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SARDAR PATEL UNIVERSITY
T.Y.B.Sc. Examination, Fifth Semester
Monday, 25th November 2013
Time : 10.30 am To 01.30 pm
Instrumentation Course Code : US05CINS06
Course Title : Analytical Instrumentation

Total Marks : 70

Q-1 Write answers to the following multiple choice questions in your [10] answer book by selecting the proper option.

- (1) The pH value of pure water is ____ .
(a) 2 (b) 5 (c) 6 (d) 7
- (2) Null detector type pH meter gives the accuracy about ____ pH.
(a) 0.001 (b) 0.01 (c) 0.1 (d) 1.00
- (3) The full form of FID is
(a) Fire Ionic Detector (b) Flame Ionization Detector
(c) Fire Ionization Detector (d) Flame Ionic Detector
- (4) The internal diameter of the column is usually between
(a) 1 to 3 mm (b) 4 to 8 mm (c) 9 to 12 mm (d) 13 to 20 mm
- (5) In the cylinder, carrier gas is filled up at pressure up to
(a) 2500 lb/sq.in (b) 250 lb/sq.in (c) 1000 lb/sq.in (d) 1500 lb/sq.in
- (6) The acronym of HETP is
(a) Height Equivalent to a Theoretical Plate
(b) Hydraulic Energy to a Thin Plate
(c) Hydraulic Equivalent to a Theoretical Plate
(d) Height Equivalent to a Thin Plate
- (7) For gas analyser, oxygen gas is preferred due to its ____ nature.
(a) diamagnetic (b) paramagnetic (c) ferromagnetic (d) none of these
- (8) Conductivity cells are made from a specially developed high density ____ .
(a) carbon (b) nitrogen (c) copper (d) aluminium
- (9) The full form of HPLC is
(a) High Pressure Liquid Chromatography
(b) High Pressure Lead Chromatography
(c) High Pump Liquid Chromatography
(d) High Pump Lead Chromatography
- (10) The full form of TLC is
(a) Thermoelectric Lead Chromatograph
(b) Thin Layer Chromatograph
(c) Temperature Leading Chromatograph
(d) Thick Layer Chromatograph

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Q-2 Answer the following questions in brief. (Answer any Ten Questions) [20]

- (1) Calculate the pH of pure water.
- (2) Explain Nernst equation.
- (3) Enlist the types of pH meters.
- (4) Enlist the basic parts of gas chromatograph.
- (5) Write a brief note on carrier gas supply.
- (6) Enlist the types of detectors.
- (7) Define equivalent conductance and specific conductance.
- (8) Draw only the bridge circuit which is used in Null Method.
- (9) Write a note on Temperature Compensation in conductivity measurement.
- (10) Enlist the types of detectors for liquid chromatograph.
- (11) Give the block diagram for the types of liquid chromatograph.
- (12) Write a brief note on Partition Chromatograph.

Q-3 (a) Explain glass electrode with suitable figure. [5]
(b) Write a note on Null-detector type pH meter. [5]

OR

Q-3 (a) Write a note on Calomel electrode. [5]
(b) Write a note on buffer solution. [5]

Q-4 Explain in detail the Gas Chromatograph. [10]

OR

Q-4 (a) Write a note on Flame ionization detector. [5]
(b) With necessary figure explain sample injection system. [5]

Q-5 (a) Write a note on conductivity meter. [5]
(b) With necessary diagram explain direct reading method for measuring conductance. [5]

OR

Q-5 (a) Write a note on conductivity cells. [5]
(b) Explain paramagnetic oxygen gas analyzer. [5]

Q-6 With necessary block diagram explain in detail liquid chromatography. [10]

OR

Q-6 (a) Explain thermal detectors in detail. [5]
(b) Write a note on column of liquid chromatography. [5]

