KENDRIYA VIDYALAY SANGATHAN

SAMPLE PAPER- 1

Class XI- CHEMISTRY

1. Write the electronic configuration of
   Cu^{2+} (29) , Cr^{3+} (24).

2. What is the basic difference between Modern Periodic Law and Mendeleev's Periodic Law.

3. State the second law of Thermodynamics.

4. What are the conjugate base of HCN and NH_4^+ ?

5. Why NH_3 has higher boiling point than PH_3 ?

6. What is the full form of BOD and COD ?

7. Which type of isomerism is exhibited by but-1-yne and but-2-yne ?

8. Yellow light emitted from a Sodium lamp has a wave length (λ) of 580 nm . Calculate the frequency and wave no of the yellow light .

9. Critical temperature for carbon dioxide and methane are 31.1° C and 81.9 ° C respectively. Which of these has stronger intermolecular force and why ?

   OR

   Calculate the volume occupied by 8.8 g of CO_2 at 31.1° C and 1 bar pressure .[R=0.083 bar LK^{-1} $Mol\_^{1}$]

10. Using the equation of state PV= nRT . Show that at a given temperature , density of a gas is proportional to gas pressure 'P'.

11. Calculate the standard enthalpy of formation of CH_3OH ( ) from the following data

    $CH_3OH(l) + 3/2\ O_2$ -------→ $CO_2 + 2H_2O$ (l) ΔH = -726 kJ / mol .

    $C(g) + O_2(g)$ ----→ $CO_2(g)$ ΔH = -393 kJ/ mol

    $H_2(g) + ½\ O_2$ (g) -------? H_2O (l) ΔH = - 286 kJ/mol.

    OR

    Calculate the no of kJ of heat necessary to raise the temperature of 60.0 g of Aluminum from 35° C to 55°C - Molar heat capacity of Al is 24 J $mol^{-1}K^{-1}$.

12. Explain why pure liquids and solids can be ignored while writing the equilibrium constant expression

OR

What is KC for the following equilibrium concentration of each substance is

$[SO_2] = 0.60$ M $\quad [O_2] = 0.82$ M $\quad [SO_3] = 1.90$ M

$2SO_2(g) + O_2(g) \Leftrightarrow 2SO_3(g)$

13. Complete the following chemical reactions :

$PbS(s) + H_2O_2(aq)$ ----------→

$CaO(s) + H_2O(g)$ ----------→

$MnO_4^- + H_2O_2$ ----------→

$AlCl_3 + H_2O$ ----------→

14. Explain the following

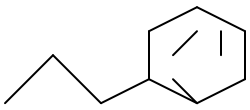
(i) Why the solution of alkali metals in liquid ammonia is blue in colour ?

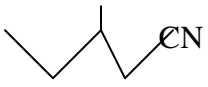
(ii) Why alkali metals and their salts impart characteristics colour to the flame ?

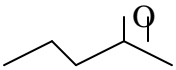
15. Draw a labeled diagram to show the dimeric structure of $AlCl_3$ chloride .State one use of anhydrous $AlCl_3$.

16. Explain why BCl_3 is monomer but BH_3 exists as B_2H_6. ?

17. Gives the IUPAC name of the following compounds

(a) 

(b) 

(c) C 

(d) $Cl_2CHCH_2CH_2OH$

18. Addition of HBr to Propene yields 2-bromopropane , While in the presence of benzoyl peroxide the same reaction yields 1 – bromopropane . Explain and give mechanism.

19. A large number of fish are suddenly found floating dead on a lake . There is no evidence of toxic dumping but you find an abundance of phytoplankton . Suggest a reason for the fish kill.

20. A welding fuel gas contain carbon and hydrogen only . Burning a small sample of it in oxygen give 3.38 g of CO_2 ,.0.690 g of water and no other products . A volume of 10 L of this welding gas is found to weigh 11.6 g calculate (i) empirical formula ii) Molar mass of this gas and iii) molecular formula [At. Wt. Of C = 12 , H=1 , O = 16].

21. (a) An atomic orbital has n = 3 , what are the possible values of l and m .

(b) How many electrons in an atom may have the following quantum numbers .
(a) n = 4 , m = -1/2 (b) n=3 , l = 0

(c) Using s , p , d , f notations describe the orbital with the following number
(a) n = 1 , l = 0 (b) n = 3 , l = 1

22. Give the reasons of the following

(a) Fluorine has less negative electron gain enthalpy than Chlorine .

(b) Noble gases tend to be less reactive .

(c) First ionization enthalpy of Mg is more than that of Na bur second ionization enthalpy of Mg is less than that of Na.

23. (a) What is meant by entropy ?

(b) Calculate the entropy change in surroundings when 1.00 mol of H_2O (l) is formed under standard conditions .

$\triangle fH$ = -286 kJ/mol , melting point of ice is 273 K.

24 (a) What is meant by conjugate acid base pair? Find the conjugated acid/base for the following .
HNO_3 , CN^- , $HclO_4^-$, CO_3^{2-}

(b) Calculate the P^H of resultant mixtures.
10 ml of 0.2 M $Ca(OH)_2$ + 25 ml of 0.1 M HCl.

25. Balance the following redox reaction by ion-electron method .

(a) MnO_4^- (aq) + I^-(aq) ----→ MnO_2(s) + I_2(s)
(in basic medium)

(b) $Cr_2O_7^{2-}$ + SO_2(g) ----------→ Cr^{3+}(aq) + SO_4^{2-}(aq)
(in acidic medium)

26. State as to why

(a) A solution of Na_2CO_3 is alkaline.
(b) Alkali metals are prepared by electrolysis of their fused chlorides ?
(c) Sodium is found to be more useful than potassium .

27. Account for the following :-

(a) Borin forms electron deficient compounds.
(b) $PbCl_4$ is less stable than $SnCl_4$.
(c) What is dry ice ? Why is it so called ?

28. (a) What is meant by hybridization of atomic orbitals ? Describe the shape of sp , sp^2 , sp^3 hybrid orbitals .

(b) What is meant by the term bond order ? Calculate the bond order of N_2, O_2, O_2^+ and O_2^-.

29. (a) Discuss the chemistry of Lassaigne's test and give test for nitrogen . (2)

(b) Why is it necessary to use acetic acid and not H_2SO_4 for acidification of sodium extract for the testing S by Lead acetate test ? (2)

(c) How will you test presence of nitrogen in organic compound ? (1)

30. (a) Complete the following reaction :

(i) Isopropyl bromide $\xrightarrow[\Delta]{\text{Alc KOH}}$ A $\xrightarrow[\text{Peroxide}]{\text{HBr}}$ B

(ii) Acetylene $\xrightarrow{NaNH_2}$ C $\xrightarrow{CH_3CH_2Br}$ D

(b) Explain the following :-

(i) Friedal Craft acylation

(ii) Wurtz's Reaction

(iii) Kolbe's Electrolytic method.

Blue Print

S.No	UNIT No	1 Mark (VSA)	2 Marks (SA-I)	3 Marks (SA –II)	5 Marks (LA)	Total /No. of Question
1.	Some basic concepts	-	-	3(1)	-	3(1)
2.	Structure of Atom	1(1)	2(1)	3(1)	-	6(3)
3.	Classification of elements and periodicity in properties	1(1)	-	3(1)	-	4(2)
4.	Chemical bonding Molecular structure	-	-	-	5(1)	5(1)
5.	States of Matter	-	4(2)	-	-	4(2)
6.	Thermodynamics	1(1)	2(1)	3(1)	-	6(3)
7.	Eqilibrium	1(1)	2(1)	3(1)	-	6(3)
8.	Redox Reaction	-	-	3(1)	-	3(1)
9.	Hydrogen	1(1)	2(1)	-	-	3(2)
10.	S -Block Elements		2(1)	3(1)	-	5(2)
11.	P- Block Elements		4(2)	3(1)	-	7(3)
12.	Organic Chemistry		2(1)	-	5(1)	7(2)
13.	Hydrocarbons	1(1)	2(1)	-	5(1)	8(3)
14.	Environment Chemistry	1(1)	2(1)	-	-	3(2)
		7(7)	24(12)	24(8)	15(3)	70(30)

1 – 7 - 1 Mark

8 – 19 - 2 Marks

20 – 27 - 3 Marks

28 – 30 - 5 Marks