



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

U18EII5203: Field Instrumentation

COURSE OUTCOMES

CO1: Identify the measurement technique of various physical parameters for process industry. K3

CO2: Solve engineering problems of Field Instruments and analyze their safety/redundancy. K4

CO3: Develop PI diagram for a given unit operation and design transmitters. K3

CO4: Evaluate the procedure to Calibrate and Mount of the measuring devices. K5

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | | |
|--|-----|------|
| 1. A two-wire pressure transmitter of range 0-2 kg/cm ² is used for measuring level of water in tank. The space above the level is filled with water vapor of 1Kg/cm ² pressure. Calculate the output current of the transmitter if the water level in the tank is 5m when pressure transmitter is installed just at the bottom level of the tank. | CO2 | [K3] |
| 2. State the device that is suitable for measuring level of corrosive liquid. | CO1 | [K2] |
| 3. Water is pumped through 100mm diameter pipe with a flow velocity of 860mm/sec. Find the volumetric rate. Density of the water is 1000Kg/m ³ . | CO2 | [K3] |
| 4. Mention the factors to select the flow meter. | CO1 | [K2] |
| 5. Write any two types of thermocouples with its temperature ranges. | CO1 | [K3] |
| 6. Using RTD with $\alpha_0 = 0.004 / ^\circ\text{C}$, $R=100\Omega$ at 20°C , find R at 100°C . | CO2 | [K3] |
| 7. Find out the readings and errors in the bourdon gauge reading if it is mounted at 30m below the water pipe line whose pressure is to be measured. (Assume the water line pressure to be 10kg/cm ²). | CO2 | [K3] |
| 8. How periodic maintenance of pressure instruments is done in industries. | CO4 | [K2] |
| 9. List the purpose of density measurement. | CO1 | [K2] |
| 10. What is piezo electric vibration? | CO4 | [K2] |

Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

- | | | | | | |
|-----|----|---|----|-----|------|
| 11. | a) | Explain any one method of liquid level measurement for measuring the level of corrosive liquid. | 8 | CO1 | [K3] |
| | b) | Describe with neat sketch the construction and working of ultrasonic level measurement. | 8 | CO1 | [K2] |
| 12. | a) | Explain in detail about any two calibration methods for Gas flowmeters. | 8 | CO4 | [K2] |
| | b) | Draw a suitable diagram to measure flow rate of hydrocarbons with relevant diagram. | 8 | CO4 | [K3] |
| 13. | a) | Illustrate any two types of reference junction compensation techniques with neat diagram. | 8 | CO2 | [K3] |
| | b) | Describe with suitable sketch, a method by which the temperature of furnace is measured. | 8 | CO2 | [K3] |
| 14. | a) | How the very low pressure is measured and explain the operation with suitable diagram. | 8 | CO2 | [K3] |
| | b) | Explain in detail about diaphragm pressure measurement with relevant diagram. | 8 | CO2 | [K2] |
| 15. | a) | Describe in detail about Saybolt viscometer with necessary diagram. | 8 | CO1 | [K2] |
| | b) | Explain in detail about pH measurement with glass electrode. | 8 | CO1 | [K2] |
| 16. | | Draw the P&I symbol for any four pumps, control valves, develop the P&I diagram for heat exchanger and explain. | 16 | CO3 | [K3] |
