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

Question Paper Code: 41651

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

Fifth Semester

Instrumentation and Control Engineering

14UIC501 - INDUSTRIAL INSTRUMENTATION II

(Regulation 2014)

(Common to Electronics and Instrumentation Engineering)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Flow rate through an orifice is _____ pressure differential.

   (a) proportional to
   (b) inversely proportional to the square root of
   (c) proportional the square root of
   (d) inversely proportional to the square of

2. Which type of orifice is not suitable for liquid and gas bubbles contain solid particles?

   (a) Concentric (b) Eccentric (c) segmental (d) Quadrant

3. The input and output of the D.P. meter is Q (input flow rate) and □p (output differential pressure) and C is the meter constant. The flow rate when □p = 250 Pa and C = 0.0004 m^3/s per Pa is

   (a) 0.00632 m^3/s (b) 0.0632 m^3/s (c) 0.00412 m^3/s (d) 0.0412 m^3/s

4. Which of the following flow meter maintains a constant pressure differential but varies the orifice area with flow

   (a) Turbine flow meter (b) Target flow meter
   (c) Rotameter (d) Pitot tube

5. A flow meter that is independent of fluid density

(a) Rotameter (b) Electromagnetic flow meters
(c) Venturi meter (d) Orifice

6. A 100 mm diameter pipe carries oil at a mean velocity of 2 m/s. The flow rate in m^3/s is

(a) 0.0157 m^3/s (b) 0.0257 m^3/s
(c) 0.157 m^3/s (d) 0.0015 m^3/s

7. Ultrasonic level measurement is not suitable for

(a) Liquids (b) slurries
(c) granular (d) interfaces

8. A pressure of _____ 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 kg/m^2 (d) 8500 kg/m^2

9. Which property measures the resistance of a liquid to flow?

(a) Density (b) Viscosity
(c) Volume (d) Solubility

10. The relative humidity of air at atmospheric pressure if the partial pressure of water vapour and saturation pressure are 30 mm Hg and 60 mm Hg is

(a) 50% (b) 33.3 % (c) 20 % (d) 40 %

PART - B (5 x 2 = 10 Marks)

11. State Bernoullis principle.

12. List any two disadvantages of magnetic flow meters.

13. Write the operating principle of capacitive type level gauge.

14. Write the operating principle of ultrasonic level measurement.

15. Differentiate absolute viscosity and kinematic viscosity.

PART - C (5 x 16 = 80 Marks)

16. (a) Illustrate with suitable diagrams the construction and working of various types of orifice. What are the advantages and disadvantages of orifice plate. (16)

Or

(b) Discuss in detail the installation and piping arrangements of different fluids in head flow meters. (16)

17. (a) Explain with necessary equations and sketch the principle of operation of the rotameter. (16)

Or

(b) What is Coriolis principle? How this principle is used for steam flow measurement? What are the limitations of this method. (16)

18. (a) Explain the working principle and construction of electromagnetic flow meter with neat sketch. (16)

Or

(b) What is vortex shedding? Explain with a neat constructional diagram how vortex shedding flow meters operates? Mention their advantages and disadvantages. (16)

19. (a) Explain in detail any two methods of electrical level measurement methods with the aid of relevant diagrams. (16)

Or

(b) Why boiler drum level has to be measured? Illustrate with neat sketches the constructional and operational details of boiler drum level measurement. (16)

20. (a) Define viscosity. How viscosity is measured using a rotameter type viscometer? (16)

Or

(b) Elucidate the use of dew cell for humidity measurement with necessary diagrams. What are the limitations of this method? (16)

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