22P111 (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P CHE1 C02 - ELEMENTARY INORGANIC CHEMISTRY

(Chemistry)

(2019 Admission onwards)

Time : 3 Hours Maximum : 30 Weightage

Section A

Answer any ***eight*** questions. Each question carries 1 weightage.

1. How are acids and bases defined in terms of i) Solvent system concept ii) Lux-flood concept. Give suitable examples.
2. What happens when vapours of S4N4 is passed through silver wool at 250^0c.
3. How calcium boride is prepared? Comment about its structure.
4. What is the action of borazine on HCl?
5. Give two examples for isopoly anions of vanadium.
6. Give two major differences between 4f and 5f orbitals.
7. Describe Woods- Saxon potential.
8. What are critical size and critical mass? Explain its importance in nuclear reactions.
9. How is the particle size and band gap are correlated?
10. What is Dynamic light scattering? Explain.
11. Nanoparticles have a lower melting point than their bulk counterparts. Explain.
12. Why carbon is used to reduce the zinc oxide?

(8 × 1 = 8 Weightage)

Section B

Answer any ***four*** questions. Each question carries 3 weightage.

13. Explain HSAB concept with suitable example.
14. a) Write a short note on superacids and super bases with suitable examples.
    b) What are super acids? Mention their uses.
15. Derive the Styx code for B2H6.

16. Applying wade's rules classify the following boranes by structural type. a) B4H12 b) B10H15

17. What are Latimer diagram? Explain how Latimer diagram is converted into reduction half cell reaction in acid solution.

18. Briefly explain the interaction of electron with matter.

19. Briefly explain the working principle of TEM. What are its advantages and disadvantages?

(4 × 3 = 12 Weightage)

Section C

Answer any ***two*** questions. Each question carries 5 weightage.

20. Discuss briefly the reactions which take place in non- aqueous sulphuric acid, HF and ammonia.

21. Discuss in detail the different types of silicates with examples.

22. (i) Write notes on Ellingham diagrams and comment on standard reduction potential of species involved.
    (ii) Discuss spectral and magnetic properties of f-block elements.

23. Identify any four methods to characterize TiO2 nanoparticles.
    (a) What is the information obtained from each technique?
    (b) Discuss the biomedical applications of nanoparticles.

(2 × 5 = 10 Weightage)

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