STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2015 – 16 & thereafter)

SUBJECT CODE: 15CH/MC/IC34

B.Sc. DEGREE EXAMINATION, NOVEMBER 2017
BRANCH IV- CHEMISTRY
THIRD SEMESTER

COURSE : MAJOR CORE
PAPER : INORGANIC CHEMISTRY-I
TIME : 3 HOURS **MAX.MARKS :100**

SECTION – A
Answer all the questions
I.Choose the correct answer: **(10x1= 10 marks)**

1. The acid strength of oxoacids of halogens increases in the order
   a. $HClO_4 > HClO_3 > HClO_2 > HClO$ b. $HClO_3 > HClO_4 > HClO_2 > HClO$
   c. $HClO > HClO_2 > HClO_3 > HClO_4$ d. $HClO_2 > HClO_3 > HClO_4 > HClO$
2. The chemical formula of pyrophosphoric acid is
   a. $H_2P_4O_7$ b. $H_4P_2O_7$ c. HPO_3 d. None of this
3. The oxidation state of Cl in $HClO_4$ is
   a. +4 b. +5 c. +6 d.+7
4. An element finding application in xerox machines is
   a. Po b. Be c. S d. Se
5. On dissolving Na(s) in NH_3 (l)
   a. solvated Na^+ is produced b. solvated electron is produced
   c. a blue solution is produced d. (a), (b) and (c) occur
6. The halogens have the outer electronic configuration
   a. ns^2np^2 b. ns^2np^4 c. ns^2np^5 d. ns^2np^6
7. PH_3 is an example of
   a. Saline hydrides b. Molecularhydrides
   c. Metallic hydrides d. Polymeric hydrides
8. The formula of Epsom salt is
   a. $BaSO_4.7H_2O$ b. $MgSO_4.7H_2O$ c. $ZnSO_4.7H_2O$ d. $CaSO_4.7H_2O$
9. The radii of the iso-electronic ions K^+, S^{2-}, Cl^- and Ca^{2+} decreases as
   a. $Ca^{2+} > K^+ > Cl^- > S^{2-}$ b. $Cl^- > S^{2-} > K^+ > Ca^{2+}$
   c. $S^{2-} > Cl^- > K^+ > Ca^{2+}$ d. $K^+ > Ca^{2+} > S^{2-} > Ci^-$

10. Ionization potential
    a. decreases from top to bottom in a group
    b. increases from top to bottom in a group
    c. decreases from left to right in a period
    d. remains the same from left to right in a period

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

11. The chemical formula of borax is --------.
12. The bond dissociation energy of F_2 molecule is --------- than that of Cl_2 molecule.
13. Lithium exhibits a diagonal relationship with --------.
14. Red phosphorous is---------- stable than white phosphorous.
15. The solution of iodine in oleum imparts ---------colour.
16. Mica is an example of -------- silicates.
17. The formula for Caro's acid is--------.
18. $N^{3-}$is the conjugate base of ---------- acid.
19. $Na_2S_2O_6$ is the salt of -------- acid.
20. The chemical formula of lithium nitride is -------.

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

21. The elements of the 4f series are known as the 'rare earths'.
22. Fluorine has a higher electron affinity compared to chlorine.
23. Alkali metal superoxides are paramagnetic.
24. Intermolecular hydrogen bonding occurs in o-nitrophenol.
25. I^{3-} is linear and symmetrical.

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

26. What is spodumene?
27. Define Electron affinity.
28. Define covalent radius.
29. What is Plaster of Paris?
30. Which are known as pseudohalogens?

SECTION – B

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

31. Explain the structures of XeF_6 and and XeO_3 molecule on the basis of VSEPR theory.
32. Explain conjugate acid-base pairs, Lewis acids, hard acid and soft acid with an example.
33. What are the types of silicones? List its uses.
34. Explain inert pair effect with reference to elements of Boron and Carbon family.
35. What are clathrates? Discuss about the applications of clathrate compounds.
36. Explain the bonding in diborane.
37. a) List any four oxyacids of sulphur and give its structure.
    b) Calculate the effective nuclear charge experienced by the 4s electron in potassium atom. (4+2)

SECTION – C

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

38. a. Give a comparative account of oxides and hydrides of nitrogen group elements. (8)
    b. Discuss about a preparation, three properties and structure of hydroxylamine. (6)
    c. Discuss about any one method of preparation and structure of borazole . (6)

39. a. Explain why ice has less density than water. (2)
    b. Discuss about any three types of silicates with examples. (8)
    c. Discuss the classification of hydrides (10)

40. a. Discuss about the importance of cryptands and crown ethers. (8)
    b. Write a concise account ofthe basic nature of iodine. (5)
    c. Discuss about the method of extraction of beryllium from beryl. (7)

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