

[201]

SARDAR PATEL UNIVERSITY

M. Sc. (Industrial Chemistry), Semester- 4 Examinations

March - 2019

PS04EICH21—Advanced Analytical Chemistry

Tuesday, 26th March 2019

Time: 02:00 p.m. to 05:00 p.m.

Total Marks: 70

- Note: i) Attempt all the questions.
 ii) Figures to right indicate full marks.
 iii) Draw neat diagrams wherever it requires.

Q-1 Answer the following Multiple Choice Questions.

Marks
(08)

- In the *Stokes process*, which is the parallel of absorption, the scattered photons are shifted to _____ frequencies.
 - Lower
 - higher
 - medium
 - rocking exclusion
- In earlier years, Raman technique was preliminary used to study _____ states of simple molecules.
 - vibrational
 - rotational
 - rocking
 - symmetry
- Dry dispersion is not suitable for _____.
 - Fine powders
 - Very fine powders
 - big particles
 - b and c
- Particle size influences many properties of particulate materials and is a valuable indicator of quality and _____.
 - performance
 - colour
 - density
 - size
- The first step is _____ in ICP, which is removal of the solvent from the droplets, resulting in microscopic solid particulates, or a dry aerosol.
 - drying
 - dissolution
 - desolvation
 - dispensing
- _____ is a powerful tool for the determination of metals in a variety of different sample matrices.
 - Flame photometry
 - HPLC
 - OES
 - GC
- TEM consists of a phosphor screen, which may be made of fine (10-100 micrometer) particulate of _____.
 - zinc sulphide
 - Ferrous chloride
 - ferric oxide
 - zinc chloride
- TEM images are formed using _____ electrons.
 - reflected
 - power
 - transmitted
 - soft

Q-2 Answer the following short questions. Each question carries equal mark. (Any Seven) (14)

1. What is the principal of Raman spectroscopy?
2. Draw an Optical diagram of a FT-Raman instrument.
3. What is a Rheological property?
4. What is Zeta potential?
5. What are the wavelengths are used in ICP?
6. What are the disadvantages of ICP.
7. Draw a schematic diagram of ICP torch.
8. Give working principle of TEM.
9. What is electrolytic polishing in TEM?

Q-3 (a) What is Raman Spectroscopy? Explain Rayleigh scattering, Raman scattering, & IR absorption. (06)

Q-3 (b) What is mutual exclusion principle of Raman? Explain with its example. (06)

OR

Q-3 (b) Write a note on applications of Raman spectroscopy. (06)

Q-4 (a) Discuss with suitable examples particle size distribution. (06)

Q-4 (b) How do we define particle size? What is equivalent sphere? (06)

OR

Q-4 (b) Discuss the dynamic light scattering technique for PSA. (06)

Q-5 (a) Explain with neat diagram various nebulizers used in ICP. (06)

Q-5 (b) Write a note on hydride generation in ICP. (06)

OR

Q-5 (b) Write a brief note on axial, radial and dual view of torch configuration in ICP. (06)

Q-6 (a) What is TEM? Write a short note on electron source (gun) of TEM. (06)

Q-6 (b) Enlist the Limitations of TEM. (06)

OR

Q-6 (b) Write a note on 1. Electron source (gun) of TEM 2. TEM sample holders. (06)

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All the Best!

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