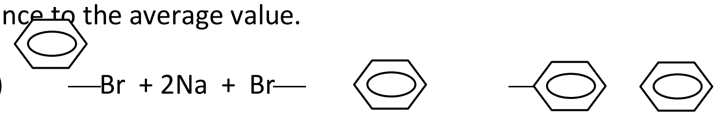
Guess Paper – 2014
Class – XI
Subject –Chemistry

SET- A

MM : 70

S.N.	Expected Answer	Marks	Total Marks
1.	Mass of an atom = gram atomic mass/Avogadro's No.	1	1
2.	(i) pent-4-yn-2-ol (ii) hexan-4-on-1-oic acid	½ + ½	1
3.	'n' cannot be zero.	1	1
4.	In calculating partial pressures.	1	1
5.	Shifting of π-electrons temporarily towards the attacking reagent.	1	1
6.	Standard enthalpy of formation.	1	1
7.	Alkaline. Due to anionic hydrolysis.	1	1
8.	Staggered. Due to least stearic repulsion.	½ + ½	1
9.	Accuracy is close agreement between average value and exact value and precision means different measurements are close among themselves and hence to the average value.	2	2
10.	(a)  Bromo benzene ... biphenyl	1	2
	(b) $2CH_4 + 2O_2 \xrightarrow[Cu]{250^0C/100atm} 2\,CH_3OH$	1	
11.	(a) Similar properties are repeated after these nos.		
	(b) Due to $1s^2$ configuration.	1	2

	(i) III (ii) I	1	
12.	(iii) II (iv) II	½ + ½	2
	Emission spectra – When light from a source is directly analyzed after passing through a prism.	½ + ½	
13.		1	2
	Absorption spectra : When light from a source is first passed through a chemical and then analyzed after passing through a prism.		
		1	
	OR		
	(a) $1/\lambda = 109{,}677(1/5^2 - 1/n_2^2)$		
	(b) Energy of an electron decreases when it comes from higher to lower shell.		
		1	2
	(a) Functional isomers. Same molecular formula and different functional groups.	1	
	(b) Tautomers.		
14.		1	2
	Example ($NH_4OH + NH_4Cl$) — extra hydroxyl ions combine with ammonium ions to form weak base.amm. hydroxide. Extra H^+ ions combine with OH^- to form water.		
		1	
	Conversion of alkanes to benzene under suitable conditions:		
15.		2	2
	n-hexane $\xrightarrow[480^0C-550^0C]{Cr_2O_3/Al_2O_3}$ cyclohexane $\xrightarrow[480^0C-550^0C]{Cr_2O_3/Al_2O_3}$		
16.	(a) Due to low ionization energy, their electrons get easily excited to higher energy state and return to ground or intermediate states thereby emitting light.	2	2
17.	(b) The extent of hydration and hence weight of the ion in aq. Solution decreases in the same order.	1	2

	(a) Due to poor screening of intermittent d-electrons.		
	(b) Due to more stable +1 state.	1	
	Dehydrohalogenation in which H-atom is released from a β-carbon		
18.	$H_3C^{\beta}—C^{\alpha}H_2Br \xrightarrow{KOH(alc.)} H_2C=CH_2$	1	2
19.	(a) Due to increasing alkyl groups, +I effect increase and positive charge is dispersed more and more and therefore stability increases in the same order.	2	3
	(b) For a very short span ohf time the H-atom is held with C-atom even without a sigma bond.	1	
20.		1½	3
	The gases trap solar heat and increase atmospheric temp. leading to global warming. The most dreadful consequence will be melting of polar ice resulting in increase of sea level causing floods.		
	(a) Electron pairing in degenerate orbitals cannot start until each one of them is first singly filled with one electron each with parallel spin.	1½	3
21.	(b) (b) **Solution** : given, $v = 45ms^{-1}$; $m = 40g = 40 \times 10^{-3}$ Now Δv = 2% of $45ms^{-1} = (2/100) \times 45 = 0.9ms^{-1}$.According to Heisenberg's principle, $\Delta x.\ m.\ \Delta v = h / 4\pi$,	3	
	or, $\Delta x = h / 4\pi.\ m.\ \Delta v$,		
22.	or, $\Delta x =(6.626 \times 10\text{-}^{34}kgm^2s^{-1}) / (4 \times 3.14 \times 40 \times 10^{-3}kg \times 0.9ms^{-1}) = 1.46 \times 10^{-33}$ m	1	3
	(i) Force of friction between two parallel layers of fluid unit distance apart , having unit surface area and a velocity gradient of $1ms^{-1}$	2	
	(ii) Solve using the formula PV = nRT, where P = 1 bar,	No step marking	
	R = 0.083 bar L $K^{-1}mol^{-1}$, n= 8.8/44		
	Derivation : For a general reaction,		

23.	$aA + bB \rightleftharpoons cC + dD$,	1	3
	$Kc = [C]^c [D]^d / [A]^a [B]^b$	2	
	or, $Kc = C_C{}^c . C_D{}^d / C_A{}^a . C_B{}^b$	No step marking	
	where C_A,C_B,C_C and C_D are the molar concentrations of A,B,C and D respectively. Also for gaseous phase ,	2	
24.	$Kp = P_C{}^c .P_D{}^d / P_A{}^a .P_B{}^b$	No step marking	3
	where P_A,P_B,P_C and P_D are partial pressures of A,B,C and D respectively. Now, for ideal gas , PV = nRT or, P = n/VRT, where n/V = C, i.e., molar concentration. For A,B,C and D therefore, we may write, $P_A = C_ART$, $P_B = C_BRT$, $P_C = C_CRT$ and $P_D = C_DRT$ .Therefore we have,		
	$Kp = C_CRT^c . C_DRT^d / C_ART^a .C_BRT^b$		
	$= C_C{}^c .C_D{}^d / C_A{}^a .C_B{}^b (RT)^{\{(c+d) - (a+b)\}}$		
	$= Kc (RT)^{\Delta n}$ where $\Delta n = \{(c+d) - (a+b)\}$		
	(ii) (a) CO_3^- (b) CH_3COO^-		
	(a) Decrease in oxidation no.		
	(b) **Solution :**		
	Indicating oxidation number of different species,		
	(0) (+5) (+2) (-3)		
	$Sn(s) + NO_3^-(aq) + H^+(aq) \rightarrow Sn^{2+}(aq) + NH_4^+(aq) + H_2O(l)$		
	gives,		

25.	$Sn(s) \rightarrow Sn^{2+}(aq)$ ....(i) as oxidation half Balancing oxidation half, we get $Sn(s) \rightarrow Sn^{2+}(aq) + 2e^-$ ....(ii) Again, reduction half is, $NO_3^-(aq) \rightarrow NH_4^+(aq)$............(iii). As oxidation no. of N decreases from +5 to -3, each N atom gains 8 electrons. Therefore we get, $NO_3^-(aq) + 8e^- \rightarrow NH_4^+(aq)$.......(iv) Balancing for O atoms we get, $NO_3^-(aq) + 8e^- \rightarrow NH_4^+(aq) + 3H_2O(l)$......(v) Balancing for H atoms gives, $10H^+ + NO_3^-(aq) + 8e^- \rightarrow NH_4^+(aq) + 3H_2O(l)$.........(vi) Now, multiplying (ii) by 4 gives, $4Sn(s) \rightarrow 4Sn^{2+}(aq) + 8e^-$ ....(vii). Adding (vi) & (vii) we get, $4Sn(s) + NO_3^-(aq) + 10H^+(aq) \rightarrow 4Sn(aq) + NH_4^+(aq) + 3H_2O(l)$ (a) Hydrides in which metal to hydrogen ration is fractional. (b) Anion-exchange resins consists of giant hydrocarbon framework attached to basic groups such as OH^- with the general composition $R—NH_3^+OH^-$. (c) A sample of H_2O_2 whose iml gives 30 ml of dioxygen at STP. (a) Reaction of quick lime with water to give slaked lime : $CaO + H_2O \rightarrow Ca(OH)_2$	½ + ½ 1 2 No step marking	3

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<tr><td></td><td>(b) They themselves are strongest reducing agent.</td><td></td><td></td></tr>
<tr><td></td><td>(c) Potassium bicarbonate fromed during the process is water soluble.</td><td></td><td></td></tr>
<tr><td></td><td>OR</td><td>1</td><td></td></tr>
<tr><td>26.</td><td>(a) Mg, diagonal relationship.</td><td>1</td><td>3</td></tr>
<tr><td></td><td>(b) (c) $2CaSO_4 . 2H_2O \xrightarrow{\text{above 393 K}} 2CaSO_4 + 2H_2O$</td><td></td><td></td></tr>
<tr><td></td><td>(gypsum) anhyd.</td><td></td><td></td></tr>
<tr><td></td><td>(c) Due to maximum polarizing power of Li^+</td><td>1</td><td></td></tr>
<tr><td></td><td>(a) (i) Due to two lone pairs in H_2O there is greater l.p-l.p repulsion.</td><td>½</td><td></td></tr>
<tr><td>27.</td><td>(ii) By the time lateral overlap would take place, head on overlap would have already taken place.</td><td>½</td><td>3</td></tr>
<tr><td></td><td></td><td>1</td><td></td></tr>
<tr><td></td><td>(b) For $H_2^+(1)$: $\sigma (1s)^1 \sigma^*(1s)^0$</td><td>1</td><td></td></tr>
<tr><td></td><td>therefore bond order is ½(1-0) = 0.5</td><td></td><td></td></tr>
<tr><td></td><td>magnetic behaviour : paramagnetic</td><td></td><td></td></tr>
<tr><td></td><td>for $H_2^-(1)$: $\sigma(1s)^2 \sigma^*(1s)^1$</td><td>1</td><td></td></tr>
<tr><td></td><td>bond order = ½(2-1) = 0.5</td><td>1</td><td>3</td></tr>
<tr><td></td><td>magnetic behaviour : paramagnetic</td><td></td><td></td></tr>
<tr><td></td><td>Since H_2^- contains one electron in the anti-bonding M.O. so it is less stable.</td><td>1</td><td></td></tr>
<tr><td></td><td>OR</td><td>1</td><td>5</td></tr>
<tr><td>28.</td><td>(a)</td><td>1</td><td></td></tr>
<tr><td></td><td><table><tr><th>Bonding molecular orbitals</th><th>Non-bonding molecular orbitals</th></tr><tr><td>Lower in energy</td><td>Higher in energy</td></tr><tr><td>Chemical bond is formed</td><td>No bond formation takes place.</td></tr></table></td><td>3
No step</td><td></td></tr>
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	(b) MO confg. of	marking	
	N_2^+ : KK $[\sigma(2s^2)]$ $[\sigma^*(2s^2)]$ $[\pi(2px^2)]$ $[\pi(2py^2)]$ $\sigma(2pz^1)$,		
	B.O. = ½ { 9 – 4} = 2.5		
	N_2 : KK $[\sigma(2s^2)]$ $[\sigma^*(2s^2)]$ $[\pi(2px^2)]$ $[\pi(2py^2)]$ $[\sigma(2pz^2)]$		
	B.O. = ½{ 10 – 4} = 3.0		
	As clear from above, B.O. for N_2^+ is less than that for N_2 . As clear from above, Due to greater bond order, N_2^+ is more stable than N_2. Also due to unpaired electron, N_2^+ is paramagnetic.		
	(a) We know that, H = U + PV...........(i). For initial state,		
	$H_1 = U_1 + PV_1$............(ii). For final state,		
	$H_2 = U_2 + PV_2$............(iii), (iii) – (ii) gives,	1	
	$(H_2 – H_1) = (U_2 – U_1) + P(V_2 – V_1)$, or,	1	5
	$\Delta H = \Delta U + P\Delta V$............(iv). Also $PV_1 = n_1RT$ and $PV_2 =$		
	n_2RT assuming ideal gas behaviour. Therefore, $P\Delta V$	3	
	$= (n_2 – n_1)RT = \Delta n RT$. Substituting for $P\Delta V$ in (iv) we get	No step marking	
	$\Delta H = \Delta U + \Delta nRT$.		
	(b)Required equation is $C_6H_{12}O_6(s) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l)$		
	Reversing eqn. (iii) , multiplying (i) & (ii) by 6 and adding we get,		
	6C(graphite) + $6O_2(g) + 6H_2(g) + 3O_2(g) + C_6H_{12}O_6(s) \rightarrow 6CO_2(g) + 6H_2O(l)$ + 6C(graphite) + $3O_2(g) + 6H_2(g)$		
	Or, $C_6H_{12}O_6(s) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l)$,	2	
29.	Corresponding enthalpy change = $6\times(-395.0) + 6\times(-269.4) – (–1169.8) = –2816.6\ KJmol^{-1}$		5

	OR (a) Due to Complete dissociation, always same number of H^+ and OH^- ions are obtained. (b) Solve as per Hess's law.		
	(a) On heating, borax loses its water of crystallisation swells up to form a puffy mass. On further heating it melts into a clear liquid which solidifies to a transparent glass like bead which consists of sodium meta borate ($NaBO_2$) and boric anhydride (B_2O_3). $Na_2B_4O_7.10H_2O \xrightarrow{Heat} Na_2B_4O_7 + 10H_2O$ (borax) $Na_2B_4O_7 \xrightarrow{Heat} 2NaBO_2 + B_2O_3$ (sodium meta borate) (boric anhydride)	3 No step marking	
	The glassy bead is commonly known as borax bead and is employed for detection of certain coloured basic radicals such as Ni^{2+}, Co^{2+}, Cr^{3+}, Cu^{2+}, etc.	2	
	(b) Due to absence of d-orbitals in C atom and their presence in Si atom lone pairs from 'O' atom of water can be accepted by 'Si' atom in the latter.	3	5
30.	**OR** (a) Discuss in terms of banana bond structure (3c-2e bond) as explained in the class.	3 for complete description	

	(b) (i) Due to inert pair effect, +2 state for Pb is more stable than that for Sn whereas +4 state for Sn is more stable than that for Pb. (ii) Due to larger size silicon atoms cannot form pπ– pπ multiple bonds. **Paper Submitted By:** **Name: Paramjeet Singh Hora** **Email: amol.preet@yahoo.com** **Phone No. 9838002681**	2 3 For complete description 1 1	5
