Reg. No. : | | | | | | | | | | |

Question Paper Code: 55052

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

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. In metering dirty fluids, slurries and fluids containing solids, what type of orifice plate is used

   (a) Concentric (b) Eccentric (c) Segmental (d) Quadratic

2. The Target flow meters comes under

   (a) Mechanical type (b) Electrical type
   (c) Inferential type (d) Mass flow type

3. The anemometer is used to measure the flow rate of fluids by measuring velocity of

   (a) Conducting liquid (b) semi conducting liquid
   (c) Non conducting liquid (d) Viscous liquid

4. The principle of Electromagnetic flow meter is

   (a) Faraday's law (b) Newton's law
   (c) Snell's law (d) Bolt Mann's law

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 solution which reached the limit of solubility is called as

(a) Dew point solution (b) Saturated solution
(c) Absorbed solution (d) Cavity solution

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. Determine the velocity of flow in an electromagnetic flow meter for the following indications. The flux density in the liquid has 0.08 Weber/m^2. The diameter of the pipe is 10 cm. The induced voltage is 0.2mV.

13. Mention the advantages of sight glass level instrument.

14. Brief the operation of thermal level sensor.

15. Calculate Dew point using difference in temperature in dry and wet bulb Psychrometer?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Pressure before orifice plate rises and pressure after it reduces but velocity increases-Justify the statement. Describe its construction and Working in detail. (12)

(ii) A pitot tube properly placed just in front of the submarine is connected to a manometer. The pressure difference in the manometer was found as 25 kN/m^2. Find the speed of submarine if the density of sea water is 1026 kg/m^3. (4)

Or

(b) (i) Elaborate the details of different types of positive displacement flow meters with a neat diagram and discuss its advantage and disadvantage. (12)

(ii) A rotameter uses a cylindrical float of 3.5 cm height, 3.5 cm diameter and density of 3900 kg/m^3. The maximum inside diameter of the metering tube is 5 cm. Determine the maximum flow rate handling capacity of the rotameter if the fluid is water. (4)

17. (a) (i) With a neat diagram explain about the construction and working operation of Electromagnetic flow meter and also discuss its advantages and limitations. (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. (10)

(ii) How the flow rate of dry materials such as coal, cement and Powdered Chemicals and fruits are measured. (6)

18. (a) (i) Explain in detail about different types of Level detectors used in Level measurement. (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) Illustrate the type of level measurement in which the Elapsed time between the transmitting and receiving pulse is related to level. (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) (i) Give the Wavelength of IR rays in which the attenuation of wavelength changes as moisture changes and explain it by using an hygrometer. (8)

(ii) How moisture can be measured in solid penetrable materials like wood and web type materials? Explain it with an example. (8)
