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## B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

### 18EIC302T - INDUSTRIAL INSTRUMENTATION

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

**Note:**

- i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.
- ii. **Part - B** and **Part - C** should be answered in answer booklet.

**Time: 3 Hours**

**Max. Marks: 100**

**PART - A (20 × 1 = 20 Marks)**  
Answer all Questions

		Marks	BL	CO
1. Bernoulli's equation relates between		1	1	1
(A) Volume and flow rate	(B) Velocity and area			
(C) Pressure and velocity	(D) Volume and pressure			
2. _____ measures velocity at a point of the fluid in a stream.		1	1	1
(A) Venturi meter	(B) pH meter			
(C) Pitot-Static tubes	(D) None of the mentioned			
3. Hot wire anemometer is an application of		1	1	1
(A) Resistive transducer	(B) Inductive transducer			
(C) Capacitive transducer	(D) Thermo electric transducer			
4. Which of the following represents Reynolds number for laminar flow?		1	1	1
(A) Less than 2000	(B) Greater than 4000			
(C) Infinite	(D) None of the mentioned			
5. Piezoelectric crystals are electrically _____.		1	1	2
(A) positive	(B) negative			
(C) neutral	(D) charged			
6. A manometer is used to measure		1	1	2
(A) Low Pressure	(B) Moderate pressure			
(C) High Pressure	(D) Atmospheric pressure			
7. In Gauge pressure, the atmospheric pressure on the scale is marked as		1	1	2
(A) 1	(B) 0			
(C) 100	(D) 10			
8. Which of the following conversions take place in Bourdon tubes?		1	1	2
(A) Pressure to displacement	(B) Pressure to voltage			
(C) Pressure to strain	(D) Pressure to force			
9. The ionization gauge an instrument used for the measurement of:		1	1	3
(A) Very low pressure	(B) medium pressure			
(C) High pressure	(D) Very high pressure			
10. Humidity is simply the amount of _____ held in the air.		1	1	3
(A) water	(B) water vapor			
(C) oxygen	(D) liquid			
11. Identify the true statement which is used for bimetallic type thermometer		1	1	3
(A) Two metals have same temperature coefficient	(B) Two metals have different temperature coefficient			
(C) One metal is cooled always	(D) Only one metal is used			

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|---|---|---|---|
| 12. Convert the temperature measurement of 35° C into Kelvin  | 1 | 1 | 3 |
| (A) 709.7 K   |   |   |   |
| (B) 532.3 K   |   |   |   |
| (C) 308.15 K  |   |   |   |
| (D) 523.2 K   |   |   |   |
| 13. The law of homogeneous circuit.   | 1 | 1 | 4 |
| (A) An emf will not be induced in a circuit with a system consisting of homogeneous metal.  |   |   |   |
| (B) The net emf in the circuit remains unaltered if a third metal is introduced, provided the junctions formed by the third metal are at same temperature.                  |   |   |   |
| (C) The emf generated at the junction temperature T1 & T3 is equal to the algebraic sum of emf generated at the junction in T1-T2 and T2-T3, where T2 lies between T1 & T2. |   |   |   |
| (D) An emf will be induced in a circuit with a system consisting of homogeneous metal.  |   |   |   |
| 14. Identify approximate room temperature and body temperature respectively   | 1 | 1 | 4 |
| (A) 12°C and 24°C   |   |   |   |
| (B) 32°C and 37°C   |   |   |   |
| (C) 37°C and 22°C   |   |   |   |
| (D) 10°C and 20°C   |   |   |   |
| 15. The inductive level transducers are mainly used for measurement of level of liquids which are   | 1 | 1 | 4 |
| (A) non-conductive  |   |   |   |
| (B) conductive  |   |   |   |
| (C) viscous   |   |   |   |
| (D) non-viscous   |   |   |   |
| 16. Which of the following is direct method of level measurement?   | 1 | 1 | 4 |
| (A) Sight glass system  |   |   |   |
| (B) air purge   |   |   |   |
| (C) Ultrasonic level detector   |   |   |   |
| (D) Radar level sensor  |   |   |   |
| 17. Identify the correct statement from the following.  | 1 | 1 | 5 |
| (A) Saturated air has an absolute humidity of 100%.   |   |   |   |
| (B) The higher the amount of water vapor, the higher the absolute humidity.   |   |   |   |
| (C) Absolute humidity is expressed in percentage.   |   |   |   |
| (D) Warm air possesses less water vapor (moisture) than cold air.   |   |   |   |
| 18. If physical quantities such as force, tension or pressure are to be measured then LVDT acts as a  | 1 | 1 | 5 |
| (A) Primary transducer  |   |   |   |
| (B) Secondary transducer  |   |   |   |
| (C) Both Primary and secondary transducer are correct   |   |   |   |
| (D) Both Primary and secondary transducer are wrong   |   |   |   |
| 19. What consideration should be exercised before acceptance or re-acceptance of a client relationship or specific engagement?  | 1 | 1 | 5 |
| 1. Business reputation of client's principal owners, key management, related parties and those charged with governance  |   |   |   |
| 2. Limitation on the scope of work and involvement, if any, in money laundering activities  |   |   |   |
| 3. Reason for proposed appointment of the firm and non-reappointment of the previous firm   |   |   |   |
| (A) 1 and 2   |   |   |   |
| (B) 1 and 3   |   |   |   |
| (C) 2 and 3   |   |   |   |
| (D) All 3   |   |   |   |
| 20. What is the maximum recommended time limit within which assembly of engagement files should be completed after the engagement reports have been finalized?              | 1 | 1 | 5 |
| (A) 30 days   |   |   |   |
| (B) 45 days   |   |   |   |
| (C) 65 days   |   |   |   |
| (D) 60 days   |   |   |   |

**PART - B (5 × 4 = 20 Marks)**

Answer any 5 Questions

Marks BL CO

21. Distinguish between orifice meter and the flow nozzle used for flow measurement.	4	2	1
22. Write the principle of working of turbine flow meter	4	1	1
23. With suitable diagram, briefly describe about the elastic elements with LVDT.	4	2	2
24. Examine the fiber optic temperature sensors	4	3	3
25. Demonstrate the Ionization gauge with a neat diagram.	4	1	2
26. Write short notes on ultrasonic gauge	4	4	4
27. Assess the variable reluctance type accelerometers	4	3	5

Marks BL CO

**PART - C (5 × 12 = 60 Marks)**

Answer all Questions

28. (a) Discuss the working principle of working of the rotameter with its construction. State it's advantages and disadvantages.	12	2	1
(OR)			
(b) Explain the construction and working principle of pitot's with suitable diagram. Also give it's advantages and disadvantages.			
29. (a) Explain the bourdon gauge used to measure the pressure with its neat diagram. Classify the various types of pressure and also its range.	12	3	2
(OR)			
(b) Predict the Bulk modulus pressure gauge and diaphragm gauge and its range			
30. (a) Demonstrate with a neat diagram of the thermocouple, Also list out its various types, materials used, range and applications.	12	3	3
(OR)			
(b) Model the two types of non-contact thermometer which is used to measure the temperature of a distant object.			
31. (a) Classify the Capacitive sensors and Differential pressure transmitter Hydra step methods	12	4	4
(OR)			
(b) Categorise Dry and wet bulb psychrometers -hygrometer-dew cell – Commercial type dew meter			
32. (a) Demonstrate the Seismic instruments as accelerometer	12	3	5
(OR)			
(b) Illustrate process flow sheet, mechanical flow sheets, Instrument index sheet, Instrument specification sheets - Loop wiring diagrams, panel drawing and specifications.			

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