

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2008-09)

SUBJECT CODE: CH/MC/IC24

B.Sc. DEGREE EXAMINATION, APRIL 2011
BRANCH IV - CHEMISTRY
SECOND SEMESTER

Reg. No

COURSE : MAJOR – CORE
PAPER : INORGANIC CHEMISTRY -I
TIME : 30 MINUTES
MAX. MARKS : 30

SECTION – A

TO BE ANSWERED ON THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30X1=30)

I Choose the correct answer:

- Na and Mg do not resemble in the following properties
a) Oxides are amphoteric b) Carbonates on heating forms metal oxides
c) Widely used as electrodes d) Used to prevent corrosion
- Hybridisation in XeF_6 is
a) dsp^3 b) d^2sp^3 c) d^3sp^2 d) d^2sp^2
- Which is the major constituent of gun powder
a) Chile salt petre b) Sulphur c) Nitrate d) Charcoal
- When SO_2 gas is passed into aqueous Na_2CO_3 , product formed is
a) NaHSO_4 b) Na_2SO_3 c) NaHSO_3 d) Na_2SO_4
- NaH is a _____ hydride
a) saline b) metallic c) molecular d) polymeric
- A compound used in space vehicles both to absorb CO_2 and liberate O_2 is
a) NaOH b) Na_2O c) Na_2O_2 d) $\text{CaO} + \text{NaOH}$
- Diagonal relationship is for
a) $\text{Li} - \text{Na}$ b) $\text{Be} - \text{Mg}$ c) $\text{Si} - \text{C}$ d) $\text{B} - \text{Si}$
- Which is more stable among the following
a) $[\text{Be}(\text{H}_2\text{O})_4]^{2+}$ b) $[\text{Mg}(\text{H}_2\text{O})_4]^{2+}$ c) $[\text{Ca}(\text{H}_2\text{O})_4]^{2+}$ d) $[\text{Sr}(\text{H}_2\text{O})_4]^{2+}$
- Which is used for indigestion is
a) $\text{Be}(\text{OH})_2$ b) KOH c) $\text{Mg}(\text{OH})_2$ d) $\text{Ca}(\text{OH})_2$
- Which of the following is not used as food preservative?
a) NaCl b) CH_3COOH c) $\text{C}_6\text{H}_5\text{COONa}$ d) HCHO

II State whether true or false:

11. $\text{Na}_2\text{B}_4\text{O}_7 + \text{NH}_4\text{Cl} \xrightarrow{\text{red heat}}$ inorganic graphite as the major product.
12. When PH_3 reacts with aq. Cu^{2+} , it forms metallic Copper.
13. When 1M $\text{Na}_2\text{SO}_4 + 1\text{M conc. H}_2\text{SO}_4$ is cooled, it gives NaHSO_4 and SO_3 .
14. Ammonia can be dried over P_4O_{10} .
15. Pyrosilicate in which three oxygen atoms of $[\text{SiO}_4]^{4-}$ are shared .

III Match the following:

- | | |
|-----------------------|---------------------------|
| 16. Explosive | NaN_3 |
| 17. Artificial gem | Fe_3O_4 |
| 18. self reduction | Sn |
| 19. magnetic material | Al_2O_3 |
| 20. Insulator | $\text{Pb}(\text{N}_3)_2$ |
| | Diamond |

IV Fill in the blanks:

21. The hydrolysis of alkyl substituted chlorosilanes gives _____
22. Sulphur acts as _____ agent in the vulcanization of rubber
23. The solubility of iodine in water is greatly increased by the addition of KI, because of the formation of _____
24. There is no _____ bond in $\text{S}_2\text{O}_7^{2-}$
25. Radium is found in _____ ore.

V Answer the following questions in a line or two:

26. HClO_4 is more acidic than HClO why?

27. In liquid state Cl_2O_6 is paramagnetic why?

28. $(\text{Me})_2\text{SiCl}_2$ on hydrolysis will produce $(\text{Me})_2\text{Si}(\text{OH})_2$, give equation?

29. Give equation for the alkaline KMnO_4 oxidation of I^- ?

30. K_2MnO_4 is not oxidized by O_3 , why?



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SECTION – B

- I. Answer any five questions: (5x6=30)
- Prove in a hydride, the hydrogen atom can exist as H^- ion? (3)
 - List 3 typical properties of saline hydrides? (3)
 - Complete the following
 - $LiNO_3(s) +$ on heating $\rightarrow ?$ (2)
 - $LiAlH_4 + NH_3 \rightarrow ?$ (2)
 - Borazine + H_2O + on heating $\rightarrow ?$ (2)
 - Differentiate the reactivities of BH_4^- and AlH_4^- ? (3)
 - Define variable valency with example? (3)
 - Describe the structure of ICl, BrF₃, IF₅.
 - Describe the acidic behaviour of the oxyacids of nitrogen? (4)
 - Conc. HNO₃ on exposure to sunlight turns brown why ? (2)
 - How is sodium bismuthate prepared? Illustrate its oxidizing property? (4)
 - Prove that Iodine has basic nature. (2)
 - What are clathrate compounds? Explain its formation? (3+3)

SECTION - C

- II. Answer any two questions: (2x20=40)
- Explain the structure of $XeOF_4$? (5)
 - How does water react with XeF_2 , XeF_4 and XeF_6 ? (3)
 - Compare and reason out the $O - Cl$ bond length in Cl_2O and ClO_2 ? (4)
 - Outline the industrial uses of halogens and their compounds? (8)
 - What are pseudohalogens? Describe their formation and characteristics? (6)
 - Give preparation, structure and two properties of oxyacids of phosphorous? (8)
 - Name the acids of sulphur with their formula? (4)
 - Write equation for thionic acid preparation? (2)

10. a) What are silicates? Classify them? Give structures? (8)
b) Prepare the following: (6)
 (i) Orthosilicic acid (ii) Borazole (iii) ICl
c) Explain the chemistry of diborane? (3)
d) Compare borazine and benzene? (3)
11. a) List the industrial importance of D_2O ? (4)
b) Explain cryptates and crown ethers with examples? (5+5)
c) Sketch the extraction of beryllium and list its exceptional properties? (6)

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