

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

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

Max. Marks: 100

Duration: 3 Hours

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

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| 1 a) Explain different functions of an instrument. | (5) |
| b) List out and explain different dynamic characteristics of an instrument. Also explain how the dynamic behaviour of an instrument can be determined. | (7) |
| c) Differentiate sensors and transducers with suitable examples. | (3) |
| 2 a) With a neat figure, explain the principle and working of mercury in glass thermometer. In some cases, dry nitrogen gas under pressure is filled above the mercury bore in a mercury thermometer, explain the purpose of this. | (8) |
| b) Explain the principle and working of an optical pyrometer with a neat figure. | (7) |
| 3 a) Explain the terms accuracy, reproducibility and sensitivity of an instrument. | (6) |
| b) Enumerate and explain any four sources of errors and precautions to be taken while using temperature measuring instruments. | (6) |
| c) Describe the principle of working of resistance thermometers. List out the commonly used sensing element materials in resistance thermometers. | (3) |

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

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| 4 a) With a neat figure, explain the principle and working of McLeod gauge. Derive the expression for finding pressure. | (12) |
| b) Explain the working of bellows used for pressure measurement with a neat figure. | (8) |
| 5 a) Explain the principle, components and working of rotameter with a neat sketch. | (10) |
| b) Describe the principle of working of quantity meters, head meters, variable area flow meter and open channel flow meters with two examples each. | (10) |
| 6 a) Explain principle of operation of piezoelectric sensors. List the advantages and disadvantages of piezoelectric sensors. | (10) |
| b) Explain the working of venturi meter with a neat figure. List out its advantages and disadvantages. | (10) |

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

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| 7 a) Explain the thermal drying method used to determine the moisture content. Explain the precautions to be taken, advantages and limitations of this method. | (12) |
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- b) Enumerate different techniques used for determining moisture content. (3)
- 8 a) With a neat schematic, explain the method of gas chromatography analysis clearly describing the various components. Enumerate the precautions to be taken. (15)
- 9 a) List out different electrodes used for pH measurement. Explain the working of calomel electrode used for pH measurement. (8)
- b) Illustrate the symbols of any ten chemical apparatus or equipment used in P and I Diagram. (5)
- c) Explain any one type of spectrometer used for analysis of metallic compounds. Also, mention the metals analysed. (2)
