

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2021 (2015 Scheme)

**Course Code: CH403****Course Name: PROCESS INSTRUMENTATION**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) Explain the desirable and undesirable static performance characteristics of an instrument. (10)
- b) Explain five factors to be considered while selecting a measuring instrument. (5)
- 2 a) Describe the construction, working and types of thermocouples with figures. (10)
- b) List out any five sources of errors and precautions to be taken in temperature measurements. (5)
- 3 a) Explain different elements of an instrument. (4)
- b) List out and explain any four functions of an instrument. (4)
- c) Explain the role of Wheatstone bridge in thermometry with a neat depiction. (7)

**PART B***Answer any two full questions, each carries 20 marks.*

- 4 a) Explain principle and working of McLeod gauge with a neat diagram and relevant equations. (10)
- b) With a neat figure explain the components and working of bourdon gauge. (10)
- 5 a) Describe the principle of working of quantity meters, area meters, head meters and velocity flow meters with two examples each. (8)
- b) Explain the construction and working of cylinder and piston type flow meter with appropriate figure. (7)
- c) List out different open channel flow measurement methods and explain any one with neat figure and relevant equation. (5)
- 6 a) Explain the working of ionization type vacuum gauge with a neat figure. (10)
- b) Describe with a neat diagram, the principle, working and uses of a pitot tube. (10)

PART C

*Answer any two full questions, each carries 15 marks.*

- 7 a) Define the terms absolute humidity, relative humidity and wet bulb temperature. (5)  
b) Explain with a neat schematic, the components and working of thermogravimetric analyser. Depict the TGA curve for any one process that leads to weight loss in TGA experiment. (10)
- 8 a) With the help of a neat schematic, explain the working of mass spectrometer. Mention any two chemicals that can be analysed using mass spectrometer. (10)  
b) Describe the principle of gas chromatography and mention its applications. (5)
- 9 a) Describe the method of determination of moisture content by thermal drying method clearly mentioning the type of materials that can be used. Mention any two advantages of the method and any two precautions to be taken. (8)  
b) Develop a Process and Instrumentation Diagram (P&ID) for pH control process. (7)

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