

Dwarka International School

Class: XI

Sample paper

General Instructions

- (a) All questions are compulsory.
- (b) Section A: Q.no. 1 to 20 are very short answer questions (objective type) and carry 1 mark each.
- (c) Section B: Q.no. 21 to 27 are short answer questions and carry 2 marks each.
- (d) Section C: Q.no. 28 to 34 are long answer questions and carry 3 marks each.
- (e) Section D: Q.no. 35 to 37 are also long answer questions and carry 5 marks each.
- (f) There is no overall choice. However an internal choice has been provided in two questions of two marks, two questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- (g) Use log tables if necessary, use of calculators is not allowed.

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

Section A

Q1. Which of the following terms are unitless?

- (i) Molality
- (ii) Molarity
- (iii) Mole fraction
- (iv) Mass percent

Q2. The probability density plots of 1s and 2s orbitals are given in Fig. 2.1:

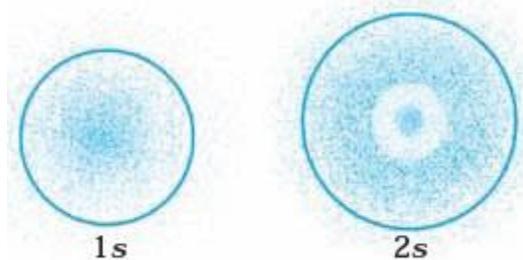


Fig. 2.1

The density of dots in a region represents the probability density of finding electrons in the region.

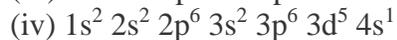
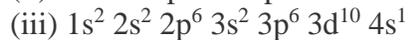
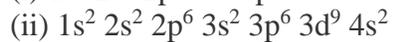
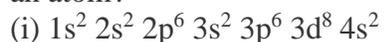
On the basis of above diagram which of the following statements is incorrect?

- (i) 1s and 2s orbitals are spherical in shape.
- (ii) The probability of finding the electron is maximum near the nucleus.

(iii) The probability of finding the electron at a given distance is equal in all directions.

(iv) The probability density of electrons for 2s orbital decreases uniformly as distance from the nucleus increases.

Q3. Which of the following options does not represent ground state electronic configuration of an atom?



Q4. Out of the following pairs of electrons, identify the pairs of electrons present in degenerate orbitals :

(i) (a) $n = 3, l = 2, m_l = -2, m_s = -\frac{1}{2}$

(b) $n = 3, l = 2, m_l = -1, m_s = -\frac{1}{2}$

(ii) (a) $n = 3, l = 1, m_l = 1, m_s = +\frac{1}{2}$

(b) $n = 3, l = 2, m_l = 1, m_s = +\frac{1}{2}$

(iii) (a) $n = 4, l = 1, m_l = 1, m_s = +\frac{1}{2}$

(b) $n = 3, l = 2, m_l = 1, m_s = +\frac{1}{2}$

(iv) (a) $n = 3, l = 2, m_l = +2, m_s = -\frac{1}{2}$

(b) $n = 3, l = 2, m_l = +2, m_s = +\frac{1}{2}$

Q5. The number of radial nodes for 3p orbital is _____.

(i) 3

(ii) 4

(iii) 2

(iv) 1

Q6. A plot of volume (V) versus temperature (T) for a gas at constant pressure is a straight line passing through the origin. The plots at different values of pressure are shown in Fig. 5.1. Which

of the following order of pressure is correct for this gas?

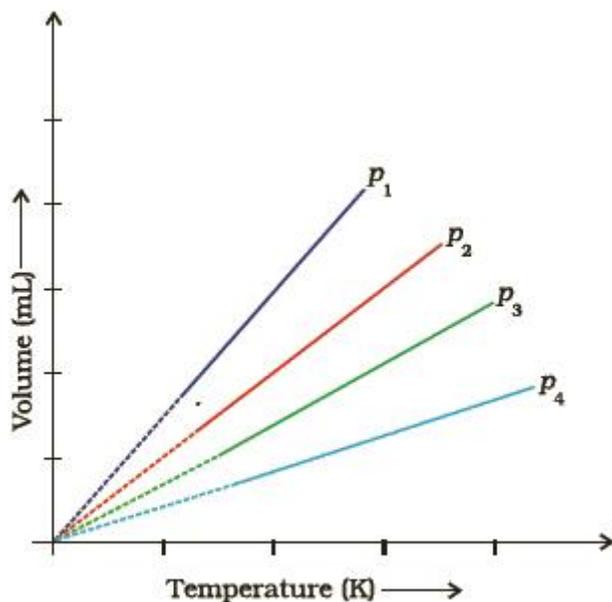


Fig. 5.1

- (i) $p_1 > p_2 > p_3 > p_4$
- (ii) $p_1 = p_2 = p_3 = p_4$
- (iii) $p_1 < p_2 < p_3 < p_4$
- (iv) $p_1 < p_2 = p_3 < p_4$

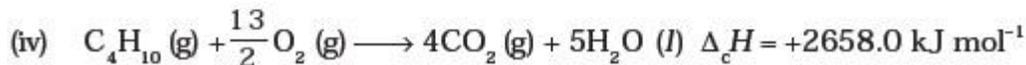
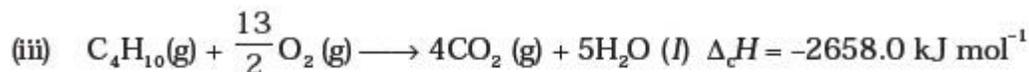
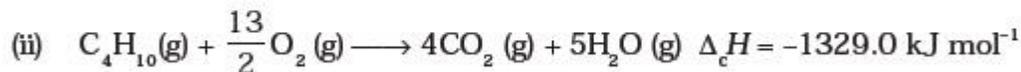
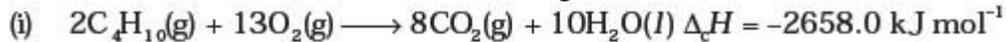
Q7. The interaction energy of London force is inversely proportional to sixth power of the distance between two interacting particles but their magnitude depends upon

- (i) charge of interacting particles
- (ii) mass of interacting particles
- (iii) polarisability of interacting particles
- (iv) strength of permanent dipoles in the particles.

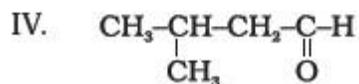
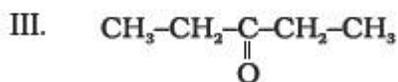
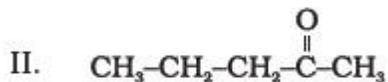
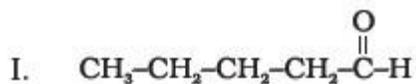
Q9. Polarity in a molecule and hence the dipole moment depends primarily on electronegativity of the constituent atoms and shape of a molecule. Which of the following has the highest dipole moment?

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

Q10. During complete combustion of one mole of butane, 2658 kJ of heat is released. The thermochemical reaction for above change is



Note : Consider the following four compounds for answering questions 11 and 12.



Q11. Which of the following pairs are position isomers?

- (i) I and II
- (ii) II and III
- (iii) II and IV
- (iv) III and IV

Q12. Which of the following pairs are not functional group isomers?

- (i) II and III
- (ii) II and IV
- (iii) I and IV
- (iv) I and II

Q13. Nucleophile is a species that should have

- (i) a pair of electrons to donate
- (ii) positive charge
- (iii) negative charge

(iv) electron deficient species

Q14. Hyperconjugation involves delocalisation of _____.

(i) electrons of carbon-hydrogen σ bond of an alkyl group directly attached to atom of unsaturated system.

(ii) electrons of carbon-hydrogen σ bond of alkyl group directly attached to the positively charged carbon atom.

(iii) π -electrons of carbon-carbon bond

(iv) lone pair of electrons

One word or one line answer questions(question no 15 to 19)

Q15. Name two phenomena that can be explained on the basis of surface tension.

Q16. Green house effect leads to global warming. Which substances are responsible for green house effect?

Q17. Acid rain is known to contain some acids. Name these acids and where from they come in rain?

Q18. On the basis of chemical reactions involved, explain how do chlorofluorocarbons cause thinning of ozone layer in stratosphere.

Q19. If the volume of a gas changes from 1.5 litre to 2.3 litre at a constant temperature of 298K what would be change in pressure while expansion of a gas?

Q20. Assertion (A): Combustion of all organic compounds is an exothermic reaction.

Reason (R) : The enthalpies of all elements in their standard state are zero.

(i) Both A and R are true and R is the correct explanation of A.

(ii) Both A and R are true but R is not the correct explanation of A.

(iii) A is true but R is false.

(iv) A is false but R is true.

SECTION B

Q21. If two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element, are in whole number ratio.

(a) Is this statement true?

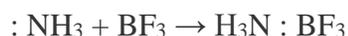
(b) If yes, according to which law?

(c) Give one example related to this law.

Q22. According to de Broglie, matter should exhibit dual behaviour, that is both particle and wave like properties. However, a cricket ball of mass 100 g does not move like a wave when it is

thrown by a bowler at a speed of 100 km/h. Calculate the wavelength of the ball and explain why it does not show wave nature.

Q23. A reaction between ammonia and boron trifluoride is given below:



Identify the acid and base in this reaction. Which theory explains it? What is the hybridisation of B and N in the reactants?

Q24. Name the classes of hydrides to which H_2O , B_2H_6 and NaH belong.

Q25. Why are BeSO_4 and MgSO_4 readily soluble in water while CaSO_4 , SrSO_4 and BaSO_4 are insoluble?

Q26. What is saytzeff rule explain with the help of any reaction

Q27. Write one method for preparation of alkanes

SECTION C

Q28. The second electron gain enthalpy of oxygen is positive?

Why atomic radius decreases along the period?

Q29. Rohan heard that instructions were given to the laboratory attendant to store a particular chemical i.e., keep it in the dark room, add some urea in it, and keep it away from dust. This chemical acts as an oxidising as well as a reducing agent in both acidic and alkaline media. This chemical is important for use in the pollution control treatment of domestic and industrial effluents.

1.1. (i) Write the name of this compound

1.2. (ii) Explain why such precautions are taken for storing this chemical

Q30. Match the following :

- | | |
|---|---|
| (i) Entropy of vapourisation | (a) decreases |
| (ii) K for spontaneous process | (b) is always positive |
| (iii) Crystalline solid state | (c) lowest entropy |
| (iv) ΔU in adiabatic expansion of ideal gas | (d) $\frac{\Delta H_{\text{vap}}}{T_b}$ |

Q31. An acidic solution of hydrogen peroxide behaves as an oxidising as well as reducing agent. Illustrate it with the help of a chemical equation.

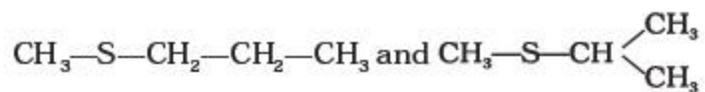
Q32. Present a comparative account of the alkali and alkaline earth metals with respect to the following characteristics:

- Tendency to form ionic / covalent compounds
- Nature of oxides and their solubility in water
- Formation of oxosalts
- Solubility of oxosalts
- Thermal stability of oxosalts

Q33. Conjugate acid of a weak base is always stronger. What will be the decreasing order of basic strength of the following conjugate bases?



Q34. Compounds with same molecular formula but differing in their structures are said to be structural isomers. What type of structural isomerism is shown by



SECTION D

Q.35. Given reason –

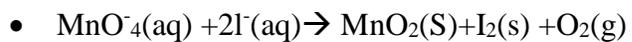
(I) Why BF_3 and XeF_4 has zero dipole moment?

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

(III) HF is polar though it has covalent bond.

Q 36. Write oxidation number of Mn in KMnO_4

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



Q37. How can you convert?

1. Propene to Propopropane
2. Propene to 2-Bromopropane

Write mechanism for any one of these

. Explain functional group isomerism and metamerism with example?

What do you understand by inductive effect?