**21MNP5C15L**

Sl. No.

# M.Tech. V Semester Degree Examination, April/May - 2024
# MINERAL PROCESSING
## Process Control and Automation
## (NEP)

Time : 3 Hours                                                     Maximum Marks : 70

**Instructions :** (1)   Answer **any five** of the following questions.
                (2)   Each question caries **equal** marks.
                (3)   Question number **1** is **compulsory**.

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|---|---|---|---|
| **1.** | (a) | Explain temperature measurement devices and their types. | **7** |
| | (b) | Define thermocouples and write a note on it. | **7** |
| **2.** | (a) | Water is flowing at a rate of 2m/sec through a tube with diameter of 1m. If the pressure at this point is 80 kPa, what is the pressure of water after tube is narrowed to a diameter of 0.5m ?  Density of water =1.0 kg/L | **7** |
| | (b) | List the limitation of Bernoulli's principle. | **7** |
| **3.** | (a) | Derive an equation to find the rate of flow of liquid through venturimeter. | **7** |
| | (b) | Write a note on any one Density measurement device. | **7** |
| **4.** | (a) | Block diagram of controlling element and explain its characteristics. | **7** |
| | (b) | What do you mean by Error ? Explain working principle of Proportional Contoller. | **7** |
| **5.** | (a) | What are transducers ? Explain Construction and working principle of Transducers. | **7** |
| | (b) | Give an account on Rheometer. | **7** |
| **6.** | (a) | A horizontal venturimeter with inlet diameter 20cm and throat diameter 10cm is used to measure the flow of water. The pressure at inlet is 17.658 $N/cm^2$ and vacuum pressure at the throat is 30 cm of mercury. Find the discharge of water through venturimeter.  Take Cd=0.98. | **7** |
| | (b) | Define thermocouples and explain the construction and working principle of thermocouples. | **7** |
| **7.** | (a) | Derive an equation for first order level process (Liquid storage tank). | **7** |
| | (b) | Explain Capacitance Level measurement device. | **7** |
| **8.** | (a) | Explain block diagram of controller and write a note on its types. | **7** |
| | (b) | List the Statistic and Dynamic characteristics of measuring instruments. | **7** |

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