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Question Paper Code	13963
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025**

Fourth Semester

**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. Which of the following viscometers uses the time taken by a liquid to flow through a calibrated tube? (a) Torque type viscometer                      (b) Saybolt viscometer (c) Rotameter    (d) Capillary tube viscometer	1	K1	CO1
2. A dew cell is primarily used to measure: (a) Relative humidity   (b) Absolute humidity   (c) Dew point      (d) Temperature	1	K1	CO1
3. In thermocouple circuits, cold junction compensation is used to: (a) Measure ambient temperature (b) Eliminate the effect of reference junction temperature (c) Improve thermal conductivity (d) Reduce electrical noise	1	K1	CO2
4. Which device is commonly used for the calibration of pressure gauges? (a) Thermograph      (b) Dead weight tester   (c) Manometer      (d) Bourdon tube	1	K1	CO2
5. Which of the following represents Reynolds number for laminar flow? (a) Less than 2000   (b) Greater than 4000   (c) Infinite      (d) None of the mentioned	1	K1	CO3
6. Which of the following represents obstruction type flow measuring systems? (a) Centrifugal force type                      (b) Rotating vane system (c) Flow nozzle device                              (d) None of the mentioned	1	K1	CO3
7. The working principle of an electromagnetic flow meter is based on: (a) Bernoulli's theorem                      (b) Faraday's law of electromagnetic induction (c) Newton's second law                      (d) Ohm's law	1	K1	CO4
8. Which principle is used in transit-time ultrasonic flow meters? (a) Doppler shift   (b) Time of flight   (c) Electromagnetic induction   (d) Thermal dispersion	1	K1	CO4
9. Float-type level gauges work based on the principle of: (a) Archimedes' principle   (b) Pascal's law   (c) Bernoulli's theorem   (d) Faraday's law	1	K1	CO5
10. The differential pressure method for boiler drum level measurement uses: (a) Capacitive probes                      (b) Two pressure taps – one at high and one at low level (c) Float sensors                              (d) Radar waves	1	K1	CO6

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

11. What is the principle of a Saybolt viscometer?	2	K1	CO1
12. Differentiate between resistive and capacitive hygrometers.	2	K2	CO1
13. Explain the principles behind thermocouple.	2	K2	CO2
14. What is bimetallic thermometer?	2	K1	CO2
15. Compare optical pyrometer and total radiation pyrometer.	2	K2	CO3
16. Describe the function of a Bourdon tube in pressure measurement.	2	K2	CO3
17. State the importance of coefficient of discharge (Cd) in orifice meters.	2	K1	CO4
18. Describe the principle behind the working of a Pitot tube.	2	K2	CO4
19. What is the basic principle of operation of a vortex shedding flow meter?	2	K1	CO5

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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|--|---|----|-----|
| 20. Compare ultrasonic and laser Doppler flow meters.                      | 2 | K2 | CO5 |
| 21. Describe the Hydra step method used for boiler drum level measurement. | 2 | K2 | CO6 |
| 22. What is the role of a smart transmitter in process measurement?        | 2 | K1 | CO6 |

**PART - C (6 × 11 = 66 Marks)**

Answer ALL Questions

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|--|----|----|-----|
| 23. a) Explain the working of a Saybolt viscometer with a neat diagram.  | 11 | K2 | CO1 |
| <b>OR</b>  |    |    |     |
| b) Outline the principle and working of a dew cell with a neat diagram.  | 11 | K2 | CO1 |
| 24. a) Construct the principle and working of thermocouples, including their signal conditioning and cold junction compensation techniques.                            | 11 | K3 | CO2 |
| <b>OR</b>  |    |    |     |
| b) Develop the installation and calibration process of pressure gauges using a dead weight tester.   | 11 | K3 | CO2 |
| 25. a) Identify how you would choose the appropriate type of flow meter for a specific application, considering factors like accuracy, cost, and flow characteristics. | 11 | K3 | CO3 |
| <b>OR</b>  |    |    |     |
| b) Utilize the principle of variable area flow meter to explain the construction and working of the rot meter. Also discuss its advantages and disadvantages.          | 11 | K3 | CO3 |
| 26. a) Explain the principle and working of a laser Doppler anemometer with a neat diagram.  | 11 | K2 | CO4 |
| <b>OR</b>  |    |    |     |
| b) Describe the operating principle and design of a vortex shedding flow meter and a target flow meter.  | 11 | K2 | CO4 |
| 27. a) Explain boiler drum level measurement using the differential pressure method.   | 11 | K2 | CO5 |
| <b>OR</b>  |    |    |     |
| b) Explain various methods of level measurement including displacer, ultrasonic, and Hydrastep with applications.  | 11 | K2 | CO5 |
| 28. a) Develop the working principle of industrial transmitter for measurement of temperature in industry.   | 11 | K3 | CO6 |
| <b>OR</b>  |    |    |     |
| b) Utilize the concept of smart transmitter to showcase its advantages over conventional transmitter.  | 11 | K3 | CO6 |