

Directorate of Education
Govt. of NCT of Delhi

Practice Test Material

2015-2016

Subject : Chemistry
Class : XI

Under the guidance of :
Addl. DE (School/Exam)

Prepared by :

- | | | |
|-------------------------|----------|---------------------|
| 1. Mrs. Anita | Lecturer | RPVV, Lajpat Nagar |
| 2. Ajay Chaudhary | Lecturer | RPVV, Civil Lines |
| 3. Deepak K. Rohela | Lecturer | RPVV, SMV |
| 4. Harpat Singh | Lecturer | RPVv, Kishan Ganj |
| 5. Pradip Mundra | Lecturer | RPVV, Paschim Vihar |
| 6. Mukesh Kumar Kaushik | Lecturer | RPVV, Narela |

PRACTICE TEST-1

CLASS: XI

SUBJECT: CHEMISTRY

SOME BASIC CONCEPTS OF CHEMISTRY

Time : 45 minutes

M.M. : 25

One mark questions

1. What is the SI unit of density?
2. Calculate the number of significant figures in 0.00505.
3. Calculate the number of atoms present in 52u of He.
4. If ten volumes of dihydrogen gas reacts with five volumes of dioxygen gas, how many volumes of water vapour will be produced?
5. What is the total number of atoms present in 3 moles of methane?

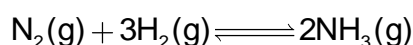
Two marks questions

6. How are 0.50 mol Na₂CO₃ and 0.50M Na₂CO₃ different?
7. How much copper can be obtained from 100g copper sulphate?
8. Determine the molecular formula of an oxide of iron in which the mass percent of iron and oxygen are 69.9 and 30.1 respectively?

Three marks questions

9. The relative abundance of various isotopes of silicon is :
Si(28) = 92.23% Si(29)=4.67% Si(30)=3.10%
What is the average atomic mass of silicon.
10. a) Balance the following equation and answer the questions:
$$\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$$

b) How many grams of HCl are required to react with 5.0g of MnO₂. 2
(Given mol. Wt. of MnO₂ = 84u; HCl = 36.5u)
11. N₂ and H₂ react with each other to produce NH₃ according to the following chemical equation



- a) Calculate the mass of NH₃ produced if 2.0×10³g N₂ reacts with 1.0×10³g of H₂.
- b) Will any of the two reactants remain unreacted? If yes, which one and what would be its mass?

Five marks questions

12. a) A welding gas contains carbon and hydrogen only. Burning a small sample of it in oxygen gives 3.38g carbon dioxide, 0.690g of water and no other products. A volume of 10.0L (measured at STP) of this welding gas is found to weigh 11.6g. Calculate :
- (i) empirical formula 2
- (ii) molar mass of the gas $\frac{1}{2}$
- (iii) molecular formula $\frac{1}{2}$
- b) The density of 3M solution of NaCl is 1.25gml^{-1} calculate molality of the solution.

PRACTICE TEST-2

CLASS: XI

SUBJECT: CHEMISTRY

STRUCTURAL ATOM

Time : 45 minutes

M.M. : 25

1. Draw the structure of dz^2 orbital. 1
2. Write the electronic configuration of Fe^{2+} (At.No. 26) 1
3. Which quantum number determines the orientation of atomic orbital? 1
4. Which of the following orbitals are possible:
1p, 2s, 2p & 3f 1
5. What is the lowest value of n that allows g orbital to exist. 1
6. Show that the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de Broglie wavelength associated with the electron revolving around the orbit. 2
7. a) Write the values of all the four quantum numbers of 19th electron of copper (At.No. 29)
b) Using s, p, d, notations, describe the orbital with the following quantum numbers:
(i) $n = 1, \ell = 0$ (ii) $n = 4, \ell = 2$
8. Calculate the mass photon with wavelength 3.6\AA . 2
9. The energy associated with the first orbit in the hydrogen atom is $-2.18 \times 10^{-18} \text{ J atom}^{-1}$.
a) What is the energy associated with the fifth orbit for H-atom?
b) What is the energy associated with the third orbit for Li^{2+} ion?
c) Calculate the radius of Bohr's fifth orbit for H-atom. 3
10. State Heisenberg's uncertainty principle. On the basis of uncertainty principle show that an e^- cannot exist within atomic nucleus. 3

OR

Arrange the following type of radiations in increasing order of frequency (a) radiation from microwave oven (b) amber light from traffic signal (c) radiation from F.M. radio.

11. What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition $n=4$ to $n=2$ of He^+ spectrum? 3
12. a) Write the Schrodinger wave equation

- b) Number of radial nodes in 2p orbital
- c) Calculate the total number of electrons present in 1 mol of methane
- d) How many subshells are associated with $n=4$.
- e) How many electrons will be present in the sub-shells having m_s value of $-1/2$ for $n=4$?

OR

- a) "Exactly half filled and fully filled orbitals are more stable". Why?
- b) The work function for Cs atom is 1.9eV. Calculate
 - i) the threshold frequency
 - ii) the threshold wavelength

If the Cs elements is irradiated with $\lambda=500\text{nm}$, calculate the K.E. and velocity of ejected e^- .

PRACTICE TEST-3

CLASS: XI

SUBJECT: CHEMISTRY

CLASSIFICATION OF ELEMENTS

Time : 45 minutes

M.M. : 25

One mark questions

1. Write symbol and name of element with atomic number 118.
2. Predict group number and period number for element with atomic number 48.
3. Arrange in decreasing size: Mg^{2+} , Al^{3+} and Na^+
4. Write the general electronic configuration of d-block elements.
5. What are super heavy elements?

OR

What is the basic theme of organisation in periodic table.

Two marks questions

6. The formation of $F_{(g)}^-$ from $F_{(g)}$ is exothermic whereas that of $O_{(g)}^{2-}$ from $O_{(g)}$ is endothermic. Explain.
7. Predict the formula of stable binary compounds that would be formed by combination of following pair of elements
(i) Mg & N (ii) Al & I
8. Explain properties of d-block elements.

Three marks questions

9. Account for the following :
 - a) First ionisation enthalpy of nitrogen is higher than oxygen
 - b) Electron gain enthalpy of fluorine is less negative than chlorine
 - c) First ionisation enthalpy of Gallium is higher than aluminium
10. How do atomic radii vary in a period? Why?
11. The increasing order of reactivity among group 1 elements is $Li < Na < K < Rb < Cs$ whereas that among group 17 elements is $F > Cl > Br > I$. Explain.

Five marks questions

12. a)
 - (i) What are isoelectronic species? Give example.
 - (ii) Out of Na and Mg which has higher 2nd ionisation enthalpy and why?
 - (iii) Define Newland law of Octaves & give example.
- b) Electron gain enthalpy of Be and Mg are positive. Why?

PRACTICE TEST-4

CLASS: XI

SUBJECT: CHEMISTRY

CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

Time : 45 minutes

M.M. : 25

One mark questions

1. Which two elements among Al, Si, Ba and O belong to same period?
2. Write the general electronic configuration of d-block elements.
3. Arrange in decreasing size : Mg^{2+} , Al^{3+} , Na^+
4. Show with the help of chemical reaction that Na_2O is a basic oxides.
5. Al atom loses e^- successively to form Al^+ , Al^{2+} , Al^{3+} ions, which step will have highest ionisation enthalpy?

OR

Out of Na and Mg, which has a higher 2nd ionisation enthalpy and why?

Two marks questions

6. Why are e^- gain enthalpy of Be and Mg are positive? The formation of $F_{(g)}^-$ from $F_{(g)}$ is exothermic.
7. Whereas that of $O_{(g)}^{2-}$ from $O_{(g)}$ is enthothermic. Explain.
8. Ne and Na^+ are isoelectronic species. Do they have same ionisation enthalpies also?

Three marks questions

9. Would you regard Zn ($z=30$), Cd($z=48$) and Hg($z=80$) as s-block elements. Give reasons.
10. What are the various factors due to which the ionisation enthalpies of the main group elements tends to decrease down the group?
11. The increasing order of reactivity among group 1 elements is $Li < Na < K < Rb < Cs$ whereas that among group 17 elements is $F > Cl > Br > I$. Explain.

Five marks questions

12. Predict the formula of stable binary compounds that would be formed by the combination of following pairs of elements.
(a) Li and O (b) Mg and N (c) Al and Iodine (d) Element At.No. 71 and F
(e) P and F

PRACTICE TEST-5
CLASS: XI
SUBJECT: CHEMISTRY
CHEMICAL BINDING

Time : 45 minutes

M.M. : 25

1. Write Lewis dot structure of BeF_2 and NO_2 . 1
2. Write the resonance structures of CO_3^{2-} molecule. 1
3. He_2 molecule does not exist. Give reason. 1
4. Arrange the following molecules according to the increasing order of their bond angles. 1
 $\text{NH}_3, \text{H}_2\text{O}, \text{CH}_4$
5. Out of MgO and NaCl which has higher lattice enthalpy and why? 1
6. What is formal charge? Calculate the formal charge on each atom in SO_2 molecule? 2
7. Identify the hybridization of central atom in NH_3 and NH_4^+ . Which of these has higher bond angle and why? 2
8. Define H-bond. Give example of species having intermolecular H-bonding and species having intra-molecular H-bonding. 2
9. Draw the shapes of following molecules using VSEPR theory : 1x3=3
(a) ClF_3 (b) XeOF_4 (c) SF_4
10. a) Write the molecular orbital configuration of N_2^+ and N_2^- . 1x3=3
b) Calculate their bond orders
c) Write their magnetic behaviour.
11. a) Out of σ and π bonds which is more stable and why? 1
b) The enthalpy needed to break two O-H bonds in water are as follows:
i) $\text{H}_2\text{O}_{(g)} \rightarrow \text{H}_{(g)} + \text{OH}_{(g)} \quad \Delta_a H_1^0 = 502\text{KJ/mol}$
ii) $\text{OH}_{(g)} \rightarrow \text{H}_{(g)} + \text{O}_{(g)} \quad \Delta_a H_2^0 = 427\text{KJ/mol}$
What is the average bond enthalpy of H_2O ? 1
c) Considering x-axis as the internuclear axis, which out of the following pairs of orbitals will form a sigma bond
(i) 1s and 2s (ii) 1s and 2py (iii) 2py and 2py 1

12. Give reasons for the following :

- a) BF_3 has zero dipole moment
- b) All the bonds in PCl_5 molecule are not equal
- c) HCl is more volatile than HF .
- d) The bond angle in H_2O molecule is more than the bond angle in H_2S .
- e) The nitrogen-oxygen bond length in nitrate ion is in between N-O single bond and N=O double bond length. 1x5=5

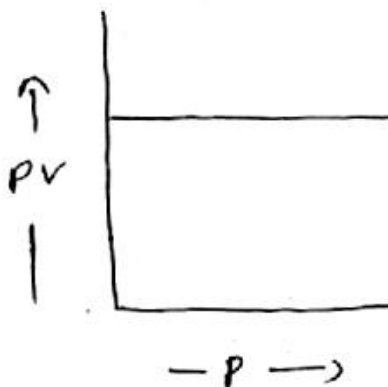
PRACTICE TEST-6
CLASS: XI
SUBJECT: CHEMISTRY
STATES OF MATTER

Time : 45 minutes

M.M. : 25

One mark questions

1. Write mathematical forms of Boyle's law and Charle's law.
2. Write Vanderwaal's gas equation for n moles of real gas.
3. What is significance of 'a' & 'b' in Vanderwaal's gas equation?
4. At a particular temperature, why is vapour pressure of acetone is less than that of ether?
5. The given graphical plot verify which law?



Two marks questions

6. Explain, why do gases deviate from ideal behaviour.
7. If volume, mass and temperature of two gases H_2 and O_2 kept in separate vessels are same, in which vessel the pressure will be greater and how many times?
8. The density of a gas is 3.80g/l at STP. Calculate its density at 27°C and 700 torr pressure.

Three marks questions

9. A neon-dioxygen mixture containing 70.6g dioxygen and 167.5g neon. If pressure of the mixture of gases in the cylinder is 25 bar. What is the partial pressure of dioxygen and Ne in the mixture?
10. State and explain Dalton's law of partial pressure. What are its applications?
11. What is kinetic gas equation? Deduce (i) Boyle's law (ii) Charle's law from kinetic gas equation.

OR

Write postulates of Kinetic molecular theory of gases?

Five mark questions

12. a) A sample of N_2 gas at $18^\circ C$ and 760mm of Hg has a volume of 2.67 ml.
What is the volume at STP? 2
- b) Assign reason for the following :
- i. The surface of a liquid behaves a stretched membrane.
 - ii. Cooling is always caused during evaporation.
 - iii. V.P. of a liquid increase on increasing the temperature. 3

PRACTICE TEST-7
CLASS: XI
SUBJECT: CHEMISTRY
THERMODYNAMICS

Time : 45 minutes

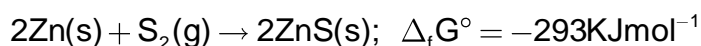
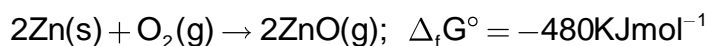
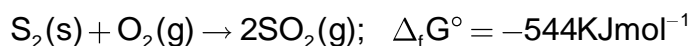
M.M. : 25

One mark questions

1. Define standard Molar enthalpy of formation.
2. State Hess's Law.
3. Why does a mole of water at 0°C have greater entropy than that of 1 mole of ice at 0°C?
4. What is meant by free energy?
5. Write one applications of Born-Haber cycle.

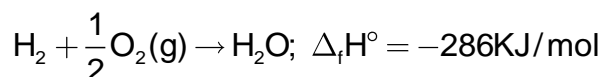
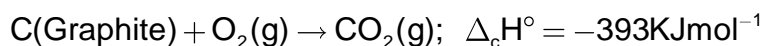
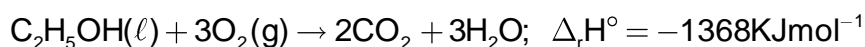
Two marks questions

6. On the basis of following $\Delta_f G^\circ$ values at 1073K.

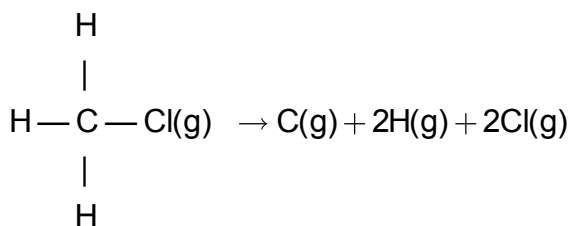


Show that roasting of zinc sulphide to form ZnO is a spontaneous process.

7. Calculate the standard enthalpy of formation of C_2H_5OH from the following data:



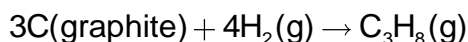
8. Calculate the $\Delta_r H^\circ$ for the reaction :



The average bond energies of C-H bond and C-Cl bond are 414.0 KJ/mol and 326.0 KJ/mol resp.

Three marks questions

9. Calculate the standard Gibb's energy change for the formation of propane at 298K.

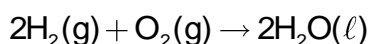


$\Delta_f H^\circ$ for propane ($\text{C}_3\text{H}_8(\text{g})$) is = 103.8KJ/mol

Given values of Entropy :

$S_m^\circ \text{C}_3\text{H}_8(\text{g}) = 270.2 \text{ JK}^{-1} \text{ mol}^{-1}$, $S_m^\circ \text{C}(\text{graphite}) = 5.70 \text{ JK}^{-1} \text{ mol}^{-1}$ &
 $S_m^\circ \text{H}_2(\text{g}) = 130.7 \text{ JK}^{-1} \text{ mol}^{-1}$.

10. For the reaction :



$\Delta V^\circ = -25\text{KJ}$ and $\Delta S^\circ = -80\text{JK}^{-1}$

Calculate ΔG° for the reaction and predict whether the reaction may occur spontaneously.

11. Calculate Lattice energy for MgCl_2 from the given information :

$\Delta_{\text{sub}} H^\circ$ for Mg = +210KJ/mol

$\Delta_{\text{i.e.}} H^\circ$ for $\text{Mg}^{2+} = +2187\text{KJ/mol}$

$\Delta_{\text{bond}} H^\circ$ for $\text{Cl}_2 = +242\text{KJ/mol}$

$\Delta_{\text{eg}} H^\circ$ for Cl = -348.6KJ/mol

$\Delta_f H^\circ$ for $\text{Mg}(\text{s}) + \text{Cl}_2(\text{g}) \rightarrow \text{MgCl}_2(\text{s})$

$\Delta_f H^\circ = -800\text{KJ/mol}$

Five mark questions

12. a) Derive the relationship between C_p & C_v for an ideal gas.
b) Deceive $\Delta G = -T\Delta S_{\text{total}}$
c) Comment: Reaction with $\Delta_r G^\circ < 0$ always have an equilibrium constant grater than 1.

PRACTICE TEST-8
CLASS: XI
SUBJECT: CHEMISTRY
THERMODYNAMICS

Time : 45 minutes

M.M. : 25

1. How does the internal energy of the system changes when electrical or mechanical work is done on an adiabatic system. 1
2. For an isolated system $\Delta U=0$, what will be ΔS ? 1
3. Given $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3$ $\Delta_r H^\circ = -92.4 \text{KJ/mol}^{-1}$. What is the standard enthalpy of formation of ammonia? 1
4. Which of the following is not a state function and why? 1
Heat and Enthalpy
5. Give an example of reaction for which $\Delta H = \Delta U$. 1
6. Differentiate between the following :
 - a) Extensive and intensive properties
 - b) Sublimation energy and enthalpy of atomisation 1x2=2
7. All spontaneous reactions follow the criteria $\Delta S_{\text{total}} = \Delta S_{\text{sys}} + \Delta S_{\text{surr}} > 0$
Starting from this relation, how can we derive a relationship between ΔG and spontaneity. 2
8. Under what conditions the following reactions occur spontaneously:
 - a) Both ΔH and ΔS are negative for the reaction
 - b) Both ΔH and ΔS are positive for the reaction 1x2=2
9. Give reasons for the following:
 - a) The enthalpy of neutralisation is less than 57.1KJ/mol when a weak acid reacts with a weak base.
 - b) When an ideal gas expands in vacuum there is neither absorption nor evolution of heat but when a real gas expands cooling is observed.
 - c) Although dissolution of NaCl in water is endothermic but it readily dissolves. 1x3=3
10. Calculate the lattice enthalpy of $MgBr_2$. Given:
 - i) Enthalpy of formation of $MgBr_2 = 524 \text{KJ mol}^{-1}$
 - ii) Sublimation enthalpy of Mg = 148KJ mol^{-1}
 - iii) Ionization enthalpy of Mg = 2187KJ mol^{-1}
 - iv) Vapourisation enthalpy of $Br_2(l) = 31 \text{KJ mol}^{-1}$

- v) Dissociation enthalpy of $\text{Br}_2(\text{g}) = 193 \text{ KJ mol}^{-1}$
- vi) Electron gain enthalpy of $\text{Br}(\text{g}) = 331 \text{ KJ mol}^{-1}$ 3
11. a) Define bond enthalpy. 1
- b) Calculate bond enthalpy of HCl if bond enthalpy of H–H bond is 436 KJ mol^{-1} , Cl–Cl B.E. is 242 KJ mol^{-1} and heat of formation of HCl is 92.5 KJ mol^{-1} . 2
12. a) Predict the sign of ΔS for the following changes:
- i) $2\text{A}(\text{g}) + \text{B}(\text{g}) \rightarrow 2\text{C}(\text{g})$
- ii) $2\text{CaCO}_3(\text{s}) \rightarrow 2\text{CaO}(\text{s}) + 2\text{CO}_2(\text{g})$ 1x2=2
- b) Calculate the standard enthalpy of formation of $\text{CH}_3\text{OH}(\ell)$ from the following data: 3
- $\text{CH}_3\text{OH}(\ell) + \frac{3}{2}\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\ell) \quad \Delta_r H^\circ = -726 \text{ KJ mol}^{-1}$
- $\text{C}(\text{graphite}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) \quad \Delta_r H^\circ = -393 \text{ KJ mol}^{-1}$
- $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\ell) \quad \Delta_r H^\circ = -286 \text{ KJ mol}^{-1}$

PRACTICE TEST-9
CLASS: XI
SUBJECT: CHEMISTRY
EQUILIBRIUM

Time : 45 minutes

M.M. : 25

1. $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$
Write the relationship between K_p and K_c for the given reaction. 1
2. Why does a catalyst not affect the magnitude of equilibrium constant? 1
3. Write the expression of K_{sp} for Ag_2CrO_4 . 1
4. Arrange the following compounds in the increasing order of acidic character.
 HF , H_2O , CH_4 and NH_3 1
5. Why a solution of NH_4Cl in water shows pH less than 7? 1
6. Calculate the pH of 1.0×10^{-8} M solution of HCl . 2
7. a) Consider the following transformations :
 $\text{A} \rightleftharpoons \text{B} \quad K_1 = 1$
 $\text{B} \rightleftharpoons \text{C} \quad K_2 = 2$
 $\text{C} \rightleftharpoons \text{D} \quad K_3 = 3$
Calculate the value of K for $\text{A} \rightleftharpoons \text{D}$. 1
- b) Predict the direction of reaction when $O_c > K_c$. 1
8. Assign reasons for the following :
 - a) Pure NaCl precipitates out when $\text{HCl}(\text{g})$ is passed in brine solution.
 - b) In qualitative analysis NH_4Cl is added before adding NH_4OH for testing Fe^{3+} or Al^{3+} ions.
9. Consider the reaction :
 $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g}) \quad \Delta_r H^\circ = -190\text{KJ/mol}$
Indicate the direction in which equilibrium will move when :
 - a) temperature is increased
 - b) pressure is decreased
 - c) an inert gas is added at constant volume. 1x3=3
10. a) Which of the following will act as lewis acid? H_2O , BF_3 and H^+ .

- b) K_b for NH_4OH and CH_3NH_2 are 1.8×10^{-5} , 4.4×10^{-4} respectively. Which of them is stronger base and why?
- c) Write the conjugate acid and conjugate base of H_2O . 1x3=3
11. The solubility of $\text{Sr}(\text{OH})_2$ at 298K is 19.23g/L of solution. Calculate the molar concentrations of strontium and hydroxyl ions and the pH of solution. [Molar mass of $\text{Sr}(\text{OH})_2 = 121.67 \text{ g/mol}$]
12. a) The following reaction takes place in the blast furnace during the extraction of iron from hematite ore
- $$\text{FeO}(\text{s}) + \text{CO}(\text{g}) \rightleftharpoons \text{Fe}(\text{s}) + \text{CO}_2(\text{g}) \quad K_p = 0.265 \text{ atm at } 1050\text{K}$$
- Calculate the equilibrium partial pressure of CO and CO_2 at 1050K.
- b) Calculate the pH of 0.10M ammonia solution. Calculate the pH after 50.0 ml of this solution is treated with 25.0 ml of 0.10M HCl. The dissociation constant of ammonia (K_b) is 1.77×10^{-5} .
- Hint – In the final condition, basic buffer is formed due to the presence of NH_4Cl and NH_4OH in the same solution.

PRACTICE TEST-10
CLASS: XI
SUBJECT: CHEMISTRY
REDOX REACTIONS

Time : 45 minutes

M.M. : 25

1. Calculate the oxidation number of chromium and nitrogen in $\text{Cr}_2\text{O}_7^{2-}$ and NO_3^- . 1
2. Identify the strongest and the weakest reducing agent from the following metals: 1

Zn, Cu, Ag, Na and Sn.
3. What is the change in oxidation number of iron in the following reaction: 1
$$\text{Fe}(\text{CN})_6^{4-} \rightarrow \text{Fe}(\text{CN})_6^{3-}$$
4. Identify the species oxidized and reduced in the following reaction: 1
$$2\text{Cu}_2\text{O}(\text{s}) + \text{Cu}_2\text{S}(\text{s}) \rightarrow 6\text{Cu}(\text{s}) + \text{SO}_2(\text{g})$$
5. Four metals A, B, C and D have their standard reduction potential values equal to + 0.80; -0.76, -0.12 and +0.34V respectively. Arrange them in decreasing order of their electropositive character. 1
6. a) What is standard hydrogen electrode. 1
b) How can you determine the electrode potential of Zn electrode with the help of SHE? Explain by writing the formula. 1
7. Standard reduction potential of F_2 , Cl_2 , Br_2 and I_2 is given below:
$$E_{\text{F}_2/\text{F}^-}^0 = +2.87\text{V} \quad E_{\text{Cl}_2/\text{Cl}^-}^0 = +1.36\text{V} \quad E_{\text{Br}_2/\text{Br}^-}^0 = 1.09\text{V} \quad E_{\text{I}_2/\text{I}^-}^0 = 0.54\text{V}$$
 - a) Which one of the halogens is best oxidant and why?
 - b) Among HI, HBr, HCl and HF which one is best reducing agent and why? 1x2=2
8. Balance the following equation by half reaction method : 2
$$\text{P}_4(\text{s}) + \text{OH}^-(\text{aq}) \rightarrow \text{PH}_3 + \text{H}_2\text{PO}_2^-(\text{aq})$$
9. Write one example of each of following type of redox reaction:
 - a) Decomposition reaction
 - b) Metal displacement reaction
 - c) Disproportionation reaction 1x3=3

10. Write the balanced ionic equation for the reaction of potassium dichromate with sodium sulphite to give Cr(III) and sulphate ions. 3
11. Account for the following :
- a) H_2O_2 can act as oxidising as well as reducing agent but O_3 has only oxidising property.
 - b) On adding conc. H_2SO_4 to NaCl(s) , HCl gas is produced but $\text{Br}_2(\text{g})$ and not HBr(g) is obtained when conc. H_2SO_4 is added to NaBr(s) .
 - c) ClO_4^- does not show disproportionation reaction. 1x3=3
12. a) What is the importance of salt bridge in an electrochemical cell.
- b) Write the cell reaction taking place in Daniel cell.
- c) Which electrode is negatively charged?
- d) Name the carriers of current in the cell?
- e) What is the direction of flow of electrons when external voltage greater than 1.1V is applied. 1x5=5

PRACTICE TEST-11
CLASS: XI
SUBJECT: CHEMISTRY
HYDROGEN

Time : 45 minutes

M.M. : 25

Very short answer type questions:

1. Explain why H_2O_2 cannot be stored for prolonged periods?
2. What is the use of Hydrogen in manufacture of Vanaspati Ghee?
3. Give two examples of interstitial hydrides.
4. Give an example of reaction in which H_2 act as oxidising agent.
5. Name one metal which liberate H_2 when treated with NaOH .

Short answer type questions:

6. Show how H_2O_2 functions both as reducing and as an oxidising agent.
7. H_2O_2 is used to restore the colour of old paintings containing lead sulphide. Write balanced equation for the reaction that takes place in this process.
8. Among NH_3 , H_2O and HF , which would you expect to have highest magnitude of hydrogen bonding & why?

Short answer type questions:

9. a) What is the difference between 'Hydration' and 'hydrolysis'?
b) Why is the ice lighter than water?
10. What do you understand by the terms:
(i) Hydrogen economy (ii) Water-gas shift reaction (iii) 'Syn Gas'
11. a) What is 'Heavy Water'?
b) Complete the following reactions:
(i) $\text{CaC}_2 + \text{D}_2\text{O} \rightarrow$ (ii) $\text{SO}_3 + \text{D}_2\text{O} \rightarrow$

Long answer type questions

12. a) What happens when :
i) FeSO_4 is treated with acidified hydrogen peroxide
ii) Acidified KMnO_4 reacts with H_2O_2
b) Discuss the principle and method of softening of hard water by synthetic ion-exchange resins.

PRACTICE TEST-12
CLASS: XI
SUBJECT: CHEMISTRY
S-BLOCK ELEMENTS

Time : 45 minutes

M.M. : 25

Very short answer type questions:

1. Why are alkali metals strong reducing agents?
2. Why are alkali metals used in photoelectric cells?
3. Why is second ionisation enthalpy of alkali metals higher than alkaline earth metals?
4. What happens when KO_2 reacts with water? Give balanced chemical equation.
5. Why is BeCl_2 soluble in organic solvent?

Short answer type questions:

6. What is responsible for the blue colour of solution of alkali metals in liquid ammonia? Give chemical equation also.
7. Heat of hydration of Na^+ (size 102pm) = -397 KJ/mol^{-1} whereas Ca^{2+} (size 100pm) = $-1650 \text{ KJ mol}^{-1}$. Explain the difference.
8. Complete the following :
(i) $\text{LiNO}_3 \xrightarrow{\Delta}$ (ii) $\text{Li} + \text{N}_2 \longrightarrow$

Short answer type questions:

9. Why does BeCl_2 get polymerical? Draw the structure of (i) BeCl_2 (vapour), (ii) BeCl_2 (solid)
10. a) Heating effect on LiNO_3 and NaNO_3 write reactions
b) Why are lithium salts commonly hydrated and those of other alkali ions usually anhydrous? (1+2)
11. Give reasons :
a) LiF is almost insoluble in water whereas LiCl soluble in water
b) Al cannot be used for storing NaOH
c) Strontium imparts colour to the flame while beryllium does not.

Long answer type questions

12. a) What happens when :
i) Sodium metal dropped in water
ii) Sodium metal is heated in free supply of air
b) How would you explain the following observations:
i) BeO is almost insoluble but BeSO_4 is soluble in water
ii) LiI is more soluble than KI in ethanol.
iii) What is the composition of cement?

PRACTICE TEST-13
CLASS: XI
SUBJECT: CHEMISTRY
S-BLOCK ELEMENTS

Time : 45 minutes

M.M. : 25

1. Why group two elements are harder and denser than group 1 elements?
2. What is quick lime? How is it prepared?
3. Which of the alkali metal is having least melting point?
(a) Rb (b) Cs (c) Li (d) Na
4. Which one of the alkaline earth metal carbonates is thermally most stable:
(a) MgCO_3 (b) SrCO_3 (c) CaCO_3 (d) BaCO_3
5. Why CaO has high melting point?
6. Describe in brief the manufacture of caustic soda using Cartner-Kellnar & cell.
7. What happens when exhaling is made through a tube passing in lime water? What will happen if continued exhaling is made through it? If the solution thus obtained is heated, what do we observe? Explain giving chemical reaction.
8. Discuss the diagonal relationship of Be and Al with regards to :
 - i. action of alkali
 - ii. the structure of their chloride
9.
 - a) K_2CO_3 cannot be prepared by solvay process, why?
 - b) How will you prepare NaHCO_3 from NaCl ?
10.
 - a) Explain the biological importance of :
(i) Na (ii) K (iii) Mg (iv) Ca elements
 - b) Why do Gypsum is added to cement?
11. Compute the following reaction :
 - a) $\text{CaO} + \text{H}_2\text{O} \rightarrow$
 - b) $\text{Ca}_3\text{N}_2 + \text{H}_2\text{O} \rightarrow$
 - c) $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow$
12.
 - a) State as to why :
 - i) A solution of Na_2CO_3 is alkaline?
 - ii) Alkali metals are prepared by electrolysis of their fused chlorides
 - iii) Lithium is the only alkali metal to form nitrides.
 - b)
 - i) Which is more basic – NaOH or KOH & why?
 - ii) Which is more reducing – Li and Na, why?

PRACTICE TEST-14
CLASS: XI
SUBJECT: CHEMISTRY
P-BLOCK ELEMENTS

Time : 45 minutes

M.M. : 25

Very short answer type questions

1. Why does boron not form B^{3+} ion?
2. Complete the following :
$$Na_2B_4O_7 \xrightarrow{\text{heat}}$$
3. What property of anhydrous $AlCl_3$ makes it a very good preparative reagent in organic chemistry?
4. CO_2 is gas while SiO_2 is solid at room temperature. State a reason for this.
5. Arrange the following in increasing order of Lewis acid character :
 BF_3 , BCl_3 , BBr_3 and BI_3

Short answer type questions

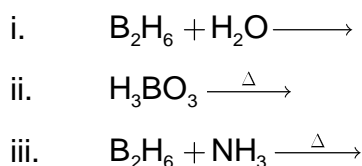
6. Is boric acid a protic acid? Explain.
7. Explain the following reactions:
 - a) Silicon is heated with methyl chloride at high temperature in presence of copper
 - b) Hydrated alumina is treated with aqueous NaOH solution
8. How would you explain the lower atomic radius of Ga as compared to Al?

Short answer type questions

9. Give reason :
 - a) BF_3 is weaker Lewis acid than BCl_3
 - b) BCl_3 exists but BH_3 does not
 - c) $PbCl_4$ is good oxidising agent
10. A certain salt 'X', gives the following results:
 - i. Its aqueous solution is alkaline to litmus
 - ii. It swells up to a glassy material 'Y' on heating
 - iii. When conc. H_2SO_4 is added to a hot solution of 'X', white crystals of an acid 'Z' separate out.

Write equations for all the above reactions and identify 'X', 'Y' and 'Z'.

11. Write balanced equations for :



Long answer type questions:

12.
 - a) Write the structure of diborane and explain the nature of bonding in it.
 - b) Explain why BCl_3 is monomer but anhydrous $AlCl_3$ has dimeric structure.

PRACTICE TEST-15

CLASS: XI

SUBJECT: CHEMISTRY

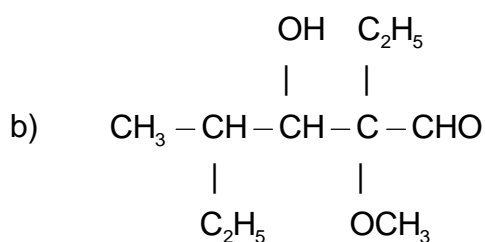
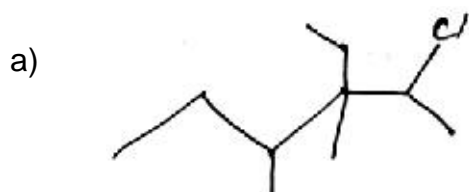
SOME BASIC CONCEPT IN ORGANIC CHEMISTRY & TECHNIQUES

Time : 45 minutes

M.M. : 25

One mark questions

1. Write IUPAC name of :

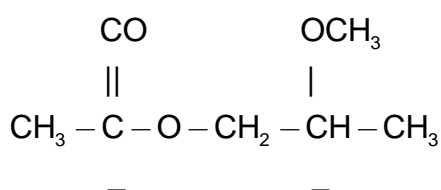


2. Write bond line structure for :

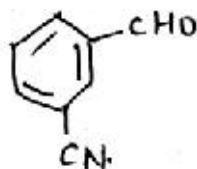
a) Neopentyl alcohol

b) t-Butyl ethyl ether

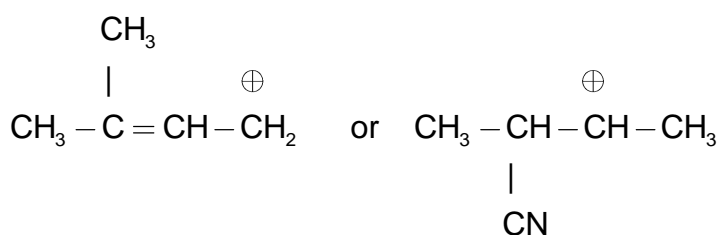
3. Write hybridization of underlined carbon atoms:



4. Find number of σ & π bond in following molecules:



5. Which is more stable and why:

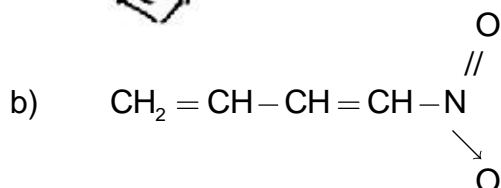
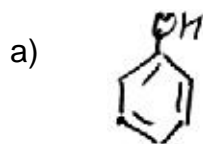


Two marks questions

6. Write four differences between σ & π bonds.

7. Write short notes on :

- a) Inductive effect &
 b) Hyper conjugation effect
8. Write resonance structures for



Three marks questions

9. Write structural formula of :
- a) P-nitro aniline
 b) 2,3-Dibromo-1-Phenyl pentane
 c) 4-Ethyl-1-fluoro-2-nitro benzene
10. Write isomers as per given instructions
- a) $\text{C}_4\text{H}_8\text{O}$ (all possible functional isomers)
 b) C_6H_{14} (structural isomers)
 c) $\text{C}_4\text{H}_{10}\text{O}$ (metamers)
11. a) Giving justification, categorise the following molecules/ion as nucleophile or electrophile:
- $\text{HS}^-, \text{BF}_3, \text{C}_2\text{H}_5\text{O}^\ominus, (\text{CH}_3)_2\text{NH}, \text{Cl}^+, \text{CH}_3\text{C}^+ = \text{O}, \text{NH}_2^\ominus, \text{NO}_2^\oplus$ (2)
- b) Classify the following rxn in one of the rxn type studied in this unit
- i) $(\text{CH}_3)_2\text{C} = \text{CH}_2 + \text{HCl} \rightarrow (\text{CH}_3)_2\text{C}(\text{Cl}) - \text{CH}_3$
- ii) $\text{CH}_3\text{CH}_2 - \text{Br} + \text{OH}^- \rightarrow \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O} + \text{Br}^-$ (1)

Five mark questions:

12. i) Explain why an organic liquid vaporizes at a temperature below its boiling points in its steam distillation. 1
- ii) Why is nitric acid added to sodium extract before adding silver nitrate for testing halogen? 1
- iii) What is the role of heated copper gauge during estimation of nitrogen in Dumas method? 1
- iv) A sample of 0.5g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50ml of 0.5M H_2SO_4 . The residual acid required 60ml of 0.5M NaOH for neutralisation. Find the percentage comparison of nitrogen in the organic compound.

PRACTICE TEST-16
CLASS: XI
SUBJECT: CHEMISTRY
HYDROCARBONS

Time : 45 minutes

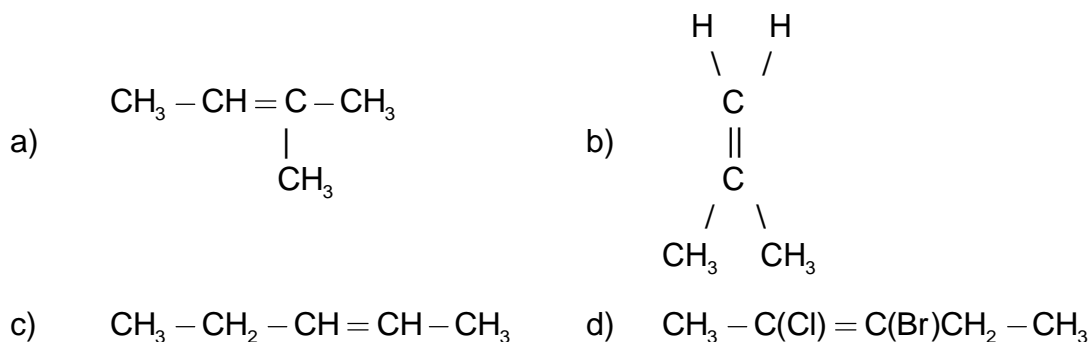
M.M. : 25

One mark questions

- Write IUPAC name of following compounds :
 - $(\text{CH}_3)_2 \text{C}(\text{C}_2\text{H}_5)_2$
 - Tetra-tert-butyl on ethane
- Explain wurtz rxn with a suitable example.
- Write products of Kolbe's reductive electrolysis of 2-methyl sodium propanoate.
- Name the compound which will give propane on heating with soda lime.
- Write Saytzeff's rule and explain with an example.

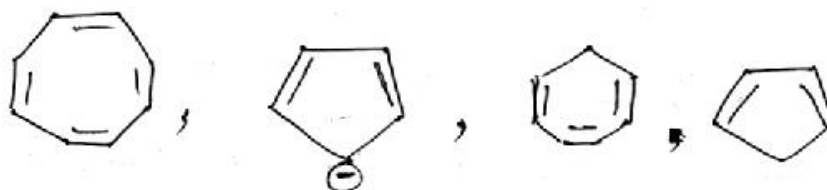
Two marks questions



- Complete the following rxn
 - $\text{C}_6\text{H}_{14} \xrightarrow[773\text{K}, 10-20\text{ohm}]{\text{V}_2\text{O}_5} ?$
 - $$\text{CH}_3 - \text{CH} = \underset{\begin{array}{c} | \\ \text{CH}_3 \end{array}}{\text{C}} - \text{CH}_2 - \text{CH}_3 \xrightarrow[\text{(ii) Zn+H}_2\text{O}]{\text{(i) O}_3}$$
- Draw Newman and sawhorse projection for ethane.
- Which one of the following molecules will show as cis and trans isomerism:



Three marks questions

9. a) Which one of the following compound will be aromatic: 1



- b) Explain Markonikov's rule with a suitable example. 2
- c) Arrange according to increasing acidic character
 $\text{CH}_3 - \text{C} \equiv \text{CH}$, , , CH_4

10. Carryout following conversions:

- a) Ethyne to But-1-yne
- b) Benzene to acetophenone
- c) Benzene to meta nitrotoluene

11. Explain following rxns with suitable chemical reaction:

- a) Friedel craft's alkylation
- b) Ozonolysis
- c) Peroxide effect

Five marks questions:

12. a) What effect does branching of an alkane chain has on its boiling point? 2
- b) Explain formation of ethane during halogenation of methane. 2
- c) Arrange the following compounds in order of their decreasing reactivity with an electrophill (E^+).
 (i) Toluene (ii) p - $\text{CH}_3 - \text{C}_6\text{H}_4 - \text{NO}_2$ (iii) P-Dinitrobenzene 1

PRACTICE TEST-17
CLASS: XI
SUBJECT: CHEMISTRY
ENVIRONMENTAL CHEMISTRY

Time : 45 minutes

M.M. : 25

1. Define pollutant.
2. What is acid rain?
3. How is ozone formed in the atmosphere?
4. Name two greenhouse gases.
5. Define Eutrophication.
6. Explain primary and secondary air pollutants with suitable example.
7. Why is the use of chlorofluoro carbon being discouraged? Explain.
8. Why is acid rain considered a threat to Taj Mahal?
9. "Oxygen plays a key role in the troposphere while ozone in the stratosphere". Explain.
10. Why is CO a potentially dangerous air pollutant?
11.
 - a) Differentiate the term of photochemical smog and classical smog.
 - b) Write down the reactions involved during the formation of photochemical smog.
12. Write a short note on :
 - a) BOD
 - b) Pesticides and Herbicides
 - c) Green Chemistry