18CHP21

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2022
(Fourth Semester)

Branch – **CHEMISTRY**

ANALYTICAL CHEMISTRY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 Which one of the following is not used for detection in Gas chromatography?
(i) IR (ii) NMR
(iii) Flame ionisation (iv) Electrical conductivity

2 An isocratic elution in HPLC is one in which the composition of the solvent
(i) remains constant (ii) changes continuously
(iii) changes in a series of steps (iv) none of these

3 Bromine yields abnormally high ____ peak
(i) Molecular ion peak (ii) M+1 peak
(iii) M+2 peak (iv) M+3 peak

4 In which state of matter mass spectroscopy is being performed?
(i) Solid (ii) Liquid (iii) Plasma (iv) Gaseous

5 What causes bright lines in an emission spectrum?
(i) electrons jumping to higher energy levels when absorbing light
(ii) electrons falling to lower energy level releasing energy
(iii) protons jumping to higher energy levels when absorbing light
(iv) protons falling to lower energy level releasing energy

6 In atomic absorption spectroscopy, which of the following is the generally used light source?
(i) Tungsten lamp (ii) Xenon- Mercury lamp
(iii) hydrogen or deuterium discharge lamp
(iv) hollow cathode lamp

7 In DTA _____ is used as a reference material.
(i) alumina (ii) $MgSO_4$
(iii) CaO (iv) Silicon tetra chloride

8 In derivative thermogravimetric curves, Y axis represents
(i) dm/dt (ii) dm. (iii) dt. (iv) none of these

9 The electro analytical technique that involves the measurement of current consumed in a redox reaction of the analyte is
(i) Potentiometry (ii) Conductometry
(iii) Coulometry (iv) Polarography

10 The ratio of concentration of titrant to the concentration of the analyte in amperometric titration ideally should be
(i) 2 (ii) 5 (iii) 0.5 (iv) 10

Cont...

SECTION - B (25 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 5 = 25)

11 a Discuss the applications of gel permeation chromatography.

OR

b Give a brief account on paper electrophoresis.

12 a Explain the theory of mass spectroscopy.

OR

b Discuss McLafferty rearrangement and its significance.

13 a Discuss the comparison between, Atomic Absorption Spectroscopy and Atomic Emission Spectroscopy.

OR

b What is on sensitivity and detection limit in Atomic Absorption Spectroscopy? Explain.

14 a Write a note on thermometric titration.

OR

b What is a thermogram? What are the factors which influence the thermogram?

15 a Explain the following (i) residual current. (ii) diffusion current. (iii) migration current.

OR

b Briefly write about amperometric titrations.

SECTION -C (40 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 8 = 40)

16 a Sketch a block diagram of HPLC instrument and explain.

OR

b Write a detailed note on ion-exchange chromatography.

17 a Explain the following (i) Molecular ion peak (ii) Meta stable ions (iii) Retro Diel's-Alder cleavage.

OR

b Give a brief account on the fragmentation patterns of hydrocarbons and acids.

18 a Draw a block diagram of Atomic emission spectroscopy and explain.

OR

b Discuss the principle and applications of Atomic absorption spectroscopy.

19 a Write the principle of DTA and DSC. Discuss the applications of DSC.

OR

b Illustrate the principle and instrumentation of TGA.

20 a What is constant current and controlled potential coulometry? Give a detailed note on them.

OR

b Sketch a dropping mercury electrode, explain its functioning. What are its merits?

Z-Z-Z END