

Question Paper

Exam Date & Time: 22-Nov-2023 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

Instrumental Methods of Analysis [PQA-BP701T]

Marks: 75

Duration: 180 mins.

I Multiple Choice Questions (MCQs)

Answer all the questions.

Section Duration: 30 mins

- 1) Ultraviolet range in the electromagnetic spectrum is _____ (1)
- [200-400 nm](#)
[400-700nm](#)
[100-200 nm](#)
[700 nm-1mm](#)
- 2) Sigma electrons are present in (1)
- [Saturated system](#)
[Unsaturated system](#)
[Fully saturated system](#)
[Half saturated system](#)
- 3) Paracetamol tablet IP are assayed by (1)
- [UV spectroscopic method](#)
[Visible spectroscopic method](#)
[Fluorometric method](#)
[IR Spectroscopic method](#)
- 4) Complimentary colour for Blue is..... (1)
- [Red](#)
[Orange](#)
[Green](#)
[Yellow](#)
- 5) Wavelength accuracy for Glass filters is (1)
- [±3 nm](#)
[±300 nm](#)
[±0.3 nm](#)
[+30 nm](#)
- 6) The stationary phase in TLC is (1)
- [Adsorbent](#)
[Liquid held between glass plate and adsorbent](#)
[Glass plate](#)

Cellulose

- 7) Wavenumber for the mid IR region is (1)
- 4000 cm⁻¹ - 400 cm⁻¹
40 cm⁻¹ - 400 cm⁻¹
4000 cm⁻¹ - 40 cm⁻¹
4000 cm⁻¹ - 650 cm⁻¹
- 8) Water hasnumber of fundamental vibrations (1)
- 2
3
4
5
- 9) One of the following is an easily reducible element (1)
- Calcium
Copper
Beryllium
Barium
- 10) One of the following anion is responsible for interference with calcium (1)
- Chloride
Carbonate
Oxalate
Iodide
- 11) One of the following gas is filled in hallow cathode lamp (1)
- Argon
Oxygen
Hydrogen
Nitrogen
- 12) Turbidometry deals with the measurement of (1)
- Scattered radiation
Transmitted radiation
Fluorescent radiation
Phosphorescent radiation
- 13) Solvent programming, also called gradient elution, involves (1)
- changing the column length
changing the mobile phase composition
using the mobile phase unchanged
successive injection of sample
- 14) In HPLC, the analytical performance improves when (1)
- particle diameter is increased
particle diameter is reduced
coarser particles are paired with shorter columns
low temperature is used
- 15) In gas chromatography, derivatization is desirable to (1)

- [improve the thermal stability of compounds](#)
- [enable interaction with buffer](#)
- [introduce a detector oriented tag into the molecule](#)
- [removes backpressure](#)

16) Which of the following HPLC detector is an example of 'bulk property detector'? (1)

- [UV-Visible detector](#)
- [Fluorescence detector](#)
- [Electrochemical detector](#)
- [Refractive index detector](#)

17) The glass electrode used in the pH measurement is (1)

- [metal-metal oxide electrode](#)
- [a membrane electrode](#)
- [ion selective electrode](#)
- [Quinhydrone electrode](#)

18) Silver- silver chloride electrode (1)

- [Silver wire coated with calomel](#)
- [Silver wire coated with potassium chloride](#)
- [Silver wire coated with silver chloride.](#)
- [platinum wire coated with silver chloride](#)

19) Calibration of the cell constant of a conductance cell is carried out by using a solution of (1)

- [0.1 M Sodium chloride](#)
- [0.1M Calcium chloride](#)
- [0.1 M Potassium chloride](#)
- [0.1M Aluminium chloride](#)

20) Principle of quantitative analysis using potentiometry is based on (1)

- [Nernst equation](#)
- [Illkovic equation](#)
- [Beer-lambert equation](#)
- [Kirckoff's law](#)

II Long Answers

Answer all the questions.

- 1) Explain rate theory in detail and how the drawbacks of plate theory were addressed. (10)
- 2) Discuss in detail all the modules of low-pressure quaternary gradient HPLC systems (10)

III Short Answers

Answer all the questions.

- 1) Explain the principle in the analysis of the following by spectroscopy (5)
 - a) Paracetamol tablets IP (2 M)
 - b) Thiamine by fluorimetry (3 M)
- 2) How Spectrophotometer is different from Colorimeter? (5)
- 3) Explain the factors affecting column chromatography (5)

- 4) Explain the working of Hollow cathode lamp (5)
- 5) Write the structure of aspirin and paracetamol, mark the functional groups and their wave number. (5)
- 6) Explain the role of supporting electrolyte in polarography and list any four applications of polarography (5)
- 7) Write the construction and working of glass electrode (5)

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