

ST. PAUL'S SCHOOL
FIRST TERMINAL EXAMINATION
CLASS XI (2016-17)
CHEMISTRY

TIME : 3 hours

MM - 70

- Q1. Commercially available concentrated hydrochloric acid contains 38% HCl by mass. What is the molarity of this solution if the density is 1.19 g/ml?
- Q2. Draw the Lewis representation of HNO_3 and NF_3 .
- Q3. What is an isochore? Draw a representative graph as an example.
- Q4. What are disproportionation reactions? Explain with an example.
- Q5. Draw the bond-line structures for -
 (a) $\text{BrCH}_2\text{CH}_2\text{COCH}(\text{CH}_3)\text{CH}_2\text{C}_2\text{H}_5$
 (b) $\text{H}_2\text{NCH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{OH})\text{C}(\text{CH}_3)_3$
 (1 x 5 = 5)
- Q6. How are different line spectrum obtained in a hydrogen atom? Explain and draw the spectral lines for the first four series.
- Q7. (a) Write the general configuration of group 10.
 (b) Write the symbols of elements with atomic numbers 118 and 130.
- Q8. Find the oxidation number of the marked elements in the given compounds -
 H_3PO_3 , SO_4^{2-} , MnO_4^- , SiO_2
- Q9. (a) Draw a well-labelled diagram of NHE and write a note on its use.
 (b) What is the function of a salt bridge in a Daniel cell? What salts are used in it?
- Q10. What are the various strategies to control environmental pollution? Explain.
 (2 x 5 = 10)
- Q11. A welding fuel gas contains carbon and hydrogen only. Burning a small sample of it in oxygen, gives 3.38g of carbon-dioxide, 0.690g of water and no other products. A volume of 10 litres (at STP) of this gas weighs 11.6g. Calculate -
 (i) empirical formula
 (ii) molar mass of the gas
 (iii) molecular formula
- Q12. (a) What are quantum numbers? Explain all the four quantum numbers.
 (b) Write the values of all the quantum numbers for the -
 (i) 13th electron of chlorine
 (ii) 28th electron of zinc
- Q13. Write a note on the following -
 (a) anomalous behaviour of elements of the second period
 (b) diagonal relationship
 (c) Lanthanoids and Actinoids
- Q14. Arrange the following in increasing order of the property indicated -
 (a) F, Cl, Br, I (negative gain enthalpy)
 (b) Mg, O, Na, F (atomic size)
 (c) Al, Mg, Si, Na (ionisation enthalpy)
 (d) N, C, O, F (second ionisation enthalpy)
 (e) Br^+ , Br, Br^- (size)
 (f) B, Al, C, Si (metallic nature)
- Q15. (a) Draw the molecular orbital diagram for O_2^+ and find its bond order and magnetism.
 (b) Draw the potential energy diagram for the formation of a hydrogen molecule.

- Q16. (a) Explain sp^2 hybridisation in ethene molecule. Draw the relevant diagrams.
 (b) Why is the resultant dipole moment different in NH_3 and NF_3 molecules?
- Q17. If we represent the central atom with A, bond pairs with B and lone pairs with E, then write the name of the shape, their hybridisation and draw the structures of the molecule types ABE_3 , AB_7 and AB_3E_2 .
- Q18. (a) A container has 14g of hydrogen and 96g of oxygen at STP. Find the volume of the container. ($R = 0.083 \text{ dm}^3 \text{ bar K}^{-1} \text{ mol}^{-1}$)
 (b) How does the addition of a soluble salt affect the boiling point of water? Why?
 (c) Derive the expression for coefficient of viscosity.
- Q19. Write all the postulates of the Kinetic Molecular Theory of Gases.
- Q20. (a) Derive the van der Waal's equation for real gases.
 (b) Define compressibility factor. How does it link a real gas to an ideal gas?
 (c) What is vapour pressure? How is it linked to the boiling point of a liquid?
- Q21. Explain position isomerism, functional isomerism and metamerism with suitable examples of each and draw the required structures.
- Q22. (a) Propyl and butyl are present as branches to the main chain of hydrocarbons. They can exist in different forms and structures. Draw these forms and name them.
 (b) Draw the structures of phenol and aniline.

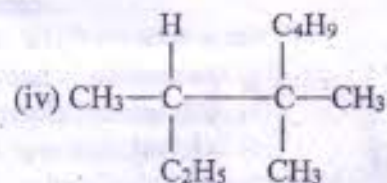
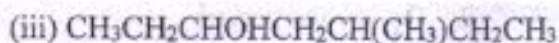
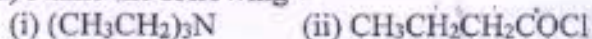
(3 x 12 = 36)

- Q23. Proper drinking water is an essential part of our daily life. Hence, International Standards have been set for drinking water. Write the parameters for International Drinking Water standards which must be followed everywhere.

(4 x 1 = 4)

- Q24. (a) Write a note on Photoelectric Effect.
 (b) Draw the shapes of the 2p orbitals.
 (c) Write the spin arrowhead configurations for Mn^{4+} and Ni^{2+} .
- Q25. (a) Balance the following using half-reaction method -
 (i) $MnO_4^- + Br^- \rightarrow Mn^{2+} + Br_2$ (acidic medium)
 (ii) $Al + NO_3^- \rightarrow Al(OH)_4^- + NH_3$ (basic medium)
 (b) Construct all the possible cells from the given standard potential values. Write the cell reactions and find the values of their E°_{cell} -
 $K; K^+ = -2.93 \text{ V}$ $Fe; Fe^{2+} = -0.44 \text{ V}$ $Al; Al^{3+} = -1.66 \text{ V}$

- Q26. (a) Name the following -



- (b) Draw the structures of the following -
 (i) 4 ethyl -2-methyl aniline (ii) 2,3 dimethyl -6-(2 methyl propyl) decane
 (iii) 5-(1,1-dimethyl ethyl) -6-ethyl -2-methyl octane
 (iv) 2 methyl 6 chloro hexanone -3
 (v) 2,3,3 trimethyl pentene (vi) 3,4 diethyl hexyne

(5 x 3 = 15)