VENKATESHWAR INTERNATIONAL SCHOOL

Sector – 10, Dwarka, New Delhi – 110075

UNIT TEST II (2025-26)

SET B

CLASS –XI

CHEMISTRY

Time: 1 ½ hrs **Max Marks: 35**

General Instructions:

1. *All questions are compulsory*
2. *Questions 1 to 5 are multiple choice questions and carry 1 mark each.*
3. *Questions 6 to 9 are very short answer questions and carry 2 marks each.*
4. *Questions 10 to 13 are short answer questions and carry 3 marks each.*
5. *Questions 14 and 15 is long answer question and carries 5 marks.*

Q1 In thermodynamics, a process is called reversible when:

(a) When system and surroundings are interconvertible
(b) There is no boundary between system and surroundings
(c) The surrounding is always in equilibrium with system
(d) System changes into surrounding

Q2 Which of the following does not match with respect to the shape of the molecule?

(a) NH_3 - Trigonal pyramidal
(b) SF_4 - Tetrahedral
(c) H_2S - Bent
(d) XeF_4 - Square planar

Q3 Intramolecular H-Bonding is shown by:

(a) p-Nitrophenol
(b) m-Nitrophenol
(c) o-Nitrophenol
(d) All of these

Q4 Identify the incorrect statement amongst the following:

(a) C_2 molecule has four electrons in its two degenerate π molecular orbitals.
(b) H_2^+ ion has one electron.
(c) H_2^+ ion is diamagnetic.
(d) O_2^- ion is paramagnetic.

Q5 The quantity of heat needed to raise the temperature of substance by 1° C (1K) is called:

(a) Heat Capacity (b) Specific Heat

(c)Molar heat capacity (d) Specific heat capacity

Q6 Derive the relation $\Delta H = \Delta U + \Delta n_g RT$.

Q7 Predict the dipole moment of the following where X is more electronegative than A:

(i) A molecule AX_2 with a linear geometry.
(ii) A molecule AX_4 with tetrahedral geometry.
(iii) A molecule A_2X with bent/angular geometry.
(iv) A molecule AX_4 with square planar geometry.

Q8 Explain and predict the sign of entropy change in each of the following:

(a) A liquid crystallizes into a solid.
(b) $Ca(s) + 2H_2O(l) \longrightarrow Ca(OH)_2(aq) + H_2(g)$

Q9 Answer the following:

(a) Why Be_2 molecule does not exist?
(b) What is the total number of sigma and pi bonds in C_2H_2?

Q10 (a) Draw the Born Haber cycle for $CaCl_2$.

(b) Classify the following as open, closed or isolated systems:

(i) A chemical reaction taking place in an enclosed flask.
(ii) A cup of hot tea placed on a table.

Q11 Enlist the main postulates of VSEPR theory.

Q12 Calculate the enthalpy of formation of ethane from the following data:

(i) $C(s) + O_2(g) \longrightarrow CO_2(g)$ $\Delta_f H^\circ = -393.5kJ$

(ii) $H_2(g) + \frac{1}{2}O_2(g) \longrightarrow H_2O(l)$ $\Delta_f H^\circ = -285.8kJ$

(iii) $C_2H_6(g) + \frac{7}{2}O_2(g) \longrightarrow 2CO_2(g) + 3H_2O(l)$ $\Delta_f H^\circ = -1560.0kJ$

Q13 Draw the orbital overlap diagram for the following on the basis of hybridisation:

(a) C_2H_4 (b) NH_3

Q14 (a) Calculate $\Delta_f G^\circ$ for the reaction:

$$2\,C_6H_{12}O_6(s) + 6\,O_2(g) \longrightarrow 6\,CO_2(g) + 6\,H_2O(l)$$

$\Delta_f G^\circ$ values (kJ/mol) are: $C_6H_{12}O_6(s) = -910.2$, $CO_2(g) = -394.4$ and $H_2O(l) = -237.2$. Also predict the feasibility of the reaction.

(b) Explain extensive and intensive properties giving suitable examples.

Q15 (a) Draw the molecular orbital diagram for F_2 molecule.

(b) Write electronic configuration of F_2^+ and F_2^- and compare their stabilities.