of $0.008 \text{ m}^4 \text{ N}^{-0.5} \text{ s}^{-1}$. Calculate the flow rate when change in pressure is 180 Pa.
(a) $0.1073 \text{ m}^3/\text{s}$ (b) $0.124 \text{ m}^3/\text{s}$ (c) $0.1073 \text{ cm}^3/\text{s}$ (d) $0.124 \text{ mm}^3/\text{s}$
2. The Target flow meters comes under
(a) Mechanical type (b) Electrical type
(c) Inferential type (d) Mass flow type
3. Find the pressure will be created by a column of liquid 6 m height if the weight density is 1250 kg/m^3
(a) 7500 kg/m^2 (b) 208.33 kg/m^2 (c) $73,500 \text{ kg/m}^2$ (d) 8500 kg/m^2
4. Ultrasonic level measurement is not suitable for
(a) Liquids (b) slurries
(c) granular (d) interfaces
5. Which of the following is a direct level measurement?
(a) Air trap method (b) float level gauge
(c) Diaphragm box method (d) ultrasonic method
6. The boiler drum level measurement is based on
(a) density (b) differential pressure
(c) viscosity (d) ultrasonic method

7. The ultrasonic refers to the frequency in the range of
 (a) 20 to 20000KHz (b) 20 to 20000Hz
 (c) 20 to 20000MHz (d) 20 to 2000Hz
8. The air purge or bubbler systems can exceed pressure of liquid at
 (a) 0.1kg/cm^2 (b) 5kg/cm^2 (c) 0.01kg/cm^2 (d) 3kg/cm^2
9. A flow meter that is independent of fluid density
 (a) Rota meter (b) Venturi meter
 (c) Electromagnetic flow meter (d) Orifice meter
10. For continuous recording and control of relative humidity, electrical transducers of _____ type are widely used.
 (a) Thermistor (b) Dun more
 (c) RTD (d) Dew cells

PART - B (5 x 2 = 10 Marks)

11. How did impeller works in mass flow meters?
12. Write the principle of vortex shedding flow meter operates
13. Mention the advantages of sight glass level instrument.
14. Mention the important considerations in the use of float for level measurement.
15. Calculate Dew point using difference in temperature in dry and wet bulb Psychrometer?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Elaborate the details of different types of positive displacement flow meters with a neat diagram and discuss its advantage and disadvantage. (16)

Or

- (b) (i) State coriolis principle. Discuss how it is applied to measure the mass flow rate Of given medium directly with a help of neat sketch. (16)

17. (a) (i) Explain how the Doppler effect applied to measure the flow rate of given Medium and mention the limitation with a suitable example (10)

- (ii) Explain the excitation schemes of an Electromagnetic flow meter. (6)

Or

- (b) (i) State Karman's Principle and show the flow velocity is proportional to Vortex frequency. (16)
18. (a) (i) Discuss the working principle of capacitive level sensor applicable for conductive and non-conductive liquid with neat circuit equivalent diagrams (8)
- (ii) How liquid level is measured using float and displacer sensor? (8)
- Or
- (b) (i) Explain how boiler drum level is measured using hydra step system. (8)
- (ii) Illustrate level measurement using Bubbler system. (8)
19. (a) (i) Draw and explain different types of Contact level sensors. (8)
- (ii) Discuss how level can be measured using optical level sensor. (8)
- Or
- (b) (i) Describe a technique of measurement of liquid level or solid level using radioactive sources and detectors. How can this method be adopted in batch filling process. (8)
- (ii) Explain in detail how the level is measured by using Capacitance and Resistance Tapes. (8)
20. (a) (i) If the Process Sample is in liquid state, how moisture can be measured using sample vaporization and sample stripping method. (8)
- (ii) Describe the constructional details and working principle of Dry and Wet bulb Psychrometer and explain the calculation of relative humidity with a numerical example using Psychrometric chart. (8)
- Or
- (b) Describe the working principle of Rota meter type viscosity measurement. Mention the effect of temperature on viscosity. State the application of viscosity measurements in process industries. (16)

