

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2010-11)

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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TIME : 2 ½ hours

MAX. MARKS : 70

SECTION – B

- I. Answer any five questions: (5x6=30)
- a) Prove in a hydride, the hydrogen atom can exist as H^- ion? (3)
b) List 3 typical properties of saline hydrides? (3)
 - Complete the following
a) $LiNO_3(s) +$ on heating $\rightarrow ?$ (2)
b) $LiAlH_4 + NH_3 \rightarrow ?$ (2)
c) Borazine + H_2O + on heating $\rightarrow ?$ (2)
 - a) Differentiate the reactivities of BH_4^- and AlH_4^- ? (3)
b) Define variable valency with example? (3)
 - Describe the structure of ICl, BrF₃, IF₅.
 - a) Describe the acidic behaviour of the oxyacids of nitrogen? (4)
b) Conc. HNO₃ on exposure to sunlight turns brown why ? (2)
 - a) How is sodium bismuthate prepared? Illustrate its oxidizing property? (4)
b) 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)
- a) Explain the structure of $XeOF_4$? (5)
b) How does water react with XeF_2 , XeF_4 and XeF_6 ? (3)
c) Compare and reason out the O – Cl bond length in Cl_2O and ClO_2 ? (4)
d) Outline the industrial uses of halogens and their compounds? (8)
 - a) What are pseudohalogens? Describe their formation and characteristics? (6)
b) Give preparation, structure and two properties of oxyacids of phosphorous? (8)
c) Name the acids of sulphur with their formula? (4)
d) 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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