

CLASS 11(2017-18)  
CHEMISTRY

1. Calculate the volume of 34g of  $\text{NH}_3$  at STP.
2. How many electrons in sulphur can have  $n + l = 3$ ?
3. Why does entropy increases on mixing of two gases?
4. Why is  $\text{BeCl}_2$  soluble in organic solvents?
5. Write IUPAC name of:  $\text{CH}_3\text{-CO-CH}_2\text{-CH}_2\text{-CHO}$ .
6. Calculate the molarity of a solution of ethanol in water in which the mole fraction of ethanol is 0.040.
7. (a) What is the hybrid state of phosphorus in  $\text{PCl}_5$ ?  
(b) p-nitrophenol has higher boiling point compared to o-nitrophenol. Comment on the statement.
8. The equilibrium constant for a reaction is 12. Calculate the value of  $\Delta G^\circ$ ;  
[ $R=8.314 \text{ JK}^{-1}\text{mol}^{-1}$ ;  $T= 330\text{K}$ ]
9. (a) Name the calcium compound used in surgical bandages.  
(b) What is the above compound commonly called?
10. The following reaction :  $\text{Cu(s)} + 2\text{Ag}^+ \rightarrow 2\text{Ag(s)} + \text{Cu}^{2+}$  occurs in a cell.  
(a) Write the electrode reactions.  
(b) Which one is the positive electrode?  
(c) Represent the cell.
11. (a) State the law of constant proportion.  
(b) Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc following the reaction:  $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$   
Calculate the volume of hydrogen gas liberated at STP when 32.65g of zinc reacts with HCl.
12. (a) Write molecular orbital configuration of  $\text{O}_2$ . Predict its magnetic behaviour.  
(b) What is the shape of  $\text{XeOF}_4$ ?
13. (a) Locate the element with  $z=110$  in the periodic table.  
(b) Anionic radius is always more than that of neutral atom. Why?  
(c) Write the general electronic configuration of the d-block elements.
14. The ionization constant of acetic acid is  $1.74 \times 10^{-5}$ . Calculate the degree of dissociation of acetic acid in its 0.05 M solution. Calculate the pH of the solution and the concentration of acetate ion in the solution.
15. (a) Describe the effect of:  
(i) addition of  $\text{CH}_3\text{OH}$   
(ii) increase in pressure  
on the equilibrium of the reaction:  
$$2\text{H}_2(\text{g}) + \text{CO}(\text{g}) \rightleftharpoons \text{CH}_3\text{OH}(\text{g})$$
  
(b) Write the conjugate acid and conjugate base of  $\text{HSO}_4^-$ .
16. For a reaction, both  $\Delta_r H$  and  $\Delta_r S$  are negative. Discuss the condition for spontaneity of the reaction.
17. (a) State Dalton's law of partial pressure.  
(b) Out of  $\text{NH}_3$  and  $\text{H}_2$ , which will have larger value of 'b' (Van der waal's constant)  
(c) Plot compressibility factor (Z) vs Pressure for an ideal gas.

18. (a) How will you prepare  $\text{H}_2\text{O}_2$  from 2-Ethylanthraquinol? Where do you find this method of preparation of  $\text{H}_2\text{O}_2$ ?  
 (b) Give one example of each to explain that  $\text{H}_2\text{O}_2$  acts as an reducing as well as oxidising agent.  
 (c) Write any one use of  $\text{H}_2\text{O}_2$ .
19. (a) State as to why:  
 (i) Alkali metals have low ionization enthalpy.  
 (ii) Lithium carbonate decomposes at low temperature but sodium carbonate is thermally stable.  
 (b) Complete and balanced the equation:  $\text{BeCl}_2 + \text{LiAlH}_4 \rightarrow$
20. (a) Draw the cis and trans structures for Hex-2-ene. Which isomer will have higher boiling point and why?  
 (b) Write one possible functional isomer for ethanol.  
 (c) Draw the hyperconjugation structures for propene.
21. (a) Arrange the following compounds in decreasing order of acidity. Also justify your answer.  
 $\text{CH}_3\text{COOH}$ ,  $\text{CF}_3\text{COOH}$ ,  $\text{CCl}_3\text{COOH}$ ,  $\text{CH}_3\text{CH}_2\text{COOH}$   
 (b) Draw the resonance structures for nitrobenzene and phenol.
22. (a) Draw the staggered conformation for ethane. Explain why it is more stable than the eclipsed conformation.  
 (b) Discuss the method of preparation of ethane from Kolbe's electrolytic method.
23. Thermal power plants generally use coal as a fuel which liberates  $\text{SO}_2$ ,  $\text{CO}_2$  and  $\text{CO}$  gases. It produces huge amount of ash called fly ash. Fly ash causes air pollution. Mr Aggarwal, an engineer, suggested that fly ash should be used as substitute of cement ie, can be mixed with cement. Using fly ash as cement substitute will reduce pollution to lot of extent. It can also be used in agriculture.  
 (a) What is the advantage of using fly ash in cement?  
 (b) Why are the gas power plants better than thermal power plants?  
 (c) What are the values possessed by Mr. Aggarwal?
24. (a) Account for the following:  
 (i) In group 14 of the periodic table, +4 oxidation state is more stable for Si, Ge, but for lead stability of +2 oxidation state is more.  
 (ii)  $\text{H}_3\text{BO}_3$  is a weak non protic acid.  
 (b) Draw the structures for (i) orthoboric acid, (ii)  $\text{SiO}_2$   
 (c) Write a balanced Chemical equation for  $\text{H}_3\text{BO}_3 \xrightarrow{\Delta} \text{-----} \rightarrow$
25. (a) Write in brief on Friedel Crafts Alkylation.  
 (b) Bring out the following conversions:  
 (i) ethene to benzene  
 (ii) t- Butyl bromide to isobutyl bromide  
 (c) Identify compounds A and B
- $$\text{CH}_3\text{-CH=CH}_2 \xrightarrow[\text{Zn/H}_2\text{O}_2]{\text{O}_3} [\text{A}] + [\text{B}]$$
26. (a) Write the electronic configuration for the element with atomic number 29.  
 (b) How much energy is required to ionise a hydrogen atom if the electron occupies  $n = 5$  orbit? Compare your answer with the ionization enthalpy of H-atom.  
 (c) Calculate the wave length of an electron moving with a velocity of  $2.05 \times 10^7 \text{ ms}^{-1}$ .  
 (d) How many angular and radial nodes are there in 5d orbital?

