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SARDAR PATEL UNIVERSITY

T.Y. B.Sc. (5th Semester) (Instrumentation) Examination 2019

US05CINS06 (Analytical Instrumentation)

Friday, 22-11-2019, 10:00 am to 01:00 pm

Maximum Marks: 70

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

- (1) For gas conductivity measurement, the technique used is _____.
(a) Null method (b) magnetic wind type (c) Dumbbell type (d) all of these
- (2) The types of gas analyzer is _____.
(a) Magnetic wind type (b) CO₂ (c) IR type (d) All of these
- (3) Conductivity measurement is done using _____.
(a) Null method (b) direct reading method (c) high frequency method (d) all of these
- (4) An analyzer is used to observe the _____.
(a) Content of different gases (b) molarity of gases (c) mass of gas (d) charge of gas
- (5) _____ is type of detector.
(a) Fluorescence (b) high pressure pump (c) gradient elution (d) sample injection
- (6) Which one is not the type of liquid chromatograph?
(a) Refractive index (b) gradient elution (c) high pressure pump (d) none of these
- (7) The combination electrode is made up by and reference electrode.
(a) Glass (b) quartz (c) metal (d) semiconductor
- (8) The pH value represents the in compound.
(a) H⁺ ions (b) conductivity (c) OH⁻ ions (d) Iron
- (9) The pH value of pure water is
(a) 9 (b) 7 (c) 14 (d) Zero
- (10) The internal diameter of the column is usually in between mm.
(a) 4-8 (b) 12-15 (c) 1-5 (d) 7-9

Q-2 Answer the following questions in brief. (Answer any ten questions)

[20]

- (1) Enlist the types of conductance measuring methods.
- (2) Sketch the Wheatstone bridge circuit for conductivity measurement.
- (3) Explain specific conductance.
- (4) Write note on gradient illusion.
- (5) Explain adsorption detectors in brief.
- (6) Enlist the parts of liquid chromatograph.
- (7) Brief the principle of pH measurement.
- (8) Give an account of Hydrogen electrode.
- (9) Draw the diagram of combined electrode.
- (10) Enlist the basic parts of Gas chromatography.
- (11) Write a Brief note on carrier gas supply.
- (12) Enlist the type of detector.

(1)

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- Q-3 (a) Explain the principle and working of Calomel electrode. [06]
(b) With necessary diagram explain the chopper amplifier type pH meter. [04]
- OR
- Q-3 (a) Explain in detail the Null detector type pH meter. [10]
- Q-4 (a) Why the column is considered as a heart of Gas chromatograph? [06]
(b) Explain the cross sectional area ionization detector. [04]
- OR
- Q-4 (a) Write the detail note on Argon ionization detector. [06]
(b) With a necessary figure explain the Sample injection system. [04]
- Q-5 (a) Explain infrared Gas analyzer. [06]
(b) What is Null method? Why it is used explain in detail. [04]
- OR
- Q-5 (a) Explain the principle and working of magnetic wind analyzer. [06]
(b) Explain the conductivity measurement using high frequency method. [04]
- Q-6 (a) Write a note on refractive index (RI) detectors in detail. [06]
(b) Discuss high pressure pump system for liquid chromatography. [04]
- OR
- Q-6 (a) With necessary block diagram explain in detail the liquid chromatography. [10]

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