

**B.Tech. SEM -VI (Chemical 2014 Course (CBCS) : WINTER - 2018**

**SUBJECT: PROCESS INSTRUMENTATION AND INSTRUMENTAL METHODS OF ANALYSIS**

Date: Friday  
Day: 16/11/2018

**W-2018-2443**

Time: 10.00 AM TO 01.00 PM  
Max. Marks: 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.

- Q.1** a) Define process instrumentation and explain the need and scope of process instrumentation. (05)  
b) Describe displacer level gauge in detail (05)

**OR**

- Q.1** a) Give the classification of temperature measuring instrument. (05)  
b) Explain calibration procedure for thermometers. (05)

- Q.2** a) Why mass spectrophotometer is preferred for analyzing isotopes? (05)  
b) State the applications of UV and IR spectroscopic analysis methods. (05)

**OR**

- Q.2** a) Define karl fischer titration (05)  
b) Describe emission spectroscopy in detail (05)

- Q.3** a) State the relative advantages, disadvantages and applications of Abbe refractometer. (07)  
b) Give applications of nephelometry. (03)

**OR**

- Q.3** Explain the following terms (10)  
i) Refractive index and its significance for analysis  
ii) Conductometry for analysis

- Q.4** a) Explain the theories of chromatography. (06)  
b) Give advantages of high performance liquid chromatography (04)

**OR**

- Q.4** Draw typical chromatographic recorder chart and describe its use for determining concentrations of components of the mixtures. (10)

- Q.5** a) Derive response equation for mercury thermometer. (06)  
b) Give classification of second order system. (04)

**OR**

- Q.5** a) Define poles and zeros of transfer function. (05)  
b) Explain input output models of transfer function. (05)

- Q.6** What is ON – OFF controller? Under what circumstance ON – OFF controller can be used? Write down its limitations. (10)

**OR**

- Q.6** a) Define various process control terms used in typical control loop. (05)  
b) What are control valve characteristics? (05)