

Dwarka International School

Sample Paper
CLASS XI

CHEMISTRY

This question paper consist of four sections

- Section A consist of MCQ question all of them carry 1 mark each
- Section B consist of 5 question all of them carry 2 mark each
- Section C consist of 10 question all of them carry 3 mark each
- Section D consist of 2 question all of them carry 5 mark each

*****ALL THE BEST*****

SECTION A

1. WHAT Will be the molarity of a solution , Which contains 5.85g of NaCl (s) per 500ml ?
(i) 4ml L^{-1} (II) 20mol L^{-1} (III) 0.2 mol L^{-1} (iv) 2mol L^{-1}
2. If 500mL of a 5M solution is diluted to 1500 mL , what will be the molarity of the solution obtained?
(I) 1.5M (II) 1.66 M (III) 0.017M (iv) 1.59 M
3. what will be the molality of the solution containing 18.25 g of HCL gas in 500g of water ?
(I) 0.1m (ii) 1M (iii) 0.5m (iv) 1 m
4. what is the mass percent of carbon in carbon dioxide ?
(i) 0.034% (ii) 27.27% (iii) 3.4% (iv) 28.7%
5. If the density of a solution is 3.12 g ml^{-1} , the mass of 1.5 mL solution in significant figures is
(i) 4.7 g (ii) 46.8g (iii) $4680 \times 10^{-3}\text{ g}$ (iv) 46.80 g
6. Which of the following conclusions could not be derived from Rutherford alpha particle scattering experiment ?
(i) Most of the space in the atom is empty.
(ii) The radius of the atom is about 10^{-15} m while that of nucleus is 10^{-15} m .
(iii) Electrons move in a circular path of fixed energy called orbits.
(iv) Electrons and the nucleus are held together by electrostatic forces of attraction.
7. Two atoms are said to be isobars if.

1. they have same atomic number but different mass number.
2. they have same number of electrons but different number of neutrons.
3. they have same number of neutrons but different number of electrons.
4. sum of the number of protons and neutrons is same but the number of protons is different

8. The pair of ions having same electronic configuration is _____.

(i) Cr^{3+} , Fe^{3+}

(ii) Fe^{3+} , Mn^{2+}

(iii) Fe^{3+} , Co^{3+}

(iv) Sc^{3+} , Cr^{3+}

9. For the electrons of oxygen atom, which of the following statements is correct?

(i) Z_{eff} for an electron in a 2s orbital is the same as Z_{eff} for an electron in a 2p orbital.

(ii) An electron in the 2s orbital has the same energy as an electron in the 2p orbital

(iii) Z_{eff} for an electron in 1s orbital is the same as Z_{eff} for an electron in a 2s orbital.

(iv) The two electrons present in the 2s orbital have spin quantum numbers m_s but of opposite sign.

10. In which of the following pairs, the ions are iso-electronic?

(i) Na^+ , Mg^{2+}

(ii) Al^{3+} , O^-

(iii) Na^+ , O^{2-}

(iv) N^{3-} , Cl^-

11. Which of the following statements concerning the quantum numbers are correct?

1. Angular quantum number determines the three dimensional shape of the orbital.
2. The principal quantum number determines the orientation and energy of the orbital.
3. Magnetic quantum number determines the size of the orbital.
4. Spin quantum number of an electron determines the orientation of the spin of electron relative to the chosen axis

12. Total number of orbitals associated with third shell will be _____.

1. 2

2. 4
3. 9
4. 3

13. Identify the pairs which are not of isotopes?

- (i) 1X , 1Y
- (ii) X , Y
- (iii) X , Y
- (iv) X , Y

14. Which of the following statements about the electron is incorrect?

1. It is a negatively charged particle.
2. The mass of electron is equal to the mass of neutron.
3. It is a basic constituent of all atoms.
4. It is a constituent of cathode rays.

15. Which of the following properties of atom could be explained correctly by Thomson Model of atom?

1. Overall neutrality of atom.
2. Spectra of hydrogen atom.
3. Position of electrons, protons and neutrons in atom.
4. Stability of atom.

16. Which of the following options does not represent ground state electronic configuration of an atom?

- (i) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
- (ii) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$
- (iii) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$
- (iv) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$

Q17. Polarity in a molecule and hence the dipole moment depends primarily on electronegativity of the constituent atoms and shape of a molecule. Which of the following has the highest dipole moment?

- (i) CO_2
- (ii) HI
- (iii) H_2O
- (iv) SO_2

Q18. Which of the following species has tetrahedral geometry?

- (i) BH_4^-
- (ii) NH_2^-
- (iii) CO_3^{2-}
- (iv) H_3O^+

Q19. Number of π bonds and σ bonds in the following structure is—

- (i) 6, 19
- (ii) 4, 20
- (iii) 5, 19
- (iv) 5, 20

20. A measured temperature on Fahrenheit scale is 200°F . What will this reading be on Celsius scale? (i) 40°C (ii) 94°C (iii) 93.3°C (iv) 30°C

SECTION B

Q.21. The density of 3 molal solution of NaOH is 1.110 g mL^{-1} . Calculate the molarity of the solution.

Q.22. (I) The energy associated with the first orbit in the hydrogen atom is $-2.18 \times 10^{-10}\text{ J atom}^{-1}$. What is the energy associated with the fourth orbit?

(II). Calculate the radius of Bohr's third orbit for hydrogen atom.

Q.23. Explain the terms 'valency' of an element. How does it vary in a period and in a group in the periodic table?

Q.24. Explain why cations are smaller and anions larger in radii than their parent atoms?

Q.25. H_2O is liquid at room temperature but H_2S is gas. Why?

SECTION C

Q 26. Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss?

Q.27. Explain, giving reasons which of the following sets of quantum numbers are not possible—

- | | | | | |
|------|--------|-------|-----------|-------------|
| i. | $n=0,$ | $l=0$ | $m_l=0,$ | $m_s= +1/2$ |
| ii. | $n=1,$ | $l=0$ | $m_l=0,$ | $m_s= -1/2$ |
| iii. | $n=1,$ | $l=1$ | $m_l=0,$ | $m_s= +1/2$ |
| iv. | $n=2,$ | $l=1$ | $m_l=0,$ | $m_s= -1/2$ |
| v. | $n=3,$ | $l=3$ | $m_l=-3,$ | $m_s= +1/2$ |
| vi. | $n=3,$ | $l=1$ | $m_l=0,$ | $m_s= +1/2$ |

Q 28. Explain why dipole moment of BF_3 is zero?

Q 29. The second electron gain enthalpy of oxygen is positive?

Q 30. Calculate the kinetic energy of photoelectron ejected by striking of a wave having frequency 200nm and threshold frequency is 100nm ?

Q 31. On what factors value of atomic radius depends?

Q32. Calculate the total number of angular nodes and radial nodes present in $3p$ orbital.

Q33. An atom having atomic mass number 13 has 7 neutrons. What is the atomic number of the atom?

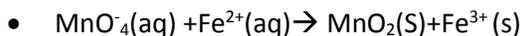
Q34. How can u explain for the fact that two electrons can never have same set of quantum number?

Q 35. Explain all gaseous laws?

SECTION D

Q 36. Write oxidation number of Mn in MnO_4^-

ii). Balance the following ionic equation in basic medium:



Q37. How many sub shells are associated with $n=4$?

How many electrons will be present with value of spin quantum number $(-1/2)$ and principal quantum number

Among the flowing pairs of orbitals which orbital will experience the large effective nuclear charge?

(I) $2s$ and $3s$

(II) $4s$ and $4f$

(III) $3d$ and $3p$

