THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

AIM HIGH, TOGETHER WE FLY

General Instructions:
1. The Question Paper contains four sections.
2. Section A has 18 questions and are Multiple choice type carrying 1 mark each
3. Section B has 3 questions carrying 2 marks each
4. Section C has 2 questions carrying 3 marks each
5. Section D has 1 question carrying 5 marks
5. Attempt all questions

Q No.	SECTION A (1 mark each)
1.	Which of the following figures represent 1 mol of dioxygen gas at STP? a) 16g of gas b) 22.7L of gas c) 11.2L of gas d) 3.011×10^{23} dioxygen molecules
2.	The $\Delta_f H^\circ$ at 298K for CCl_4, H_2O, CO_2 and HCl are -25.5, -57.8, -94.1 and -22.1 K cal per mol respectively. Then ΔH at 298K for the reaction is a) -32.9 Kcal b) -414.4 Kcal c) -99.2 Kcal d) -323.6 Kcal
3.	Van der Waals equation of state is obeyed by real gases. For n moles of a real gas, the expression will be (a) $\left(\dfrac{P}{n} + \dfrac{na}{V^2}\right)\left(\dfrac{V}{n-b}\right) = RT$ (b) $\left(P + \dfrac{a}{V^2}\right)(V-b) = nRT$ (c) $\left(P + \dfrac{na}{V^2}\right)(nV-b) = nRT$ (d) $\left(P + \dfrac{n^2 a}{V^2}\right)(V - nb) = nRT$
4.	The reaction quotient, Q_c is useful in predicting the direction of the reaction. Which of the following is incorrect? a) If $Q_c > Kc$, net reaction goes from right to left b) If $Q_c < Kc$, net reaction goes from left to right

	c) If Q_c=Kc reaction is in equilibrium d) If Q_c>Kc, net reaction goes from left to right
5.	The order of decreasing ionisation enthalpy in alkali metal is a) Na>Li>K>Rb b) Rb>Na>K>Li c) Li>Na>K>Rb d) K>Li>Na>Rb
6.	For the reaction, $$SO_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons SO_{3(g)},$$ If K_p= $K_c(RT)^x$ where the symbols have their usual meaning, then the value of x is a) 1 b) -1 c) -1/2 d) 1/2
7.	When sodium is dissolved in liquid ammonia, a solution of deep blue colour is obtained. The colour of the solution is due to a) ammoniated electron b) sodium ion c) sodium amide d) ammoniated sodium ion
8.	Meta directing group in aromatic substitution is a) $-CH_3$ b) -OH c) $-NO_2$ d) $-OCH_3$
9.	The correct order of acidity of alkynes is a) Ethyne>Propyne>But-2-yne b) Ethyne>But-2-yne>Propyne c) But-2-yne>Propyne>Ethyne d) Propyne>Ethyne>But-2-yne
10.	Carbon forms large number of compounds because it has a) low electron affinity b) no d-orbitals in the valence shell c) variable valency d) property of catenation
11.	The hybridisation of C in diamond is a) sp b) sp^2 c) sp^3 d) sp^3d^2
12.	Benzene undergoes hydrogenation in presence of Ni catalyst to give a) Toluene b) Phenol c) Cyclohexane

	d) Ethylbenzene
13.	Which of the following alkali metals give hydrated salts? a) Li b) Na c) K d) Cs
14.	In heavier elements of group 14, the tendency to show +2 oxidation state increases in the order a) Ge<Sn<Pb b) Pb<Sn<Ge c) Sn<Ge<Pb d) Pb<Ge<Sn
15.	The reagents used to convert bromomethane to ethane is a) H_2 in presence of Pt b) Na in dry ether c) CH_3Cl in presence of anhyd. $AlCl_3$ d) NaOH and CaO
16.	Chloroethane reacts with alc.KOH to give a) Butane b) Ethane c) Ethene d) Butene
17.	Which of the following condition is not favourable for the feasibility of a reaction? a) ΔH=-ve, ΔS=+ve at all temperatures b) ΔH= -ve, ΔS= -ve at low temperature c) ΔH= +ve, ΔS= +ve at high temperature d) ΔH= +ve, ΔS= -ve at all temperatures
18.	7.0 g of a gas at 300 K and 1 atm occupies a volume of 4.1 litre. What is the molecular mass of the gas? (Given: R= 0.0821 L atm K^{-1} mol^{-1}) (a) 42 (b) 38.24 (c) 14.5 (d) 46.5
	SECTION B **(2 marks each)**
19.	A vessel of 120mL capacity contains certain amount of gas at 35^0C and 1.2 bar pressure. The gas is transferred to another vessel of volume 180mL at 35^0C. What would be its pressure?
20.	Give reasons: a) Alkali metals imparts characteristic colour to the flame. b) The first ionisation enthalpy of the alkaline earth metals are higher than those of the corresponding group 1 metals.
21.	Explain the following: a) Why there is a phenomenal decrease in ionisation enthalpy from carbon to Si?

	b) Why gallium has a lower atomic radius as compared to Al?
	Section C
	(3 marks each)
22.	Calculate the standard enthalpy of formation of CH_3OH from the following data. CH_3OH (l) + $\dfrac{3}{2}$ O_2(g) $\rightarrow$ CO_2(g) + $2H_2O$(l) ; $\Delta_r H^\ominus$ = –726 kJ mol^{-1} C(graphite) + O_2(g) $\rightarrow$ CO_2(g) ; $\Delta_c H^\ominus$ = –393 kJ mol^{-1} H_2(g) + $\dfrac{1}{2}$ O_2(g) $\rightarrow$ H_2O(l) ; $\Delta_f H^\ominus$ = –286 kJ mol^{-1}.
23.	At 473 K, equilibrium constant K_c for decomposition of phosphorus pentachloride, PCl_5 is 8.3 ×10^{-3}. If decomposition is depicted as, PCl_5 (g) $\rightleftharpoons$ PCl_3 (g) + Cl_2 (g) $\Delta_r H^\ominus$ = 124.0 kJ mol^{-1} a) Write an expression for K_c for the reaction. b) What is the value of K_c for the reverse reaction at the same temperature? c) What is the effect of temperature on this equilibrium?
	Section D
	(5 marks)
24.	I. Carry out the following conversions a) Benzene to toluene b) Benzene to nitrobenzene II What is the major product of the reaction of But-1-ene with HBr? III Complete the reaction $\qquad\qquad$ $O_3/Zn/H_2O$ CH_3-C=CH_2 $\quad\xrightarrow{\hspace{2cm}}$ $\quad\quad\mid$ $\quad\quad CH_3$ IV. Draw the cis-trans isomers of 1,2-Dibromoethene