

FIRST TERM EXAMINATION (14 SEPT 2017)

Paper - CHEMISTRY

Class – XI

(SET – A)

Time: 3hrs.

MM: 70

General Instructions:

- i) All questions are compulsory.
- ii) Question number 1 to 5 carry 1 mark each.
- iii) Question number 6 to 10 carry 2 marks each.
- iv) Question number 11 to 22 carry 3 marks each.
- v) Question number 23 is of 4 marks.
- vi) Question number 24 to 26 carry 5 marks each.
- vii) Use log tables if necessary, use of calculators is not allowed.

- Q1. How are 0.50 mol Na₂ CO₃ and 0.50M Na₂ CO₃ different?
- Q2. State Pauli's Exclusion principle.
- Q3. What would be the IUPAC name and symbol for the element with atomic number 120?
- Q4. Draw the Lewis structure of HCOOH.
- Q5. Explain the physical significance of Vander Waals parameters.
- Q6. Which of the following pairs of elements would have a more negative electron gain enthalpy?
(i) O or F (ii) F or Cl
- Q7. Discuss the shape of PH₃ molecule using VSEPR theory.
- Q8. State Boyle's Law with Mathematical Expression. What is its physical application?
- Q9. Justify the following reaction is a redox reaction
$$\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2$$
- Q10. Why are potassium and caesium rather than lithium used in photoelectric cells?
- Q11. Determine the empirical and molecular formula of an oxide of iron in which mass% of Fe and oxygen are 69.9 and 30.1 respectively. (Atomic mass of Fe = 56, O=16)
- Q12. The density of 3M solution of NaCl is 1.25 gml⁻¹, Calculate molality of the solution.
- Q13. Write the electronic configurations of the following ions:
(i) Na⁺ (ii) O²⁻ (iii) H⁺
- Q14. 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.
- Q15. An atomic orbital has n=3. What are the possible values of l and m?
- Q16. Among the second period elements the actual ionization enthalpies are in the order
Li < B < Be < C < O < N < F < Ne

Explain why

- i) Be has higher Ionisation enthalpy than B.
- ii) O has lower Ionisation enthalpy than N and F?

- Q17. What do you understand by isoelectronic species? Name a species that will be isoelectronic with F^- and Mg^{2+} .
- Q18. Describe the hybridization in case of PCl_5 . Why are the axial bonds longer as compared to equatorial bonds?
- Q19. What will be the minimum pressure required to compress 500dm^3 of air at 1 bar to 200dm^3 at 30°C ?

- Q20. a) Assign oxidation number to the underlined element $\text{NaH}_2\underline{\text{P}}\text{O}_4$
 b) Identify the substance oxidized, reduced, oxidizing agent and reducing agent for the given reaction.

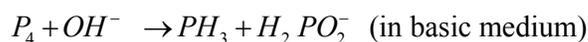


- Q21. Balance the following redox reaction by ion-electron method



OR

By oxidation method, balance the following equation



- Q22. What happens when (write reactions)
- Sodium metal is dropped in water.
 - Sodium metal is heated in free supply of air.
 - Sodium peroxide dissolves in water.
- Q23. Penicillin, an important antibacterial agent was discovered by Alexander in 1928. It has the formula $\text{C}_{14}\text{H}_{20}\text{N}_2\text{SO}_4$. It saved millions of lives of world.
- How is penicillin important for life?
 - What is the molecular mass of the compound?
 - Give mass of one molecule of penicillin in grams?
 - Calculate mass percentage of nitrogen in this compound?

- Q24. i) Draw Molecular orbital diagram for O_2^+ molecule.
 ii) What is the total number of sigma and pi bonds in C_2H_2 .

OR

- Compare the relative stability of O_2 , O_2^- , O_2^+ on the basis of bond order. Indicate their magnetic properties.
- Define hydrogen bond. Is it weaker or stronger than the Vander Walls forces?

- Q25. a) 34.05ml of phosphorus vapour weighs 0.0625g at 546°C and 0.1 bar pressure. What is the molar mass of phosphorus
- b) Critical temperature for carbon-di-oxide and methane are 31.1°C and -81.9°C respectively. Which of these has stronger intermolecular forces and why?

OR

- a) Calculate the volume occupied by 8.8 g of CO_2 at 31.1°C and 1 bar pressure. $R = 0.083 \text{ bar LK}^{-1} \text{ mol}^{-1}$.
- b) Using the equation of state $PV = nRT$, show that at a given temperature density of a gas is proportional to gas pressure p .
- Q26. (i) How will you explain the following observations?
- a) BeO is almost insoluble but BeSO_4 is soluble in water.
- b) BaO is soluble but BaSO_4 is insoluble in water.
- c) LiI is more soluble than KI in ethanol.
- (ii) Draw the structure of (a) BeCl_2 (vapour) (b) BeCl_2 (solid)

OR

- (i) 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?
- (ii) Why are lithium salts commonly hydrated and those of the other alkali ions usually anhydrous?