

**SEVENTH SEMESTER B.TECH DEGREE EXAM (MODEL) NOVEMBER 2016**

**BIOTECHNOLOGY & BIOCHEMICAL ENGINEERING**

**13.703 BIOPROCESS INSTRUMENTATION (B)**

Model Question Paper

**Time: 3 hours**

**Max. Marks: 100**

**PART-A**

*Answer all questions. Each question carries 2 marks*

1. Explain Peltier effect and Thompson effect.?
2. What are the direct level measurement methods ?
3. Give an account on CRO and Energy meters.
4. Write short note on McLeod Gauge.
5. Monitoring and control of dissolved CO<sub>2</sub>-Discuss.
6. Explain the working principle of magnetic flow meter.
7. Write about pH measurement techniques.
8. Explain the principle and operation of open channel flow measurements.
9. What is chromatography? Mention different chromatographic techniques?
10. What do you mean by a PI diagram? How is it useful for the industrial applications?

**PART-B**

*Answer any one full question from each module.*

**Module – I**

11. Explain about Piezoelectric transducer, electromagnetic transducer, optical transducer and its biological application. (20)

**OR**

12. Explain in detail the static and dynamic characteristics of measuring instruments. Also add a short note on importance of corrosion for the selection of thermocouple. (20)

**Module – II**

13. (a) Describe in detail about the principle and working of a burden gauge, a diaphragm gauge, and bellows. (10)  
(b) Discuss the method of measuring the liquid level in a closed vessel. (10)

**OR**

14. (a) Explain the principle of working of manometers. Describe in detail the working of various types of manometers. (12)  
(b) Explain the importance of pH and conductivity measurement in process industry . Discuss the instrument used for these measurements. (8)

**Module – III**

15. (a) With a neat sketch explain the construction and working of a rotameter. What are its advantages and disadvantages. (10)  
(b) When is the venturimeter preferred over an orifice meter? (10)

**OR**

16. Explain turbine type flow meters , strain gauge flow meters and mass flow meters (20)

**Module – IV**

17. (a) Discuss the P&I diagram for a shell and tube Heat exchanger. (10)  
(b) Explain conductometric analysis and its applications. (10)

**OR**

18. (a) Develop the P&I diagram for temperature control of a distillation column. (10)  
(b) Explain with a neat schematic diagram the function of a on-liquid chromatography. What are its applications? (10)