STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2019 – 20 & thereafter)

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023
BRANCH IV- CHEMISTRY
THIRD SEMESTER

COURSE : MAJOR CORE
PAPER : INORGANIC CHEMISTRY-I
SUBJECT CODE : 19CH/MC/IC34
TIME : 3 HOURS MAX.MARKS :100

SECTION – A
Answer all the questions

I. Choose the correct answer: (10x1= 10 marks)

1. The atomic and ionic radii ---------- from beryllium to barium.
   (i) increases (ii) decreases (iii) neither increases nor decreases (iv) none.
2. Ionic hydride amongst the following is
   (i) beryllium hydride (ii) sodium hydride (iii) ammonia (iv) titanium hydride.
3. Epsom salt is
   (i) $MgSO_4.7H_2O$ (ii) CuSO4. $5H_2O$ (iii) FeSO4. $7H_2O$ (iv) Na_2SO_4.
4. Mineral of lithium is
   (i) spodumene (ii) bauxite (iii) carnallite (iv) gypsum
5. Which is amphoteric?
   (i) boron oxide (ii) indium oxide (iii) gallium oxide (iv) boron hydroxide
6. Tendency of an element to form complexes is favored by
   (i) small size of atom or ion (ii) high charge
   (iii) availability of vacant orbitals of suitable energy (iv) all
7. Teflon is a polymer of
   (i) fluorine (ii) chlorine (iii) bromine (iv) iodine.
8. Which element has no allotropes?
   (i) Bismuth (ii) Antimony (iii) Arsenic (iv) Phophorous.
9. Hybridisation in $XeOF_4$ is
   (i) sp^2 (ii) sp^3 (iii) sp^3d (iv) sp.
10. Caro's acid is
    (i) H_2SO_4 (ii) H_2SO_5 (iii) $H_2S_2O_7$ (iv) $H_2S_2O_8$.

II. Fill in the blanks: (10x1 = 10 marks)

11. Hard acids prefer to combine with ----- bases.
12. All cations are regarded as -------- acids.
13. Cesium and potassium are used in ----- cells.
14. Alkali metals are strong -------- agents.
15. Borazole is also called as ----------.
16. Zeolites act as ----------.
17. Marshall's acid is ----------.
18. Perchloric acid is a strong ---------- agent.
19. ---------- is used as cryogenic fluid.
20. XeF_2 has a ----------geometry.

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III. State whether true or false: **(5x1= 5 marks)**

21. The stronger an acid, the weaker is its conjugate base.
22. All alkali metals do not impart colour to flame.
23. Mica is an aluminosilicate.
24. H_2Te is a weaker acid than H_2S.
25. Pseudohalogens are volatile.

IV. Answer the following in a line or two: **(5x1 = 5 marks)**

26. Define an acid and a base according to Lux-Flood concept.
27. Give reason – Sodium is more electropositive than barium.
28. What are fullerenes? Give their uses
29. What is phosphorescence?
30. What are pseudo halogens?

SECTION – B

Answer any five questions: **(5x6=30 marks)**

31. Explain the classifications of hydrides.
32. Discuss the basic nature of iodine.
33. What are clathrate compounds? Mention their applications.
34. Give the preparation, properties and uses of perhalic acid.
35. How is beryllium extracted from its ore?
36. Explain the preparation, properties and uses of silicones.
37. Write the preparation, properties and uses of Marshall's acid.

SECTION – C

Answer any two questions: **(2x20=40 marks)**

38. (a) How is diborane prepared? Discuss its properties and structure. (10)
    (b) What are inter halogen compounds? Give the preparation, properties and uses of ICl, BrF_3 and IF_5. (10)

39. (a) Explain the structure, bonding and uses of XeF_4 and XeF_6. (10)
    (b) Discuss the following:
        (i) Preparation and properties of dinitrogen tetroxide
        (ii) Oxyacids of phosphorous.. (10)

40. (a) What are silicates? How are they classified? Explain. (10)
    (b) How are the following prepared? (i) hydrazoic acid and (ii) hydrazine. Give their properties and explain their structure. (10)

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