AIR FORCE BAL BHARTI

संतूर बीर

FIRST TERM (2015-2016)   (BB)
CLASS XI
SUBJECT : CHEMISTRY

Time : 3 Hours   M.M. : 70

Instructions:

- All questions are compulsory.
- Question 1 to 5 are very short answer type carry one mark each.
- Question 6 to 10 carry two marks each.
- Question 11 to 22 carry three marks each.
- Question 23 is for four marks.
- Question 24 to 26 carry five marks each.

Q. 1.   What shell would be the first to have g-subshell? How many orbitals will be possible in g-subshell?

4, 3, 2, 1, 0, 1, 2, 3, 4   (1)

Q. 2.   Chlorine can be converted in chloride ion more easily as compared to fluoride ion why?   (1)

Q. 3.   What is one a.m.u.?   (1)

Q. 4.   Write the empirical formulae of the following: (1)

   (i) $C_6H_{12}O_6$

   (ii) H_2O

Q. 5.   Name the elements in the periodic table which has highest and lowest first ionisation enthalpy.   (1)
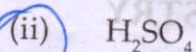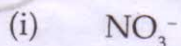
Q. 6.   Explain why cations are smaller and anions are larger in radii than their parent atoms?   (2)

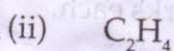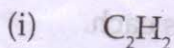XI/Chemistry   1   P.T.O.

Q. 7.   Write the resonance structures for: (2)

(i) NO_3^-

(ii) H_2SO_4

                        OR

Draw the Lewis dot str of HCN and CO.

Q. 8.   What is the total number of Sigma and pi bonds in the following molecules: (2)

(i) C_2H_2

(ii) C_2H_4

Q. 9.   Calculate the mass and charge of one mole of electrons.   (2)

Q. 10. Yellow light emitted from a sodium lamp has a wave length (λ) of 580 nm. Calculate the frequency (ν) and wave number ($\bar{\nu}$) of yellow light.   (2)

Q. 11. Draw the shapes of d-orbitals.   (3)

Q. 12. Give reason: (3)

(i)   First ionisation enthalpy of nitrogen is greater than oxygen.

(ii)   Inert gases have positive electron gain enthalpy.

(iii)   Elements in the same group have similar chemical properties.

Q. 13. Define: (3)

    (i)   Electronegativity

    (ii)   Electron gain ethalpy

    (iii)   Metallic radius

Q. 14. A photon of wavelength 4×10^{-7} m strikes on metal surface, the work function of the metal being 2.13 eV. Calculate (i) energy of the phton (eV), (ii) the Kinetic energy of the emission and (iii) the velocity of the photoelectron.

Q. 15. If the density of methanol is 0.793 kgL^{-1}, what is its volume needed for making 2.5 L of its 0.25 M solution. (3)

Q. 16. What is meant by hybridisation of atomic orbitals? Describe the shape of sp^2 and sp^3 hybrid orbitals. (3)

Q. 17. From each of the following pairs, select the molecule with higher value of the property mentioned against each pair giving reason: (3)

    (i) NH_3 and NH_4^+ (Bond angle)

    (ii) NF_3 and NH_3 (depole moment)

    (iii)   HCl and HBr (ionic character)

OR

Define dipole moment. Explain why BH_2 molecule has zero dipole moment although B-H bonds are polar.

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Q. 18. Give differences between (two each)   (3)

    (i)   Orbit and Orbital.

    (ii)   Sigma bond and pi-bond

    (iii)   Electromagnetic wave and matter wave

Q. 19. (a)   Which is better way of expressing concentration of solutions Molarity or molality why?   (1+2)

    (b)   How many moles and how many grams of sodium chloride are present in $250 \cdot cm^3$ of 0.500 M NaCl solution.

Q. 20. Give the Electronic configuration of the following ions: (3)

    (i) S^{2-} 6   (ii) Fe^{2+} 26

    (iii) Cr^{3+} 24

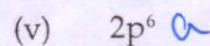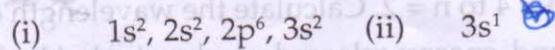   (At no. of S = 16, Fe = 26, Cr = 24)

    Give reasons why half filled and completely filled orbitals are more stable.

Q. 21. Draw the shapes of the following molecules according to VSEPR theory: (3)

    (i) ClF_3

    (ii) H_2O

    (iii) SF_4

Q. 22. The electronic configuration for the following netural atoms are given below: (3)

  (i) $1s^2, 2s^2, 2p^6, 3s^2$ (ii) $3s^1$

  (iii) $2s^2 2p^4$ (iv) $2p^5$

  (v) $2p^6$

  OR

  (a) Which of the above configuration would you expect for noble gas?

  (b) Which of the configuration will have lowest ionisation enthalpy and why?

  (c) List the above configuration in order of increasing ionisation enthalpy.
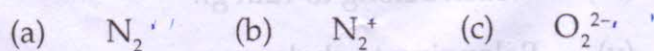
Q. 23. State the following principles: (4)

  (i) Pauli's exclusion principle

  (ii) de Broglie

  (iii) Hunds Rule

  (iv) Heisenberg

Q. 24. Write the molecular orbital configuration of the species: (5)

  (a) N_2 (b) N_2^+ (c) O_2^{2-}

  (i) Calculate the bond orders.

  (ii) Predict the paramagnetic behaviour.

  (iii) Arrange species according to their increasing order of stability.

Q. 25. What are the limitations of Bohr's model of atom? Apply Bohr's model when electron in H-atom comes from n = 4 to n = 2. Calculate the wavelength of the lines and energy released or absorbed. Also write the range of radiation. (5)

OR

How many electrons are present in all subshells (fully filled) with n + 1 = 5. Which of the four quantum numbers determine:

(a)   Energy of an electron

(b)   Size of the orbital

(c)   Shape of an orbital

(d)   the orientation of an orbital in space

Q. 26. From the periodic table name the element: (5)

(i)   Which has five electron in the outer most subshell.

(ii)   Which would tend to lose two electrons?

(iii)   Which would gain two electrons

(iv)   Which belong to 12th gr.

(v)   Belonging to chaleogens.