



**B.E DEGREE EXAMINATIONS: MAY 2018**

(Regulation 2015)

Fourth Semester

**ELECTRONICS AND INSTRUMENTATION ENGINEERING**

U15EIT403: Industrial Instrumentation I

**COURSE OUTCOMES**

**CO1:** Understand the Basic construction, principle and working of various type of pressure transducers/sensor.

**CO2:** Equip to select suitable pressure sensor for given applications and to calibrate pressure gauge

**CO3:** Understand technical terms and nomenclature used in temperature measurement,

**CO4:** Understand the Basic construction, principle and working of various type of transducers for measurement of temperature

**CO5:** Design signal conditioning circuits and methods for compensation

**CO6:** Identify instruments to measure physical quantities like vibration, velocity, viscosity, density, Humidity

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Matching type item with multiple choice code

CO4 [K<sub>1</sub>]

List I	List II
A. Rare metal thermocouple	i. Type B
B. Base Metal thermocouple	ii. Type E
C. Chromel alumel	iii. Type K
D. Copper Constantan	iv. Type T

- |    | A   | B  | C   | D  |
|----|-----|----|-----|----|
| a) | ii  | i  | iii | iv |
| b) | iii | iv | ii  | i  |
| c) | ii  | iv | iii | i  |
| d) | iii | i  | ii  | iv |

2. Cold cathode ionization gauge is also called as

CO1 [K<sub>1</sub>]

- |                  |                  |
|------------------|------------------|
| a) Pirani gauge  | b) Penning gauge |
| c) Prandtl gauge | d) Knudsen gauge |



9. Assertion (A): Unbalance of a machine gives vibrations. CO6 [K<sub>2</sub>]  
Reason (R): At a frequency equal to running speed.
- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false      d) A is false but R is true
10. Dunmore hygrometer has \_\_\_\_\_. CO6 [K<sub>1</sub>]
- a) Linear resistance/relative humidity characteristics      b) Non - linear resistance/relative humidity characteristics  
c) Linear Inductance/relative humidity characteristics      d) Non - linear Inductance/relative humidity characteristics

**PART B (10 x 2 = 20 Marks)**  
**(Answer not more than 40 words)**

11. How the capacitance principle involves in pressure measurement? CO1 [K<sub>2</sub>]
12. Discuss the operation of force balance transmitter. CO1 [K<sub>2</sub>]
13. State the working principle of resonator sensor. CO1 [K<sub>2</sub>]
14. Sketch the circuit layout of thermal conductivity gauge. CO2 [K<sub>2</sub>]
15. Recall vacuum pressure and its range. CO2 [K<sub>2</sub>]
16. Draw the signal conditioning circuit of RTD. CO5 [K<sub>1</sub>]
17. List the limitations of thermistor compare to other electrical temperature sensor. CO4 [K<sub>1</sub>]
18. Intrepret the uses cold junction compensation circuits. CO6 [K<sub>1</sub>]
19. Define the term density. CO6 [K<sub>1</sub>]
20. State the principle of peltier effect. CO4 [K<sub>1</sub>]

**Answer any FIVE Questions:-**  
**PART C (5 x 14 = 70 Marks)**  
**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

21. In a Domestic dead end water distribution supply network system for 10 consumer. In this one of the consumer end the discharge of water affects compare to others. Choose a sensor to measure to detect any leakage also illustrate the working of all the types of instrument. CO2 [K<sub>3</sub>]
22. Discuss about the various types of gauges available to measure the low pressure. CO2 [K<sub>2</sub>]

- |   |     |                   |
|---|-----|-------------------|
| 23. Demonstrate the working of various sensors of expansion type temperature measurement devices.   | CO4 | [K <sub>2</sub> ] |
| 24. Choose a suitable sensor to measure the super-heated steam temperature of boiler, illustrate its principle and working also draw the necessary circuits to convert temperature into 4-20mA signal and justify your selection. | CO5 | [K <sub>3</sub> ] |
| 25. Choose a temperature sensor having high accuracy to measure temperature range of below 600° C, illustrate the working also describe the suitable wire configuration from available methods.                                   | CO5 | [K <sub>3</sub> ] |
| 26. Describe the method for measurement of density with a Hydrometer. Explain in detail about the method used if density is to be continuously monitored and controlled using Hydrometer.   | CO6 | [K <sub>2</sub> ] |
| 27. Elaborate on the various elastic type of pressure with necessary diagrams and give an applications for each one.  | CO2 | [K <sub>2</sub> ] |

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