

MIDTERM TEST-I – AUGUST-2018

CLASS: XI
TIME : 2.30 Hrs

CHEMISTRY

MAX MARKS : 70

PART-I

ANSWER ALL THE QUESTIONS

CHOOSE THE MOST APPROPRIATE ANSWER

15 X 1 = 15

- If mass of one atom of an element is $0.645 \times 10^{-23} \text{ g}$. then the number of moles of element in 0.32 kg are a. 18 mole b. 5 mole c. 3 mole d. 8 mole
- The number of moles of benzene (C_6H_6) required to produce 88 g of CO_2 (g) after complete combustion a. 0.33 mole b. 1.33 moles c. $1/6$ moles d. 2 moles
- Assertion: Two mole of glucose contains 12.044×10^{23} molecules of glucose.
Reason: Total number of entities present in one mole of any substance is equal to 6.022×10^{22}
(a) Both assertion and reason are true and the reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false (d) Both assertion and reason are false
- Which one of the following represents 160g of methane?
a. 1 mole of methane b. 16 moles of methane
c. $\frac{6.022 \times 10^{23}}{16}$ of molecules of methane d. 6.022×10^{24} of molecules of methane
- Equivalent mass of potassium hydroxide is
a. 40 g eq^{-1} b. 56 g eq^{-1} c. 28 g eq^{-1} d. 35 g eq^{-1}
- The number of radial nodes in a given orbital can be attributed by
a. $n - l - 1$ b. $n + l$ c. $n + l + 1$ d. n
- For 1s orbital, $l=0$ and $m=0$. $f(\theta) = 1/\sqrt{2}$ and $g(\varphi) = 1/\sqrt{2\pi}$. Pick out the wrong statement. a. the shape of 1s orbital is independent of the angle θ and φ .
b. the probability of finding the electron is independent of the direction from the nucleus. c. The shape of the s orbital is spherical.
d. 1s orbital contains one radial node.
- The number of unpaired electrons in the ground state of Fe^{2+} ion is
a. 3 b. 2 c. 4 d. zero
- Splitting of spectral lines in an electric field is called
a. Compton effect b. Zeeman effect c. Stark effect d. Shielding effect
- for f electron, the orbital angular momentum is
a. $\sqrt{3} \left(\frac{h}{2\pi}\right)$ b. $\sqrt{6} \left(\frac{h}{2\pi}\right)$ c. $\frac{\sqrt{3}h}{\pi}$ d. $\frac{\sqrt{12}h}{2\pi}$
- Which of the following is second most electronegative element?
a. chlorine b. Fluorine c. oxygen d. sulphur
- The electronic configuration of the elements A and B are $1s^2, 2s^2, 2p^6, 3s^2$ and $1s^2, 2s^2, 2p^5$ respectively. The formula of the ionic compound that can be formed between these elements is a. AB b. AB_2 c. A_2B d. none of the above
- The correct order of decreasing electronegativity values among the elements X, Y, Z and A with atomic numbers 4, 8, 7 and 12 respectively
a. $Y > Z > X > A$ b. $Z > A > Y > X$ c. $X > Y > Z > A$ d. $X > Y > A > Z$
- Which of the following sets cannot be a triad?
a. Li, Na, K b. Cl, Br, I c. Ca, Sr, Ba d. O, N, S
- The minimum amount of energy required to remove an electron from a unipositive cation is called a) Screening constant b) second ionisation energy
c) electronegativity d) electron gain enthalpy

PART-II

Answer any Six questions in which Q.No 21 is compulsory

6X2=12

- In what way disproportionation reaction different from decomposition reaction?
- Define average atomic mass.
- In a reaction, 68 g of H_2S is allowed to react with 150g of Cl_2 gas. Find the excess reagent in the reaction. How much of the excess reagent at the end of the reaction?
- State Heisenberg's uncertainty principle.
- How many orbitals are possible in the 4th energy level ?
- What is $(n + l)$ rule ?

[P.T.O]

22. What are isoelectronic ions? Give examples.
 23. Explain the diagonal relationship.
 24. Explain the following statement with appropriate reason. "Ionisation potential of N is greater than that of O".

PART-III

Answer any six questions in which q.no 30 is compulsory

6X3=18

25. Write a note on electronic theory of oxidation and reduction.
 26. How much volume of carbon dioxide is produced when 50 g of calcium carbonate is heated completely under standard conditions?
 27. Balance the following equations by ion electron method.
 $\text{Zn} + \text{NO}_3^- \rightarrow \text{Zn}^{2+} + \text{NO}$ (in acid medium)
 28. Calculate the total number of angular nodes and radial nodes present in 4s, 3d and 4f orbitals.
 29. State Pauli's exclusion principle.
 30. Calculate the de-Broglie wavelength of an electron that has been accelerated from rest through a potential difference of 1 keV
 31. How would you explain the fact that the second ionisation potential is always higher than first ionisation potential?
 32. Why halogens act as oxidising agents?
 33. The electron gain enthalpy of chlorine is 348 kJ mol^{-1} . How much energy in KJ is released when 17.5 g of chlorine is completely converted into Cl^- ions in the gaseous state?

PART-IV

5 X 5 = 25

ANSWER ALL THE QUESTIONS

34. a. Balance the following equations by oxidation number method
 $\text{KMnO}_4 + \text{H}_2\text{C}_2\text{O}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{CO}_2 + \text{H}_2\text{O}$ (or)
 b. A non-essential amino acid on elemental analysis shows the following composition of atoms. C = 40.45% H = 7.87% O = 35.95% and N = 15.73%. Calculate the molecular formula of the compound. (Molecular mass of amino acid 89).
35. a. (i) Calculate the oxidation states of sulphur in the following ions and Arrange them in the correct increasing order of the oxidation state of sulphur. $\text{S}_2\text{O}_4^{2-}$, SO_3^{2-} , $\text{S}_2\text{O}_6^{2-}$, SO_4^{2-} (3)
 (ii) Write a note on four different oxidation states of oxygen with suitable examples. (2) (or)
 b. Explain the meaning of the symbol $3d^4$. Write all the four quantum numbers for these electrons.
36. a. List the main features of the quantum mechanical model of an atom. (or)
 b. (i) Show that if the measurement of the uncertainty in the location of the particle is equal to its de Broglie wavelength, the minimum uncertainty in its velocity is equal to its velocity / 4π (3)
 (ii) Write a note on magnetic quantum numbers. (2)
37. a. (i) Calculate the uncertainty in the velocity of the electron in hydrogen atom. Bohr radius of 1st orbit is 0.529 \AA . Assuming that the position of the electron in this orbit is determined with the accuracy of 0.5 % of the radius. (3)
 (ii) Calculate the de Broglie wave length of an electron moving at 72.73 ms^{-1} (or)
 b. (i) Calculate the ionic radii of Na^+ and F^- ions in NaF crystal, whose interionic distance is 231 pm. (3)
 (ii) Calculate the effective nuclear charge on 4s electron in scandium (2)
38. a. (i) Define electronegativity
 (ii) If experimental $d_{\text{H-Cl}} = 1.28 \text{ \AA}$ and covalent radius of chlorine is 0.99 \AA . In Pauling's scale the electronegativities of chlorine and hydrogen are 3 and 2.1 respectively. Calculate the covalent radii of Hydrogen atom. (or)
 b. (i) What is shielding effect? (2)
 (ii) State trends in the variation of electronegativity in groups and periods (3)