



M.E DEGREE EXAMINATIONS: JUNE 2017

(Regulation 2015)

Second Semester

ENERGY ENGINEERING

P15EET203: Instrumentation for Thermal Systems

COURSE OUTCOMES

- CO1:** Illustrate the static and dynamic measurement characteristics of instruments.
- CO2:** Demonstrate the applications of intelligent instruments in measuring systems.
- CO3:** Explain the measurement of thermo - physical quantities by various instruments.
- CO4:** Review the flow visualization techniques.
- CO5:** Demonstrate the use of gas analyzer and chromatography.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): When temperature of a cold junction is lowered, the value of neutral temperature of this thermocouple rises. CO3 [K₂]
Reason (R): More thermo emf is produced when the temperature difference between two junctions of the thermocouple is rised.
 - a) both A and R are individually true and R is the correct explanation of A
 - b) both A and R are individually true and R is not the correct explanation of A
 - c) A is true but R is false
 - d) A is false but R is true
2. The operation of rotameter is based on CO3 [K₂]
 - a) Variable flow area
 - b) Rotation of the turbine
 - c) Pressure drop across a nozzle
 - d) A is false but R is true
3. Which of the following instruments has non-linear scale? CO4 [K₂]
 1. Moving coil instrument
 2. Moving iron instrument
 3. Electrostatic instrument
 4. Rectifier instrument
 - a) 2 only
 - b) 2 and 3
 - c) 1,2 and 3
 - d) 1,2,3 and 4
4. Identify the parameter for which composite analysis is done using mass spectrometer CO4 [K₂]
 - a) Natural gas
 - b) An isotope
 - c) A solid
 - d) An alloy

PART C (6 x 5 = 30 Marks)

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| 21. Classify the instrument based on measurement characteristics. | CO1 | [K ₂] |
| 22. Explain the types of errors that occurs normally during experimentation. | CO1 | [K ₂] |
| 23. Outline the importance of intelligent instrument in measurement. | CO2 | [K ₂] |
| 24. Compare the temperature measurement using RTD and thermocouple. | CO3 | [K ₃] |
| 25. Discuss in detail about ionization gage and pirani gage. | CO4 | [K ₂] |
| 26. Discuss in detail about Ultrasonic flow meter | CO5 | [K ₂] |

Answer any FOUR Questions

PART D (4 x 10 = 40 Marks)

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| 27. Explain the various stages of experimental planning in detail. | CO1 | [K ₂] |
| 28. Illustrate the working of data acquisition system with block diagram. | CO2 | [K ₂] |
| 29. Explain in detail the working of a Laser Doppler Anemometer with the help of a neat sketch. | CO3 | [K ₂] |
| 30. Illustrate the use of intelligent instruments in measurement of physical variables. | CO4 | [K ₂] |
| 31. Outline the working principle of thermal and optical gas analysers. | CO5 | [K ₂] |
