

SEAT No. _____

No. of Printed pages: 2

[57]

SARDAR PATEL UNIVERSITY

V-SEM

Examination : B. Sc. Instrumentation (Vocational)
US05CINV04 – Analytical Instrumentation

Monday, 29th October, 2018, 10:00 AM – 1:00 PM

Total Marks: 70

Note: The figures to the right indicate maximum marks.

- Q-1. **Multiple Choice Questions-** [10]
- (1) R in Nernst's equation stands for
(a) Resistance (b) Reactance (c) Gas constant (d) Faraday Constant
 - (2) Standard buffer tablet of pH is available in the market.
(a) 7 (b) 15 (c) 2 (d) 8
 - (3) The term "Plug" is used in process.
(a) detection (b) sample injection (c) heating (d) none
 - (4) Selectivity of any detector should be
(a) High (b) Low (c) Zero (d) Adequate
 - (5) TCD is sample technique.
(a) destructive (b) non destructive (c) volatile (d) none
 - (6) If the mobile phase is gas, it ischromatography.
(a) Liquid (b) Gel (c) Paper (d) Gas
 - (7) If the molecular weight is >2000, method selection for liquid chromatography is
(a) Ionic/nonionic (b) soluble/insoluble (c) high/low (d) aqueous/non aqueous
 - (8) If mobile phase is liquid and stationary phase is also liquid it ischromatography.
(a) Partition (b) adsorption (c) thin film (d) paper
 - (9) RI detector depends on at the interface between cell wall and the flowing liquid to deflect a light beam.
(a) Fresnel's law (b) Ohms law (c) Snell's law (d) none
 - (10) For pharmaceutical products detector is used.
(a) Refractive Index (b) Fluorescence (c) Conductivity (d) Thermal

- Q-2. **Short answer type (attempt any ten)** [20]
- (1) Why pH 7 is considered as neutral?
 - (2) Draw neat labeled diagram of Reference electrode.
 - (3) Explain in brief Hydrogen Electrode.
 - (4) What should be the property of carrier gas in GC?
 - (5) What do understand by Gel Chromatography?

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[P.T.O.]

- (6) Why helical tube columns are used?
- (7) What are precautions for sample injection in Chromatography?
- (8) Enlist drawbacks of large diameter column?
- (9) Draw neat diagram of Syringe Injector for Liquid Chromatography.
- (10) Enlist requirements for detectors.
- (11) What are different types of Laser detectors?
- (12) What is Snell's law?
- Q-3. (a) Draw neat diagram of Glass electrode and explain it in detail. How to handle glass electrode? [7]
- (b) Give the basic principle of pH measurement and write the Nernst's equation with appropriate interpretation. [3]
- OR
- Q-3. (a) Write design consideration of pH meter and explain Chopper Amplifier type pH meter. [7]
- (b) State precautions to be taken to handle buffer solution. [3]
- Q-4. (a) Explain block diagram of Temperature control circuit in Oven of Gas Chromatography. [7]
- (b) Briefly explain Packed column. [3]
- OR
- Q-4. (a) Draw the block diagram of Gas chromatography (GC) and explain it. [7]
- (b) Explain working principle of Electron Capture Detector (ECD). [3]
- Q-5. (a) What is HPLC system? Describe its flow measurement and control. [7]
- (b) What are modes of gradient elution? [3]
- OR
- Q-5. (a) Discuss operation of Reciprocating Piston pump used in LC. [5]
- (b) Explain Syringe type pump. [5]
- Q-6. (a) Describe working of Mass detector. [5]
- (b) Explain Fluorescence Detector. [5]
- OR
- Q-6. (a) Discuss working of UV absorbance detector. [5]
- (b) Explain working of Refractive Index detector. [5]