

Reg. No.

Question Paper Code

13566

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Instrumentation and Control Engineering

(Common to Electronics and Instrumentation Engineering)

20ICPC402 - INDUSTRIAL INSTRUMENTATION

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

- | | Marks | K – Level | CO |
|--|-------|-----------|-----|
| 1. If shear stress is proportional to velocity gradient, fluid is called as
(a) Newtonian fluid (b) Laminar fluid (c) Viscous fluid (d) None of the mentioned | 1 | K1 | CO1 |
| 2. Relative humidity is a function of _____
(a) Ambient temperature (b) Ambient temperature and Water vapor pressure
(c) Water vapor pressure (d) Dryness | 1 | K1 | CO1 |
| 3. Output of a bimetallic element will be _____
(a) Strain (b) Displacement (c) Pressure (d) Voltage | 1 | K1 | CO2 |
| 4. _____ quantities can be measured using bellows?
(a) Absolute pressure (b) Gauge pressure
(c) Differential pressure (d) All of the mentioned | 1 | K1 | CO2 |
| 5. The value of discharge coefficient in orifice is usually between _____
(a) 0.1-0.5 (b) 0.5-0.8 (c) 0.9-1.0 (d) 1.0-2.0 | 1 | K1 | CO3 |
| 6. Example for positive displacement meter is
(a) Variable area flow meter (b) Turbine meters
(c) Rotary piston meter (d) Venturi | 1 | K1 | CO3 |
| 7. The weirs are categorized into _____ types based on the shape of the crest?
(a) One (b) Two (c) Three (d) Four | 1 | K1 | CO4 |
| 8. Solid flow rate measurement is commonly done using _____
(a) Coriolis mass flow meter (b) Ultrasonic transit-time meter
(c) Electromagnetic sensor (d) Weighing and belt conveyor method | 1 | K1 | CO4 |
| 9. Gauge glass techniques is a _____ type of method
(a) Direct (b) Indirect (c) Electrical (d) Hydrastep method | 1 | K1 | CO5 |
| 10. The function of a differential pressure transmitter in level measurement is to _____
(a) Detects pH value (b) Measures air flow
(c) Measures level based on liquid pressure difference (d) None of the above | 1 | K1 | CO5 |

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

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| 11. Enumerate the difference between humidity and relative humidity. | 2 | K2 | CO1 |
| 12. Define the term absolute viscosity. | 2 | K1 | CO1 |
| 13. What is the basic principle of dew cell hygrometer? | 2 | K1 | CO1 |
| 14. State the basic principle on which the bimetallic thermometer works. | 2 | K1 | CO2 |
| 15. Differentiate between gauge pressure and absolute Pressure. | 2 | K2 | CO2 |
| 16. List the elastic types of pressure gauges. | 2 | K1 | CO2 |
| 17. Define coefficient of discharge. | 2 | K1 | CO3 |
| 18. State the principle of oval gear positive displacement type flow meter. | 2 | K1 | CO3 |
| 19. Why does a flowmeter need calibration? | 2 | K1 | CO4 |

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| 20. State the principle of vortex shedding flow meter. | 2 | K1 | CO4 |
| 21. List the advantages of float type level measurement. | 2 | K1 | CO5 |
| 22. What is a pneumatic pressure transmitter? | 2 | K1 | CO5 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

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| 23. | a) | Summarize about viscosity with the help of a neat diagram explain the two float type viscometer. | 11 | K2 | CO1 |
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| | b) | Comment on psychrometer and how does it differ from a hygrometer? Explain any one Psychrometer in detail. | 11 | K2 | CO1 |
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| 24. | a) | Using a neat sketch explain the working of a bimetallic thermometer along with its types. | 11 | K2 | CO2 |
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| | b) | Illustrate about the methods of pressure measurement using any two manometer. | 11 | K2 | CO2 |
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| 25. | a) | State Bernoulli's theorem and describe the construction and working of different types of orifice meter. | 11 | K2 | CO3 |
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| | b) | With neat diagram explain the construction and working principle of any two positive displacement type flow meter and also state its advantages. | 11 | K2 | CO3 |
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| 26. | a) | On what principle does an electromagnetic flow meter function and explain the working of electromagnetic flow meter with a neat sketch. | 11 | K2 | CO4 |
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| | b) | Explain the principle and working of Target flow meter with a neat sketch. | 11 | K2 | CO4 |
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| 27. | a) | Explain the principle and working of Hydrastep method. | 11 | K2 | CO5 |
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| | b) | With suitable sketch explain the working of any two flow transmitter in detail. | 11 | K2 | CO5 |
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| 28. | a) (i) | Justify the need for solid flow rate measurement with an example and explain any one method of solid flow measurement with a neat sketch. | 6 | K2 | CO4 |
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| | (ii) | Elaborate the necessity for boiler drum level measurement in a power plant and with a suitable diagram explain boiler drum level measurement process. | 5 | K2 | CO5 |
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| | b) (i) | Elaborate in detail about the guidelines for selection of flow meter. | 6 | K2 | CO4 |
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| | (ii) | Differentiate between a conventional transmitter and a smart transmitter with a suitable diagram. | 5 | K2 | CO5 |
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