

Exam Date & Time: 01-Dec-2022 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

Instrumental Methods of Analysis [PQA-BP701T - S2]

Marks: 75

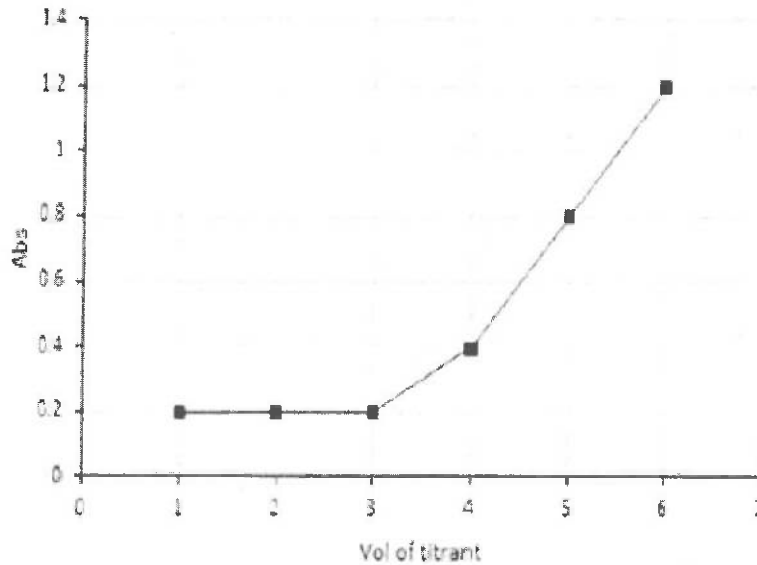
Duration: 180 mins.

I Multiple Choice Questions (MCQs)

Answer all the questions.

Section Duration: 30 mins

- 1) Which one of the following option represents the given graph of spectrophotometric titration?



(1)

- 1) Type-I-graph 2) Type-II- graph 3) Type-III-graph 4) Type-IV-graph

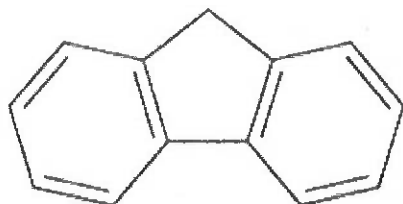
- 2) Which of the following is not a component of emission system in flame photometer?

- 1) Burner 2) Atomizer 3) Chopper 4) Fuel gas and their regulators

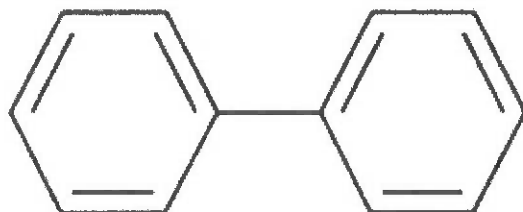
(1)

- 3) Which of the following compound will show high fluorescence intensity?

(1)



a



b

1) a	2) b	3) both a and b	4) None of the compound
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4) Which one of the statement is not true for simultaneous equation method?

1) Absorption maxima of 2 compounds should be same	2) 2 compounds should not interact	3) Iso-absorptive point is necessary parameter	4) Compounds should have different lambda max	(1)
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5) Flame Photometry is used in the determination of compositional analysis of

1) Halides	2) Soilds	3) Alkali metals	4) Natural gas	(1)
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6) Fluorescent intensity of riboflavin is reduced when it is complex with caffeine. This is an example forquenching.

1) Chemical Quenching	2) Collisional Quenching	3) Self-Quenching	4) Static Quenching	(1)
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7) The stationary phase in a cation exchange resin has:

1) Anionic fixed ion and cationic counter ion	2) Anionic fixed ion and anionic counter ion	3) Cationic fixed ion and anionic counter ion	4) Cationic fixed ion cationic counter ion	(1)
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8) The type of chromatographic technique in which separation depends on the relative retention of sample molecules according to the molecular size is

1) Ion-exchange chromatography	2) Gel filtration chromatography	3) Partition chromatography	4) Adsorption chromatography	(1)
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9) Which of the following TLC development technique is suitable for separation of complex mixtures?

1) One dimensional development	2) Two dimensional development	3) Radial development	4) Centrifugal development	(1)
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10) Which among the following is an ideal R_f value?

1) 0.1	2) 0.5	3) 1.0	4) 10	(1)
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11) Which of the following carrier gas is not used in Gas Chromatography?

(1)

1) Nitrogen	2) Oxygen	3) Hydrogen	4) Helium
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12) Which among the following is a highly polar stationary phase in gas Chromatography?

1) Polydimethylsiloxane	2) 5% phenyl-polydimethylsiloxane	3) 50% Trifluoropropyl-polydimethylsiloxane	4) 5% cyanaopropyl-polydimethylsiloxane
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 (1)

13) Which among the following GC detector is called a "hot wire detector" ?

1) Flame ionization detector	2) Electron capture detector	3) Thermal conductivity detector	4) Flame photometric detector
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 (1)

14) Which of the following is an example for a non-polar stationary phase used in HPLC?

1) Octa decyl silane column	2) Silica column	3) Alumina column	4) Amine column
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 (1)

15) Which of the following HPLC detector is an example of 'solute property detector'?

1) Conductivity detector	2) Electrochemical detector	3) Refractive index detector	4) Evaporative light scattering detector
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 (1)

16) On a 1000cm column, the retention time (t_R) for decane is 49.2 sec. Peak width at half height is 0.88 sec. Calculate the number of theoretical plates and the plate height.

1) N=17000, H=0.058 cm	2) N=1700, H=5.8 cm	3) N=170000, H=0.0058 cm	4) N=170, H=0.58 cm
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 (1)

17) Which of the following is not true of potentiometry?

1) Potential of a reference electrode does not change with the nature and concentration of the analyte solution.	2) The potential of Silver-Silver chloride reference electrode is 0.000 Volts.	3) Glass electrode does not work as an indicator electrode if it is not hydrated.	4) Principle of quantitative analysis in potentiometry is based on "Nernst equation".
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 (1)

18) Which of the following statement is true?

1) Polarographic maxima helps in easy determination of diffusion current and can be achieved by adding surfactants to the electrolyte solution.	2) The presence of dissolved oxygen in a solution can be determined from a polarogram of the solution.	3) In a biamperometric titration of Iodine against sodium thiosulphate, the sudden appearance of current is the end point.	4) The current does not increase in an amperometric titration before the end point, when "only the titrating reagent is electroactive".
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 (1)

19) Principle of quantitative analysis using polarography is based on

1) Nernst equation	2) Ilkovic equation	3) Beer-lambert equation	4) Kirckoff's law
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 (1)

20) Potential of SHE is

1) 0.0000	2) 1.000	3) 0.500	4) 10.000
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 (1)

II Long Answers

Answer all the questions.

- 1) Explain the factors affecting scattering in Nephelometry and Turbidimetry. (10)
- 2) a. Make a sketch of gas chromatography instrument with necessary labels of the components and explain its working. (10)
b. Explain the principle of flame ionization detector with the help of a suitable diagram.

III Short Answers

Answer all the questions.

- 1) a. Draw and label a IR spectra. (1 M)
b. Why stretching vibration requires more energy than bending vibration? (1 M) (5)
c. Explain basic molecular vibrations using an example. (3 M)
- 2) a. Explain the working of Photo emissive cell using neat schematic diagram. (4 M) (5)
b. What is dark current? (1 M)
- 3) Explain the qualitative and quantitative application of UV spectroscopy. (5)
- 4) What are the steps involved in paper chromatography? Explain the development techniques. (5)
- 5) If you need to separate phenol from proteins, which type of chromatography you would choose? Explain the procedure and mechanism for the same. (5)
- 6) Analyse the importance of dropping mercury electrode in polarography and explain the types of currents in polarography. (5)
- 7) Construct a conductometric titration curve for weak acid with a weak base and explain the shape of the curve. (5)

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