19P111 (Pages: 2) Name: …….……

Reg. No…….……...

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CUCSS PG)

CC19P CHE1C02 – ELEMENTARY INORGANIC CHEMISTRY

(Chemistry)

(2019 Admission Regular)

Time: Three Hours Maximum: 30 Weightage

Section A

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

1. Give two major differences between 4f and 5f orbitals.
2. Applying Wade's rules classify the following boranes by structural type.

   a) $(B_2H_7)^-$ b) B_6H_{10} c) B_5H_{11} d) B_8H_{16}
3. What is magic acid? What is the reaction of magic acid with neopentane?
4. In organic matter rich water logged soils iron will be present in which form? Justify your answer.
5. What are the differences between a SEM and TEM microscope?
6. What is meant by an aprotic solvent? What are different classes of aprotic solvents and give examples of each class.
7. Distinguish between photonuclear and thermonuclear reactions.
8. Mention how nanomaterials are classified based on their dimension.
9. How calcium boride is prepared? Comment about its structure.
10. How silicones are prepared? Account for their water repellent nature.

(8 x 1 = 8 Weightage)

Section B

Answer any ***six*** questions. Each question carries 2 weightage.

11. Briefly discuss the synthesis and structures of different isopolyanions of Mo and W.
12. Briefly describe any four applications of nanomaterials.
13. What is meant by Styx number of boranes? Derive different styx numbers possible for B_3H_7 and arrive at the most likely structure.
14. Explain neutron activation analysis.
15. Write a short note on alkali metal in liquid ammonia.
16. What are zeolites? Mention important applications of zeolites.
17. How is polythiazyl prepared? Give an account of its properties, structure and uses.
18. Write a note on Frost diagram.

(6 x 2 = 12 Weightage)

Section C

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

19. What is an Ellingham diagram? Discuss briefly about its applications and limitations.
20. Briefly discuss the HSAB theory of acids and bases and its applications.
21. a) Explain the synthesis of borazine, N-substituted borazine and B-substituted borazine.
    b) Compare the structure and reactivity of borazine with benzene.
22. Write notes on
    a) GM counter. b) Radiation dosimetry.
    c) Nuclear Fission. d) Nuclear fusion.

(2 x 5 = 10 Weightage)

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