

KENDRIYA VIDYAKLAYA SANGATHAN
SAMPLE PAPER -4
CLASS – XI

Time : 3 hrs.

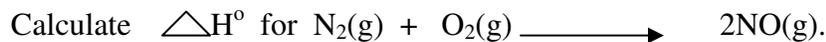
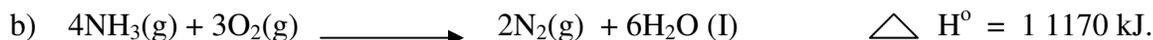
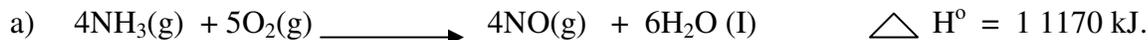
M.Marks : 70

- 01) Calculate the Normality of a 0.3M solution of phosphoric acid. (1)
- 02) Give the electronic configuration for Fe^{3+} ion. Atomic number of Fe is 26. (1)
- 03) What is the cause of acid rain ? (1)
- 04) Define pH. (1)
- 05) Arrange NaH, MgH_2 and H_2O in order of increasing reducing property. (2)
- 06) a) Give the IUPAC for .
i) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CO} - \text{COOH}$.
ii) $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{OH}$
- b) State Charles' law.
- 07) a) Name two methods to control water pollution. (02)
b) A chemist wishes to prepare 6.023×10^{24} molecules of SO_2 according to the reaction.
$$\text{S} + \text{O}_2 \longrightarrow \text{SO}_2$$

How many grams of 'S' would be needed ?
- 08) Give the chemical equations for the reactions taking place in solvay's process. (02)
- 09) A sample of oxygen gas occupies 431 ml at standard temperature and pressure. (02)
Calculate the volume when the temperature is 35°C and pressure is 800mm Hg.
- 10) An alkane of ozonolysis give 2-Butanone and 2-Methylpropanal. Identify the alkane (02)
and give the reaction when it reacts with HBr.
- 11) Give reasons why ? (02)
a) Ionisation energy of Beryllium is higher than Boron.
b) CCl_4 cannot be hydrolysed while SiCl_4 can be hydrolysed.
- 12) **Write a note on :** (02)
a) Heisenberg's Uncertainty Principle.
b) Friedel – Crafts Acylation and Alkylation.

OR

From the given data.



13) a) Why is O_2 paramagnetic whereas N_2 diamagnetic in nature. (03)

b) Give the structure formulae for the following :

i) Benzyl amine (ii) 3-Chlorobutanamide (iii) Benzoic acid.

14) What is meant by Huckel Rule ? Explain with the help of two examples. (03)
Is cyclopentadienyl anion aromatic ? Give reason.

15) Write resonating structure of benzylic free radical. Why is it more stable than methyl free radical ? (03)

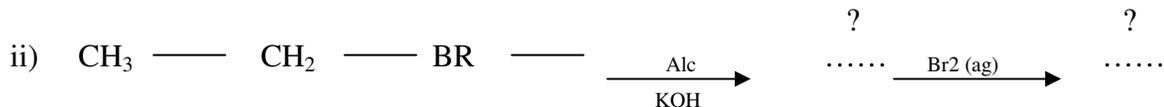
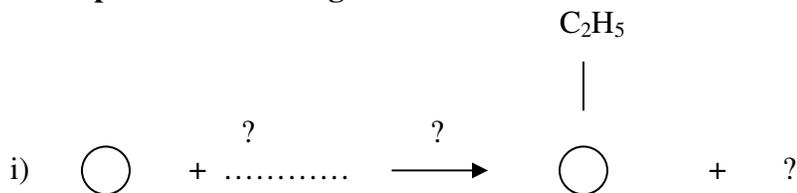
16) **Convert :** (03)

i) Calcium nitrate to Ammonia

(ii) Benzene to BHC.

(iii) Benzene to chlorobenzene.

17) **Complete the following :** (03)



- 18) At 298 K, 0.1 solution of acetic acid is 1.52% ionized. Calculate ionization constant (K_a) of acetic acid and pH of acid. (03)
- 19) a) Why do branched chain compounds have low boiling points than corresponding straight chain isomers? (03)
- b) Give an example to explain tautomerism.
- c) Why do branched chain hydrocarbons have higher melting points?
- 20) Explain three methods to remove permanent hardness of water (03)
- 21) a) Diamond is covalent, yet it has high melting point. Why. (03)
- b) What happens when SiO_2 reacts with NaOH ?
- 22) **Write short note on :** (03)
- a) Decarboxylation Reaction.
- b) Wurtz-Fittig Reaction
- c) Reimer-Tiemann Reaction.
- 23) a) Why does boron not form B^{3+} ion? (03)
- b) Give the structure of diborane.
- c) Why are fullerenes considered as the purest form of carbon.
- 24) a) Give the structure of NH_3 molecules on the basis of VSEPR. (03)
- b) Give an example of sp^2 hybridization diagrammatically.
- c) Define resonance.

OR

- a) Calculate pH of 0.50M aqueous solution of NaCN . pK_a of CN^- is 4.70.
- b) Define common ion effects.

25) a) Calculate the value of equilibrium constant at 298 K if $\Delta_r G^\circ$ at 298K is $-13.6 \text{ kJ mol}^{-1}$. $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$. (05)

b) 50 ml of 0.04M calcium nitrate solution is added to 150ml of 0.08M ammonium sulphate. Will a precipitate of calcium sulphate form or not? $K_{sp} = 4 \times 10^{-6}$.

OR

a) How do conjugated dienes differ from isolate diene? Explain 1,2 and 1,4 addition reactions of conjugated diene.

b) Give IUPAC names of following : (05)

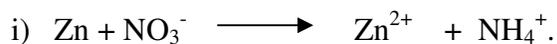
i) Picric acid.

ii) Mesitylene

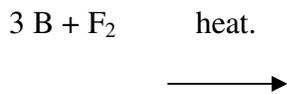
iii) Neopentyl alcohol

iv) Glyoxal.

26) a) Balance the given ionic equation in basic medium : (05)



a) (i) Complete the following :



OR.

a) Out of benzene, m- dinitrobenzene and toluene which will undergo nitration most easily and why?

b) Draw all cyclic isomers of C_5H_{10} and write their IUPAC names.

27) a) What do you mean by functional isomerism ?
Explain with the help of an example. (05)

b) How will you perform the following conversions ?

- i) Toluene to benzene
- ii) (ii) Ethyne to but-1-yne
- iii) (iii) Benzene to cyclohexane.

OR

a) What is meant by metamerism ? Explain giving example.

b) How will you carry out following conversions :

- i) Phenol to Benzene
- ii) Propyne to Acetone
- iii) Benzene to Benzophenone.

ANSWER TO NUMERICAL PROBLEMS)

9. 461.94M 18. $K_a = 2.3104 \times 10^{-5}$ 24 (a) pH = 11.8 25 (a) $K = 2.4 \times 10^2$ 25 (b) Yes.
