

SAINIK SCHOOL NALANDA
WINTER VACATION
HOMEWORK

CHEMISTRY XI		
1	Select the incorrect expression from the following. a) $\Delta S_{total} < 0$ (spontaneous process) b) $\Delta G = \Delta H - T\Delta S$ c) $\Delta S_{total} = \Delta S_{system} + \Delta S_{surr}$ d) $\Delta S_{surr} = \frac{\Delta H_{surr}}{T} = - \frac{\Delta H_{sys}}{T}$	[1]
2	Comment on the thermodynamic stability of NO(g), Given: $\frac{1}{2} N_2 (g) + \frac{1}{2} O_2 (g) \rightarrow NO (g); \Delta_r H^0 = 90 \text{ kJ mol}^{-1}$ $NO(g) + \frac{1}{2} O_2 (g) \rightarrow NO_2 (g); \Delta_r H^0 = - 74 \text{ kJ mol}^{-1}$ a) NO(g) is unstable, but NO ₂ (g) is formed b) NO ₂ (g) is unstable, but NO(g) is formed c) NO ₂ (g) is stable, but NO(g) is formed d) NO(g) is stable, but NO ₂ (g) is formed	[1]
3	Lattice enthalpies are determined by a) Hess' law b) Born - Haber cycle c) lattice cycle d) None of these	[1]
4	Enthalpy change for the reaction, $4H(g) \rightarrow 2H_2 (g)$ is - 869.6 kJ The dissociation energy of H - H bond is a) +434.8 kJ b) +217.4 kJ c) - 434.8 kJ d) - 869.6 KJ	[1]

5	<p>Which of the following properties is the measure of the degree of randomness or disorder in the system?</p> <p>a) Entropy</p> <p>b) Gibbs free energy</p> <p>c) Internal energy</p> <p>d) Enthalpy</p>	[1]
6	<p>First law of thermodynamics is a restatement of:</p> <p>a) law of conservation of parity.</p> <p>b) law of conservation of energy.</p> <p>c) law of conservation of mass.</p> <p>d) law of conservation of charge.</p>	[1]
7	<p>In a closed system, which of the following take place?</p> <p>a) The boundaries permit the flow of matter into it but not vice versa.</p> <p>b) The boundaries permit the flow of matter into or out of it.</p> <p>c) The boundaries prevent the flow of matter into or out of it.</p> <p>d) The boundaries prevent the flow of matter out of it but not vice versa.</p>	[1]
8	<p>Calculate the standard enthalpy of formation of $\text{CH}_3\text{OH(l)}$ from the following data: $\text{CH}_3\text{OH(l)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O(l)}$; $\Delta_r H^\circ = -726 \text{ kJ mol}^{-1}$ $\text{C(graphite)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$; $\Delta_c H^\circ = -393 \text{ kJ mol}^{-1}$ $\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O(l)}$; $\Delta_c H^\circ = -286 \text{ kJ mol}^{-1}$</p> <p>a) -209 kJ mol^{-1}</p> <p>b) -339 kJ mol^{-1}</p> <p>c) -269 kJ mol^{-1}</p> <p>d) -239 kJ mol^{-1}</p>	[1]
9	<p>The volume of gas is reduced to half from its original volume. The specific heat will be</p> <p>a) reduce to half</p> <p>b) be doubled</p>	[1]

	<p>c) remain constant</p> <p>d) increase four times</p>	
10	<p>In the case of compounds such as $\text{CH}_3\text{CH}_2\text{Cl}$, CH_3NO_2, etc. which of the following term is used as bond enthalpy?</p> <p>a) Minimum bond enthalpy</p> <p>b) Maximum bond enthalpy</p> <p>c) Bond dissociation enthalpy</p> <p>d) Mean bond enthalpy</p>	[1]
11	Define thermal energy.	[2]
12	Acetic acid (ethanoic acid) and hydrochloric acid react with KOH solution. The enthalpy of neutralization of ethanoic acid is $-55.8 \text{ kJ mol}^{-1}$ while that of hydrochloric acid is $-57.3 \text{ kJ mol}^{-1}$. Can you think of why are these different?	[2]
13	How will you calculate work done on an ideal gas in a compression, when the change in pressure is carried out in infinite steps?	[3]
14	At 60°C , dinitrogen tetroxide is fifty percent dissociated. Calculate the standard free energy change at this temperature and at one atmosphere.	[3]
15	<p>The standard Gibbs energy change for the reaction $\text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g)$ is $-33.2 \text{ kJ mol}^{-1}$ at 298 K.</p> <ol style="list-style-type: none"> Calculate the equilibrium constant for the above reaction. What would be the equilibrium constant if the reaction is written as $\frac{1}{2}\text{N}_2(g) + \frac{3}{2}\text{H}_2(g) \rightleftharpoons \text{NH}_3(g)$ What will be the equilibrium constant if the reaction is $\text{NH}_3(g) \rightleftharpoons \frac{1}{2}\text{N}_2(g) + \frac{3}{2}\text{H}_2(g)$ 	[5]
16	<ol style="list-style-type: none"> When 20.0 g of ammonium nitrate (NH_4NO_3) is dissolved in 125 g of water in a coffee-cup calorimeter, the temperature falls from 296.5 K to 286.4 K. Find the value of q for the calorimeter. (Treat heat capacity of water as the heat capacity of the calorimeter and its contents). A chemist while studying the properties of gaseous CCl_2F_2, a chlorofluorocarbon refrigerant, cooled a 1.25 g sample at constant atmospheric pressure of 1.0 atm from 320 K to 293 K. During cooling, the sample volume decreased from 274 to 248 	[5]

	mL. Calculate ΔH and ΔU for the chlorofluorocarbon for this process. For CCl_2F_2 , $C_p = 80.7 \text{ J/(mol K)}$.	
17	<p>Assertion (A): A process for which $\Delta S_{\text{system}} > 0$ as well as $\Delta H > 0$ passes from non - spontaneous to spontaneous state as temperature is increased. Reason (R): At higher temperature, $T\Delta S$ exceeds ΔH.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
18	<p>Assertion (A): Water in the liquid state is more stable than ice at room temperature. Reason (R): Water in liquid form has higher entropy than ice.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
19	<p>Calculate the molar solubility (S) of a salt like zirconium phosphate of molecular formula $(\text{Zr}^{4+})_3 (\text{PO}_4^{3-})_4$.</p> <p>a) $\left(\frac{K_{\text{sp}}}{6912}\right)^{\frac{1}{7}}$ b) $\left(\frac{K_{\text{sp}}}{8435}\right)^{\frac{1}{7}}$ c) $\left(\frac{K_{\text{sp}}}{5348}\right)^{\frac{1}{6}}$ d) $\left(\frac{K_{\text{sp}}}{9612}\right)^{\frac{1}{8}}$</p>	[1]
20	<p>If in the reaction $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$, x is that part of N_2O_4 which dissociates, then the number of molecules at equilibrium will be</p> <p>a) 1 b) 3 c) $1 + x$</p>	[1]

	d) $(1 + xy)^2$	
21	<p>During the process of transformation from liquid to vapour, the pressure exerted by the water molecules at a given temperature remains constant. This is called _____.</p> <p>a) freezing point of water b) vapour pressure of water c) boiling point of water d) melting point of water</p>	[1]
22	<p>The value of K_c for a reaction is directly related to the thermodynamics of the reaction and in particular with:</p> <p>a) Δn_{gas} b) ΔG c) Q_c d) Q_p</p>	[1]
23	<p>At a particular temperature and atmospheric pressure, the solid and liquid phases of a pure substance can exist in equilibrium. Which of the following term defines this temperature?</p> <p>a) Boiling point b) Phase change temperature c) Normal melting point and Freezing point d) Equilibrium temperature</p>	[1]
24	Is it possible to get precipitate of $Fe(OH)_3$ at $pH = 2$? Give reason.	[1]
25	What will be the conjugate bases for the following Brønsted acids: HF, H_2SO_4 and HCO_3^- ?	[1]
26	One millilitre solution of 0.01 M HCl is added to 1 L of sodium chloride solution. What will be the pH of the resulting solutions?	[2]
27	A certain buffer is made by mixing sodium formate and formic acid in water. With the help of equations explain how this buffer neutralises addition of a small amount of an acid or a base?	[2]
28	The solubility product of AgCl is 1.5×10^{-10} . Predict whether there will be any precipitation by mixing 50 mL of 0.01 M NaCl and 50 mL of 0.01 M $AgNO_3$ solution.	[3]

29	A 0.02 M solution of pyridinium hydrochloride has pH = 3.44. Calculate the ionization constant of pyridine.	[3]
30	One of the reactions that take place in producing steel from iron ore is the reduction of iron (II) oxide by carbon monoxide to give iron metal and CO ₂ . $\text{FeO(s)} + \text{CO(g)} \rightleftharpoons \text{Fe(s)} + \text{CO}_2\text{(g)}$; $K_p = 0.265$ atm at 1050 K What is the equilibrium partial pressures of CO and CO ₂ at 1050 K if the initial pressures are: $P_{\text{CO}} = 1.4$ atm and $P_{\text{CO}_2} = 0.80$ atm?	[5]
31	Calculate the pH of a 0.10M ammonia solution. Calculate the pH after 50.0 mL of this solution is treated with 25.0 mL of 0.10M HCl. The dissociation constant of ammonia, $K_b = 1.77 \times 10^{-5}$	[5]
32	Assertion (A): When ice and water are kept in a perfectly insulated thermos flask at 273 K and the atmospheric pressure, there is no change in mass of ice and water. Reason (R): The system is in static equilibrium a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	[1]
33	Assertion (A): For any chemical reaction at a particular temperature, the equilibrium constant is fixed and is a characteristic property. Reason (R): Equilibrium constant is independent of temperature. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	[1]
34	Assertion (A): A catalyst does not influence the value of the equilibrium constant. Reason (R): Catalyst influence the rate of both forward and backward reactions equally. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	[1]

35	<p>Assertion (A): BaCO_3 is more soluble in HNO_3 than in plain water. Reason (R): Carbonate is a weak base and reacts with the H^+ from the strong acid, causing the barium salt to dissociate.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
36	<p>Assertion: In addition of NH_4Cl to NH_4OH the solution, pH decreases but remains greater than 7. Reason: Addition of NH_4^+ ion decreases ionization of NH_4OH thus $[\text{OH}^-]$ is decreased, hence pH decreases.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
37	<p>Consider the following gaseous equilibria with equilibrium constants k_1 and k_2 respectively. $\text{SO}_{2(g)} + \frac{1}{2}\text{O}_{2(g)} \rightleftharpoons \text{SO}_{3(g)}$ $2\text{SO}_{3(g)} \rightleftharpoons 2\text{SO}_{2(g)} + \text{O}_{2(g)}$ The equilibrium constants are related as _____.</p> <p>a) $K_2 = \frac{2}{K_1^2}$ b) $2K_1 = K_2^2$ c) $K_2^2 = \frac{1}{K_1}$ d) $K_1^2 = \frac{1}{K_2}$</p>	[1]
38	<p>$\text{H}_2\text{O}(l) \rightleftharpoons \text{H}_2\text{O}(vap)$. This equation best illustrates the _____.</p> <p>a) Liquid - solid Equilibrium b) Ionic equilibrium c) Liquid - Vapour Equilibrium d) Solid - gas Equilibrium</p>	[1]
39	<p>State True or False:</p>	[2]

	<ol style="list-style-type: none"> 1. The process is known as isochoric in which the pressure remains constant throughout the change, i.e., $dP=0$. 2. Enthalpy, entropy, free energy, etc., are state variables. 	
40	<p>Fill in the blanks:</p> <ol style="list-style-type: none"> 1. An isolated system is one which can neither exchange _____ nor _____ with surroundings. 2. In adiabatic processes, no exchange of _____ in between system and surroundings takes place. 3. High temperature is favourable for _____ reactions. 4. At equilibrium stage, the rate of forward reaction is _____ to the rate of backward reaction. 	[4]
	<p>Question No. 41 to 45 are based on the given text. Read the text carefully and answer the questions: Entropy is the measure of degree of randomness or disorderness in an isolated system and is represented by the symbol S. Greater the degree of randomness, higher is the entropy. In case of chemical reactions, it shows the rearrangement of atoms or ions from one pattern in the reactants to another (in the products). If the structure of product is more disordered as compared to reactants, entropy of the reaction increases and if the structure of reactant is more disordered as compared to products, it results in decreased entropy. Entropy is also a state function, i.e. depends only on initial and final states of a system, so entropy change can be given as : $\Delta S = S_2 - S_1 = \Sigma S_{products} - \Sigma S_{reactants}$</p>	[5]
41	<p>Assertion (A): The phenomenon like flow of water down hill or fall of a stone on to the ground is an example of a spontaneous process. Reason (R): There is a net increase in potential energy in the direction of change.</p> <ol style="list-style-type: none"> a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true. 	
42	<p>Assertion (A): The dissolution of NH_4Cl in water is endothermic but it dissolves in water. Reason (R): On dissolution of NH_4Cl, entropy increases.</p> <ol style="list-style-type: none"> a) Both A and R are true and R is the correct explanation of A. 	

	<p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
43	<p>Assertion (A): The entropy decreases when the temperature of a crystalline solid is raised from 0 K to 115 K. Reason (R): On raising temperature from 0 K to 115 K, the constituent particles begin to move.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
44	<p>Assertion (A): Enthalpy of graphite is lower than that of diamond. Reason (R): Entropy of graphite is greater than that of diamond.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
45	<p>Assertion (A): Chlorine when solidified does not have zero entropy even at absolute zero. Reason (R): Chlorine is a pungent smelling gas and is difficult to solidify it.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
	<p>Question No. 46 to 50 are based on the given text. Read the text carefully and answer the questions: The enthalpy change occurring during a reaction when all the involved substances are in their standard states, is called the standard enthalpy of the reaction. The purest and most stable form of a substance at 1 bar and at a specified temperature is called its standard state. e.g. The standard state of solid iron at 500 K is pure iron at 1 bar. The standard enthalpy change is represented by writing the superscript \ominus to the symbol ΔH, i.e. by ΔH^\ominus.</p>	[5]

46	<p>In some reactions heat is evolved when</p> <p>a) None of these</p> <p>b) $H_R > H_P$</p> <p>c) $H_R = H_P$</p> <p>d) $H_{\text{R}} > H_{\text{P}}$</p>	
47	<p>The standard enthalpy of formation of diamond is not zero because</p> <p>a) None of these</p> <p>b) it is hard</p> <p>c) standard state is graphite</p> <p>d) standard state is diamond</p>	
48	<p>The standard heat of formation at 298 K for $\text{CCl}_4(\text{g})$, $\text{H}_2\text{O}(\text{g})$, $\text{CO}_2(\text{g})$ and $\text{HCl}(\text{g})$ are - 25.5, - 57.8, - 94.1 and - 22.1 kcal mol⁻¹ respectively. Calculate $\Delta_r H^\circ$ for the reaction. $\text{CCl}_4(\text{g}) + 2\text{H}_2\text{O}(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 4\text{HCl}(\text{g})$</p> <p>a) - 41.4 kcal</p> <p>b) - 82.8 kcal</p> <p>c) 82.8 kcal</p> <p>d) 41.4 kcal</p>	
49	<p>Calculate the enthalpy change for the following reaction. $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$ given enthalpies of formation of CH_4, CO_2 and H_2O are - 74.8 kJmol⁻¹, - 393.5 kJmol⁻¹ and - 286.2 kJmol⁻¹ respectively.</p> <p>a) 891.1 kJ</p> <p>b) 400 J</p> <p>c) 891.1 J</p> <p>d) 400 kJ</p>	
50	<p>The heat of combustion of carbon to CO_2 is - 393.5 kJ/mol. The heat released upon the formation of 35.2 g of CO_2 from carbon and oxygen gas is</p> <p>a) - 315 kJ</p>	

	<p>b) - 630 kJ</p> <p>c) - 3.15 kJ</p> <p>d) +315 kJ</p>	
	<p>Question No. 51 to 54 are based on the given text. Read the text carefully and answer the questions: The enthalpy change occurring during a reaction when all the involved substances are in their standard states, is called the standard enthalpy of the reaction . The purest and most stable form of a substance at 1 bar and at a specified temperature is called its standard state . e.g. The standard state of solid iron at 500 K is pure iron at 1 bar. The standard enthalpy change is represented by writing the superscript \ominus to the symbol ΔH , i.e. by ΔH^\ominus .</p>	[4]
51	If total enthalpy of reactants and products is H_R and H_P respectively, then what is the relation between H_R and H_P for exothermic reaction?	
52	Why is the standard enthalpy of formation of diamond not zero although it is an element?	
53	The standard heat of formation at 298 K for CCl_4 (g), H_2O (g), CO_2 (g) and HCl (g) are - 25.5, - 57.8, - 94.1 and - 22.1 kcal mol ⁻¹ respectively. Calculate ΔH^\ominus for the reaction. CCl_4 (g) + 2 H_2O (g) \rightarrow CO_2 (g) + 4 HCl (g)	
54	Calculate the enthalpy change for the following reaction. CH_4 (g) + 2 O_2 (g) \rightarrow CO_2 (g) + 2 H_2O (l) given enthalpies of formation of CH_4 , CO_2 and H_2O are - 74.8 kJ mol ⁻¹ , - 393.5 kJ mol ⁻¹ and - 286.2 kJ mol ⁻¹ respectively.	
	<p>Question No. 55 to 59 are based on the given text. Read the text carefully and answer the questions: The concentration of a substance in a saturated solution is defined as its solubility (S). Its value depends upon the nature of solvent and the temperature. Consider saturated solution of sparingly soluble electrolyte, A B. $\text{AB}_{\text{Solid}} \rightleftharpoons \text{AB}_{\text{Unionised molecules}} + \text{A}^+ + \text{B}^-$</p> <p>Applying the law of mass action, $K = \frac{[\text{A}^+][\text{B}^-]}{[\text{AB}]}$. Since, the solution is saturated, the concentration of unionised molecules of the electrolyte will be constant at a particular temperature, i.e. $[\text{AB}] = \text{constant } K'$ (say). Hence, $[\text{A}^+][\text{B}^-] = KK' = K_{sp(\text{constant})}$ This new constant K_{sp} is called solubility product and is defined as the product of the concentration of ions in a saturated solution of an electrolyte at a given temperature.</p>	[5]
55	<p>Assertion (A): $K_{sp} <$ ionic product. precipitate is formed. Reason (R): Solubility product (K_{sp}) is the highest limit of ionic product of the electrolyte in solutions.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p>	

	<p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
56	<p>Assertion (A): The solubility product of $[Zr_3(PO_4)_4]$ is $6912 S^7 M$. Reason (R): $Zr_3(PO_4)_4$ gives Zr^{4+} and PO_4^{3-} ion in its aqueous solution.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
57	<p>Assertion (A): If solubility of Ag_2CrO_4 mole/litre, its solubility product will be S^3. Reason (R): Solubility product of Ag_2CrO_4 is given by expression $K_{sp} = [Ag^+]^2 S$</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
58	<p>Assertion (A): Addition of silver ions to a mixture of aqueous sodium chloride and sodium bromide solution will first precipitate AgBr rather than AgCl. Reason (R): K_{sp} of AgCl < K_{sp} of AgBr</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
59	<p>Assertion (A): The solubility of salt of weak acids increases with decrease in pH. Reason (R): At lower pH anion get protonated & its concentration decreases</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p>	

	d) A is false but R is true.	
	<p>Question No. 60 to 64 are based on the given text. Read the text carefully and answer the questions: For the following reaction, $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$; $\Delta H = - 22.4 \text{ kcal}$; the favourable conditions are</p> <ol style="list-style-type: none"> 1. high concentration of N_2 and H_2 . 2. high pressure (as $\Delta n_g = - 2$). 3. low temperature (as the reaction is exothermic). <p>Although the low temperature favour the formation of NH_3 , yet an optimum temperature is set, as the rate of reaction is very slow at low temperature. A temperature of 500°C is selected and a pressure of 200 atm is applied in practice.</p>	[5]
60	<p>What is the expression of equilibrium constant for synthesis of NH_3 .</p> <ol style="list-style-type: none"> a) $\frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$ b) $\frac{[\text{H}_2]^3}{[\text{NH}_3]}$ c) $\frac{[\text{NH}_3]^2}{[\text{N}_2]}$ d) $\frac{[\text{N}_2]^2}{[\text{H}_2]}$ 	
61	<p>What happens to the yield of ammonia produced when the pressure is increased?</p> <ol style="list-style-type: none"> a) Increases b) Remain constant c) Decreases d) Increases and then decreases 	
62	<p>Which substance is used as a catalyst promoter in the synthesis of ammonia?</p> <ol style="list-style-type: none"> a) Mn b) Fe c) Cr d) Cu 	

63	<p>In the reaction, $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ Which side equilibrium is shifted when we increase the pressure of the system?</p> <p>a) Right b) Left c) First toward right and then left d) No change</p>	
64	<p>Formation of ammonia is a gaseous phase reaction taking place in 1 L flask at 127°C. If starting with 1 mole N_2 and 3 moles H_2, equilibrium mixture requires 500 mL of 1 M HCl. Then K_c is</p> <p>a) 0.04 b) 0.03 c) 0.3 d) 0.4</p>	
	<p>Question No. 65 to 68 are based on the given text. Read the text carefully and answer the questions: For the following reaction, $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$; $\Delta H = -22.4\text{ kcal}$; the favourable conditions are</p> <ol style="list-style-type: none"> high concentration of N_2 and H_2. high pressure (as $\Delta n_g = -2$). low temperature (as the reaction is exothermic). <p>Although the low temperature favour the formation of NH_3, yet an optimum temperature is set, as the rate of reaction is very slow at low temperature. A temperature of 500°C is selected and a pressure of 200 atm is applied in practice.</p>	[4]
65	What is the expression of equilibrium constant for synthesis of NH_3 ?	
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
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HOMEWORK

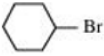
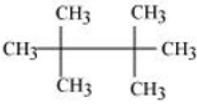
CHEMISTRY-XII		
1	The spin-only magnetic moment of $[\text{MnBr}_4]^{2-}$ is 5.9 BM. Predict the geometry of the complex ion?	[2]
2	Using the valence bond approach, deduce the shape and magnetic character of $[\text{Cr}(\text{CO})_6]$. [Atomic number of Cr = 24]	[2]
3	On the basis of crystal field theory explain why Co(III) forms a paramagnetic octahedral complex with weak field ligands whereas it forms a diamagnetic octahedral complex with strong field ligands.	[2]
4	Write the IUPAC name and draw the structure of coordination entities of $[\text{PtCl}(\text{NH}_3)_5\text{Cl}_3]$.	[2]
5	Square planar complexes with a coordination number 4 exhibits geometrical isomerism whereas tetrahedral complexes do not why?	[2]
6	Draw the structures and write the hybridized state of the central atom of each of the species. 4. $\text{Fe}(\text{CO})_5$ 5. trans - $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$	[3]
7	6. Calculate the spin only magnetic moment of the complex $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$. (Atomic number of Fe = 26) 7. Which out of the following two complexes is more stable and why? $[\text{CoF}_6]^{3-}$, $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ 8. Write the IUPAC name of the given complex: $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$	[3]
8	What is meant by chelate effect? Give an example.	[3]
9	9. Write the IUPAC name of the following complex: $\text{K}_2[\text{PdCl}_4]$ 10. Using crystal field theory, write the electronic configuration of d^5 ion, if $\Delta_o > P$. 11. What are Homoleptic complexes?	[3]
10	Using the valence bond theory predict the geometry and magnetic behaviour of $[\text{CoF}_6]^{3-}$. (Atomic number of Co =27)	[3]
11	Using crystal field theory, draw energy level diagram, write the electronic configuration of the central metal atom/ion and determine the magnetic moment value in the following: 12. $[\text{CoF}_6]^{3-}$, $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$, $[\text{Co}(\text{CN})_6]^{3-}$	[5]

	13. $[\text{FeF}_6]^{3-}$, $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$, $[\text{Fe}(\text{CN})_6]^{4-}$	
12	What is crystal field splitting energy? How does the magnitude of Δ_0 decide the actual configuration of d - orbitals in a coordination entity?	[5]
13	Give the oxidation state, d - orbital occupation and coordination number of the central metal ion in the following complexes: 14. $K_3[\text{Co}(\text{C}_2\text{O}_4)_3]$ 15. $\text{cis}-[\text{Cr}(\text{en})_2\text{Cl}_2]\text{Cl}$ 16. $(\text{NH}_4)_2[\text{CoF}_4]$ 17. $[\text{Mn}(\text{H}_2\text{O})_6]\text{SO}_4$	[5]
14	$[\text{Cr}(\text{NH}_3)_6]^{3+}$ is paramagnetic while $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic. Explain why?	[5]
15	$[\text{NiCl}_4]^{2-}$ is paramagnetic while $[\text{Ni}(\text{CO})_4]$ is diamagnetic though both are tetrahedral. Why?	[5]
16	Using the valence bond approach, deduce the shape and magnetic behaviour of $[\text{Cr}(\text{NH}_3)_6]^{3+}$ ion [At. No. of Cr = 24	[3]
17	Assertion (A): $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ complex is less stable than $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]^{2+}$ complex. Reason (R): $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ complex shows chelate effect. a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A). b) Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A). c) Assertion (A) is correct, but Reason (R) is an incorrect statement. d) Assertion (A) is incorrect, but Reason (R) is the correct statement.	[1]
18	Assertion (A): $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_2$ and $[\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_2$ are reducing in nature. Reason (R): Unpaired electrons are present in their d - orbitals. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	[1]

19	<p>Assertion (A): $[\text{Ni}(\text{CO})_4]$ is diamagnetic and tetrahedral in shape. Reason (R): $[\text{Ni}(\text{CO})_4]$ contains no unpaired electron and involves dsp^2 hybridisation.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
20	<p>Assertion (A): Potassium ferrocyanide is diamagnetic whereas potassium ferricyanide is paramagnetic. Reason (R): Crystal field splitting in ferrocyanide ion is greater than that of ferricyanide ion.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
21	<p>Assertion (A): The $[\text{Ni}(\text{en})_3\text{Cl}_2]$ (en = ethylenediamine) has lower stability than $[\text{Ni}(\text{NH}_3)_6\text{Cl}_2]$. Reason (R): In $[\text{Ni}(\text{en})_3\text{Cl}_2]$ the geometry of Ni is trigonal bipyramidal.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>	[1]
22	<p>Which branched chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of monosubstituted alkyl halide?</p> <p>a) Tertiary butyl chloride b) Neohexane c) Isohexane d) Neopentane</p>	[1]
23	<p>Vinyllic halides contain:</p> <p>a) a sp^3 - hybridized carbon atom, next to an aromatic ring, to which halogen atom is bonded.</p>	[1]

	<p>b) a halogen atom bonded to an sp^2 - hybridized carbon atom of a carbon - carbon double bond.</p> <p>c) a halogen atom bonded to an sp^3 - hybridized carbon atom next to carbon - carbon double bond.</p> <p>d) a sp^2 - hybridized carbon atom of an aromatic ring which is bonded to a halogen.</p>	
24	<p>A halogen used in potential blood substitutes in surgery is:</p> <p>a) Fluorine</p> <p>b) Bromine</p> <p>c) Iodine</p> <p>d) Chlorine</p>	[1]
25	<p>Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is</p> <p>a) Nucleophilic substitution reaction</p> <p>b) Free radical addition reaction</p> <p>c) Electrophilic elimination reaction</p> <p>d) Electrophilic substitution reaction</p>	[1]
26	<p>Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature?</p> <p>a) $CH_3CH_2CH_2OH$</p> <p>b) $CH_3CH_2 - \overset{\overset{CH_3}{ }}{\underset{\underset{CH_3}{ }}{C}} - OH$</p> <p>c) $CH_3CH_2 - \overset{\overset{CH_3}{ }}{C} - OH$</p> <p>d) $CH_3CH_2 - \overset{\overset{CH_3}{ }}{C} - CH_2OH$</p>	[1]
27	How may methyl bromide be preferentially converted to methyl cyanide and methyl isocyanide?	[2]
28	How will you bring the conversion? Benzene to biphenyl.	[2]
29	Write the structure of the major organic product of the reaction: $CH_3CH_2CH=CH_2 + HBr \xrightarrow{\text{Peroxide}}$	[2]

30	Which would undergo S_N1 reaction faster in the following pair? $CH_3 - CH_2 - CH_2 - Br$ and $CH_3 - \underset{\substack{ \\ Br}}{C}H - CH_3$.	[2]
31	Write the structure of the major organic product of the reaction: $C_6H_5ONa + C_2H_5Cl \rightarrow$	[2]
32	What happens when: 18. Propene is treated with HBr in presence of peroxide? 19. Benzene is treated with methyl chloride in presence of $AlCl_3$?	[3]
33	Compound A with molecular formula C_4H_9Br is treated with aq. KOH solution. The rate of this reaction depends upon the concentration of the compound A only. When another optically active isomer B of this compound was treated with aq. KOH solution, the rate of reaction was found to be dependent on concentration of compound and KOH both. 20. Write down the structural formula of both compounds A and B . 21. Out of these two compounds, which one will be converted to the product with inverted configuration.	[3]
34	A compound 'A' contains carbon and hydrogen only and has molecular mass of 72. Its photo chlorination gives a mixture containing only one monochloro and two dichloro hydrocarbons. Deduce the structure of A and the chlorinated products.	[3]
35	Complete the following: 22.  + $Cl_2 \xrightarrow{FeCl_3}$ 23. $CH_3COCH_3 + I_2 + NaOH \rightarrow$ 24. $CH_3CH_2CH_2Cl + NaI \xrightarrow[\text{heat}]{\text{Acetone}}$	[3]
36	Outline the preparation of the following compounds using a nucleophilic substitution reaction: 25. $CH_3OC(CH_3)_3$ 26. $CH_3CH_2CH_2N(CH_3)_2$ 27. $CH_3CH_2CH_2CH_2NO_2$ 28. $C_6H_5CH_2N^+ \equiv C^-$	[5]

	<p>29. $CH_3CH_2C - C \equiv CH_2CH_3$</p> <p>30. $C_6H_5CH_2OCOCH_3$</p> <p>31. $CH_3CH_2CH_2CN$</p> <p>32. $CH_3CH_2 - O - N = O$</p>	
37	<p>Write structures of the following compounds:</p> <p>33. 2 - Chloro - 3 - methylpentane</p> <p>34. 1 - Chloro - 4 - ethylcyclohexane</p> <p>35. 4 - tert. Butyl - 3 - iodoheptane</p> <p>36. 1,4 - Dibromobut - 2 - ene</p> <p>37. 1 - Bromo - 4 - sec - butyl - 2 - methylbenzene</p>	[5]
38	<p>Identify A, B, C, D, E, R and R^1 in the following:</p> <p></p> <p>$+ Mg \xrightarrow{\text{dry ether}} A \xrightarrow{H_2O} B$ $R - Br + Mg \xrightarrow{\text{dry ether}} C \xrightarrow{d_2O} CH_3\underset{\substack{ \\ D}}{C}HCH_3$</p> <p>$\xleftarrow{Na/ether} R^1 - X \xrightarrow{Mg} D \xrightarrow{H_2O} E$</p> <p></p>	[5]
39	Give the uses of freon 12, DDT, carbon tetrachloride and iodoform.	[5]
40	<p>Read the passage given below and answer any four out of the following questions: Nucleophilic substitution reactions are of two types; substitution nucleophilic bimolecular ($S_N 2$) and substitution nucleophilic unimolecular ($S_N 1$) depending on molecules taking part in determining the rate of reaction. Reactivity of alkyl halide towards $S_N 1$ and $S_N 2$ reactions depends on various factors such as steric hindrance, stability of intermediate or transition state and polarity of solvent. $S_N 2$ reaction mechanism is favoured mostly by primary alkyl halide then secondary and then tertiary. This order is reversed in case of $S_N 1$ reactions. The following questions are multiple - choice questions. Choose the most appropriate answer:</p> <p>38. Which of the following is most reactive towards nucleophilic substitution reaction?</p> <p>a. C_6H_5Cl</p> <p>b. $CH_2=CHCl$</p>	[4]

	<p>c. $\text{ClCH}_2\text{CH}=\text{CH}_2$</p> <p>d. $\text{CH}_3\text{CH}=\text{CHCl}$</p> <p>39. Isopropyl chloride undergoes hydrolysis by</p> <p>a. $\text{S}_\text{N}1$ mechanism</p> <p>b. $\text{S}_\text{N}2$ mechanism</p> <p>c. $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ mechanism</p> <p>d. neither $\text{S}_\text{N}1$ nor $\text{S}_\text{N}2$ mechanism.</p> <p>40. The most reactive nucleophile among the following is</p> <p>a. CH_3O^-</p> <p>b. $\text{C}_6\text{H}_5\text{O}^-$</p> <p>c. $(\text{CH}_3)_2\text{CHO}^-$</p> <p>d. $(\text{CH}_3)_3\text{CO}^-$</p> <p>41. Tertiary alkyl halides are practically inert to substitution by $\text{S}_\text{N}2$ mechanism because of</p> <p>a. insolubility</p> <p>b. instability</p> <p>c. inductive effect</p> <p>d. steric hindrance.</p> <p>42. Which of the following is the correct order of decreasing $\text{S}_\text{N}2$ reactivity?</p> <p>a. $\text{RCH}_2\text{X} > \text{R}_2\text{CHX} > \text{R}_3\text{CX}$</p> <p>b. $\text{R}_3\text{CX} > \text{R}_2\text{CHX} > \text{RCH}_2\text{X}$</p> <p>c. $\text{R}_2\text{CHX} > \text{R}_3\text{CX} > \text{RCH}_2\text{X}$</p> <p>d. $\text{RCH}_2\text{X} > \text{R}_3\text{CX} > \text{R}_2\text{CHX}$</p>	
41	<p>Complete: $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3 \xrightarrow{\text{HBr}} \text{X} \xrightarrow[\text{KOH}]{\text{alc}} \text{Y} \xrightarrow{\text{HBr/peroxide}} \text{Z}$</p>	[3]
42	<p>Assertion (A): Aryl iodides can be prepared by reaction of arenes with iodine in the presence of an oxidising agent. Reason (R): Oxidising agent oxidises I_2 into HI.</p>	[1]

	<p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
43	<p>Assertion (A): The rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water. Reason (R): Hydrolysis of methyl chloride follows second order kinetics.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	[1]
44	<p>Assertion (A): In comparison to ethyl chloride it is difficult to carry out nucleophilic substitution on vinyl chloride. Reason (R): Vinyl group is electron - donating.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	[1]
45	<p>Assertion (A): Addition of Br₂ to but - 1 - ene gives two optical isomers. Reason (R): The product contains one asymmetric carbon atom.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	[1]
46	<p>Assertion (A): 2 - Bromobutane on reaction with C₂H₅O[⊖]Na[⊕] give 2 - Butene. Reason (R): 1 - Butene is more stable than 2 - Butene.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p>	[1]

	d) A is false but R is true.	
47	Ethyl benzene cannot be prepared by _____. a) Clemmensen reduction b) Wurtz – Fittig reaction c) Friedel – Crafts reaction d) Wurtz reaction	[1]
48	Reactions with iodine in preparation of aryl iodide from arenes require the presence of _____. a) diazonium salt b) an oxidizing agent c) a reducing agent d) ZnCl ₂ catalyst	[1]
49	Reaction of C ₆ H ₅ CH ₂ Br with aqueous sodium hydroxide follows _____. a) S _N 1 mechanism b) S _N 2 mechanism c) Any of the two depending upon the temperature of the reaction d) Saytzeff rule	[1]
50	The position of –Br in the compound in CH ₃ CH=CHC(Br)(CH ₃) ₂ can be classified as _____. a) Aryl b) Secondary c) Vinyl d) Allyl	[1]
51	In the following reaction, the compound used in the reaction for synthesizing ethyl fluoride is: _____ + AgF → H ₃ C– F + AgBr a) H ₃ C– Br, Sandmeyer's reaction b) H ₃ C– Br, Electrophilic substitution	[1]

	<p>c) $\text{H}_3\text{C}-\text{Br}$, Swartz reaction</p> <p>d) $\text{H}_3\text{C}-\text{Br}$, Free radical fluorination of methane</p>	
52	<p>Fill in the blanks:</p> <ol style="list-style-type: none"> In valence bond theory, the geometry of $\text{Ni}(\text{CO})_4$ is _____. The complex, $[\text{Cr}(\text{NH}_3)_6\text{Cl}_3]$ has _____ shape. The oxidation state of the central metal is shown by _____ in bracket immediately following its name. The neutral molecules, anions, or cations which are directly linked with the central metal atom or ion in a complex ion are called _____. In the inner orbital (low spin) octahedral complexes involve _____ hybridization. _____ gives a precipitate with silver nitrate on heating. General formula of haloarene is _____. _____ are insoluble in water but are soluble in benzene. Haloalkanes contain halogen atom (s) attached to the _____ hybridised carbon atom(s) of an alkyl group. 	[9]
	<p>Question No. 53 to 56 are based on the given text. Read the text carefully and answer the questions: The crystal field theory (CFT) is an electrostatic model which considers the metal - ligand bond to be ionic arising purely from electrostatic interactions between the metal ion and the ligand. Ligands are treated as point charges in case of anions or point dipoles in case of neutral molecules. The five d orbitals in an isolated gaseous metal atom/ion have the same energy, i.e., they are degenerate. In an octahedral coordination entity with six ligands surrounding the metal atom/ion, there will be repulsion between the electrons in metal d orbitals and the electrons (or negative charges) of the ligands. This splitting of the degenerate levels due to the presence of ligands in a definite geometry is termed as crystal field splitting and the energy separation is denoted by Δ_0. The colour in the coordination compounds can be readily explained in terms of the crystal field theory.</p>	[4]
53	<p>Assertion (A): In tetrahedral coordination entity formation, the d orbital splitting is inverted and is smaller as compared to the octahedral field splitting. Reason (R): Spectrochemical series is based on the absorption of light by complexes with different ligands.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p>	

	<p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
54	<p>Assertion (A): The $d_{x^2-y^2}$ and d_{z^2} orbitals which point towards the axes along the direction of the ligand will experience more repulsion. Reason (R): The d_{xy}, d_{yz} and d_{xz} orbitals which are directed between the axes will be lowered in energy.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
55	<p>Assertion (A): The complex $[Ti(H_2O)_6]^{3+}$, which is red in colour. Reason (R): The crystal field theory attributes the colour of the coordination compounds to d - d transition of the electron.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
56	<p>Assertion (A): Ligands for which $\Delta_0 < P$ are known as weak field ligands and form high spin complexes. Reason (R): If $\Delta_0 > P$, then the fourth electron enters one of the e_g orbitals giving the configuration $t_{2g}^3 e_g^1$.</p> <p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>	
	<p>Question No. 57 to 61 are based on the given text. Read the text carefully and answer the questions: A primary alkyl halide (A) C_4H_9Br reacted with alcoholic KOH to give compound (B). Compound (B) is reacted with HBr to give compound (C) which is an isomer of (A). When (A) reacted with sodium metal, it gave a compound (D) C_8H_{18} that is different than</p>	[5]

	the compound obtained when n - butyl bromide reacted with sodium metal.	
57	<p>IUPAC name of compound (D) is</p> <p>a) 2,5 - dimethylhexane</p> <p>b) 3,4 - dimethylhexane</p> <p>c) 2 - methylheptane</p> <p>d) n - octane</p>	
58	<p>When compound (C) is treated with alc. KOH and then treated with HBr in presence of peroxide, the compound obtained is</p> <p>a) $CH_3CH_2CH_2 \overset{\text{C}}{\underset{\text{CH}_3}{ }} H - Br$</p> <p>b) $CH_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{ }} C - Br$</p> <p>c) $CH_3 CH_2 CH_2 CH_2 Br$</p> <p>d) $CH_3 - \overset{\text{CH}_3}{\underset{\text{H}}{ }} C - CH_2 - Br$</p>	
59	<p>Compound (A) is</p> <p>a) $CH_3 CH_2 CH_2 Br$</p> <p>b) $CH_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{ }} C - Br$</p> <p>c) $CH_3 \overset{\text{C}}{\underset{\text{CH}_3}{ }} H - CH_2 Br$</p> <p>d) $CH_3 CH_2 CH_2 CH_2 Br$</p>	
60	<p>Which type of isomerism is present in compound (A) and (C)?</p> <p>a) Chain</p> <p>b) Positional</p> <p>c) Functional</p> <p>d) Both positional and functional</p>	
61	<p>Identify compound (B).</p> <p>a) $CH_3 - \overset{\text{C}}{\underset{\text{CH}_3}{ }} = CH_2$</p> <p>b) None of these</p>	

	<p>c) $\text{CH}_3 - \text{CH}=\text{CH} - \text{CH}_3$</p> <p>d) $\text{CH}_3 - \text{CH}_2 - \text{CH}=\text{CH}_2$</p>	
	<p>Question No. 62 to 65 are based on the given text. Read the text carefully and answer the questions: An organic compound X which is manufactured by heating a mixture of chloral and chlorobenzene in the presence of concentrated H_2SO_4 is used as an insecticide. The use of compound X is banned in many countries. The compound is very effective against mosquitoes which spread malaria.</p>	[4]
62	Name the compound X.	
63	Give its structural formula.	
64	Write the IUPAC name of compound X.	
65	Why is the use of compound X banned in many countries? Should we also advocate the ban of this compound though it is banned in many countries?	