#### Module Name : MSc Chemistry-E Exam Date : 20-Sep-2020 Batch : 09:00-11:00

Sr. No.	Client Question ID	a Question Body and Alternatives	Marks	Negative Marks
Object	tive Question			
1	1	<i>A,B,C,D,E,F,G</i> are amines, each one of which forms amine hydrochloride containing 32.4296 chlorine. What will be the molecular formula of amine?	4.0	1.00
		$\stackrel{A1}{:} C_6 H_5 N H_2$		
		A2 C <sub>3</sub> H <sub>7</sub> NH <sub>2</sub>		
		$^{A3}_{:}$ C <sub>4</sub> H <sub>9</sub> NH <sub>2</sub>		
		<sup>A4</sup> CH <sub>3</sub> NH <sub>2</sub>		
Object	tive Operation			
2	2	It is required to make a buffer solution of $pH = 4$ using acetic acid and sodium acetate. How much sodium acetate is to be added to 1 L of acetic acid? (Dissociation constant of acetic acid = $1.8 \times 10^{-5}$ )	4.0	1.00
		A1 : 0.018 g/L		
		A2 : 1.476 g/L		
		A3 1.081 g/L		
		A4 : 1.232 g/L		
Object	tive Ouestion			
3	3	Henry's law constant for CO, in water is $1.67 \times 10^8$ Pa at 298K. The quantity of CO <sub>2</sub> in 500ml of aerated water when packed under 2.5 atm CO <sub>2</sub> pressure at 298K is	4.0	1.00
		A1 2.78 g		
		A2 : 1.85 g		
		A3 3.12 g		
		A4 0.12 g		
Object	ive Operation			
4	4	If the relative rates of substitution of $1^{\circ}$ and $2^{\circ}$ hydrogens are in the ratio of 1: 3.8. What will be the percentage of 2 - chlorobutane and 1 -chlorobutane respectively formed by chlorination of <i>n</i> - butane in the presence of light at 298K?	4.0	1.00

	A1 28%, 72%		
	A2 72%, 28%		
	A3 36%, 64%		
	A4 64%, 36%		
Objective Ouesti	on		
5 5	What will be the angular frequency of an electron occupying the second Bohr's orbit of He <sup>+</sup> ion?	4.0	1.00
	$ \stackrel{A1}{:} 2.067 \times 10^{16} \text{ sec}^{-1} $		
	$ \stackrel{A2}{:} 2.067 \times 10^{15} \text{ sec}^{-1} $		
	$ \stackrel{A3}{:} 2.067 \ge 10^{14} \sec^{-1} $		
	$ \stackrel{A4}{:} 2.067 \times 10^{13} \text{ sec}^{-1} $		
Objective Ouesti	on		
6 6	A constant current was flowing for 2 hours through a KI solution ovidicing indide ion to indine	4.0	1.00
	$(2I^- \rightarrow I_2 + 2e^-)$ . At the end of the experiment liberated iodine consumed 21.75 mL of 0.083 lM		
	solution of sodium thiosulphate following the redox change $I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$ . What was		
	the average rate of current flown in ampere?		
	A1 8.718 A :		
	A2 0.0242 A		
	A3 : 1.807A		
	A4 4.123 A		

7	7	For the following reaction predict the product $CH_3-CH=CH_2 \xrightarrow{(i) BD_3/THF}_{(ii) CH_3COOH}$ Product	4.0	1.00
		$ \begin{array}{c} A1 \\ CH_3 - CH - CH_2 \\ I \\ H \\ OH \end{array} $		
		A2		

$$\begin{array}{c} : \quad CH_3-CH-CH_2\\ H \quad D \end{array}$$

$$\begin{array}{c} A3\\ : \quad CH_3-CH-CH_2\\ D \quad H \end{array}$$

$$\begin{array}{c} A4\\ : \quad CH_3-CH-CH_2\\ D \quad H \end{array}$$

8	8	In the following reaction identify 'X' $CH_3 - CH = CH_2 \xrightarrow{(i) BH_3 / THF}_{(ii) AgNO_3 / NaOH} X$	4.0	1.00
		A1 CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OH		
		A2 CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>		
		A3 CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>3</sub>		
		A4 CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> BH <sub>2</sub>		

9	9	Which of the following compounds will evolve CO <sub>2</sub> gas with NaHCO <sub>3</sub> ?	4.0	1.00
		$\begin{array}{c} COOH \\ \bigcirc \\ A \end{array} \\ \bigcirc \\ B \bigg \\ O \bigg \\ B \bigg \\ O \bigg \\ B \bigg \\ O \bigg \\ O \bigg \\ B \bigg \\ O \bigg \\ $		
		A1 : A, C, D, E		
		A2 : A, D		
		A3 : B, C, D		
		A4 : A, D, E		
Objec	tive Question			
10	10	While performing flame test, how many of the following metals show bluish green colour under uranium glass? Na, K, Ca, Sr, Ba, Cu	4.0	1.00
		Al Ba, Cu :		
		A2 Ba		

		A3 Ca		
		A4 Cu		
Objec	ctive Question			
11	11	A solution contains a mixture of $Ag^+(0.10M)$ and $Hg_2^{2+}$ which are to be separated by selective precipitation. Which one of these metals will get precipitated and what will be its percentage? ( $K_{sp}$ of $AgI = 8.5 \times 10^{-17}$ and $K_{sp}$ of $Hg_2I_2 = 2.5 \times 10^{-26}$ )	4.0	1.00
		A1 Hg, 99.83%		
		A2 Ag, 99.83%		
		A3 Hg, 25.75%		
		A4 Ag, 25.75%		
Objec	ctive Question	JI		
2	12	Traces of fluoride ions (F) in drinking water (about 1 ppm) greatly reduce the incidence of dental cavities (tooth decay). What is the reason for reduction in cavities?	4.0	1.00
		A1 The enamel $[3Ca_3(PO_4)_2.CaF_2]$ on the surface of teeth is converted to much harder $3Ca_3(PO_4)_2.Ca(OH)_2$ :		
		A2 The enamel $[3Ca_3(PO_4)_2.Ca(OH)_2]$ on the surface of teeth is converted to much harder $3Ca_3(PO_4)_2.CaF_2$ :		
		A3 The enamel $[Ca(OH)_2]$ on the surface of teeth is converted to $CaF_2$ :		
		A4 The enamel $[Ca_3(PO_4)_2.Ca(OH)_2]$ on the surface of teeth is converted to much harder $3Ca_3(PO_4)_2.CaF_6$ :		
Obied	ctive Ouestion			
3	13	Which of the given statements about $N$ , $O$ , $P$ and $Q$ with respect to $M$ is not correct?	4.0	1.00
		A1 <i>M</i> and <i>N</i> are non-mirror image stereoisomers		
		A2 M and O are identical		
		A3 $M$ and $P$ are enantiomers:		
		$A^{A}_{:}$ M and Q are identical		
21.				
Joje	suve Question		1.0	1.00

		$\frac{A1}{2}$ 1.7 x 10 <sup>5</sup>		
		$\frac{A2}{2}$ 5.88 x 10 <sup>-6</sup>		
		$\frac{A3}{2}$ 5.88 x 10 <sup>6</sup>		
		$\frac{A4}{2}$ 1.7 x 10 <sup>-5</sup>		
Object	tive Question			
15	15	A flask is connected to another flask of volume of 800ml having HCL(g) at 8 atm and 200K through a narrow tube of negligible volume. The two gases reacts to form $NH_4Cl(s)$ with evolution of 43kJ mol <sup>-1</sup> heat. If heat capacity of HCl <sub>67</sub> at constant volume is 20JK <sup>-1</sup> mol <sup>-1</sup> and neglecting heat capacity of flask, $NH_4Cl$ and volume of solid $NH_4Cl$ formed, calculate final temperature in flask. (Assume $R = 0.08L$ -atmK <sup>-1</sup> mol <sup>-1</sup> ) A1 977.27 K	4.0	1.00
		A2 : 1177.27 K		
		A3 1077.27 K		
		A4 : 1277.27 K		
Object	tive Question			
16	16	1.8 g hydrogen atoms are excited by radiations. The study of spectra indicates that 27% of the atoms are in third energy level, 15% of the atoms are in second energy level and rest of the atoms are in the ground state. ionisation potential of H is 13.6eV. What willbe the total energy involved when all the atoms return to ground state?	4.0	1.00
		A1 265.7 kJ		
		A2 : 566.8 kJ		
		A3 : 832.50 kJ		
		A4 : 610.5 kJ		
Object	tive Question			
17	17	Identify the final product. $H_3C \xrightarrow{H_3C} H \xrightarrow{CPBA (1 eq.)} H_3O^*$	4.0	1.00
		A1 $H_3C$ OH H HO $CH_2COCH_3$		



		A3 4 :		
		A4 2 :		
01.				
06je	ctive Question		4.0	1.00
20	20	0.22g sample of a volatile compound, containing C , H and Cl only, on combustion gave 0195 g of $CO_2$ and 0.0804 g of $H_2O$ . 0.120 g of this compound occupiesa volume of 37.24mL at 105°C and 768mm of pressure. The molecular formula of the compound is $C_aH_bCl_z$ The value of z is	4.0	1.00
		A1 2 :		
		A3 4 :		
		A4 1 :		
Obje	ctive Question			
21	21	In the following process of disproportionation:Initial concentration of chlorate ion was 0.1M. The equilibrium concentration of perchlorate ion will be	4.0	1.00
		A1 0.19M		
		A2 0.1M		
		A3 0.024M		
		A4 0.019M		
Obie	ctive Ouestion			
22	22	Which of the following alkenes is most reactive towards cationic polymerisation?	4.0	1.00
		$ \overset{A1}{:} CH_2 = CHCH_3 $		
		$ \overset{A2}{:} CH_2 = CHC1 $		
		$ \overset{A3}{:} CH_2 = CHC_6H_5 $		
		$ \overset{A4}{:} CH_2 = CHCO_2CH_3 $		
Ohie	ctive Operation			
23	23	Which of the following radial distribution graphs correspond to $n=3$ , $l=2$ for an atom?	4.0	1.00
		A1		



Object								
24	24	Percentage lonisation of a weak acid can be calculated using the formula	4.0	1.00				
		$\stackrel{\text{A1}}{:} 100 \sqrt{\frac{K_a}{C}}$						
		$ \stackrel{A2}{:} \frac{100}{1+10^{(pK_{a}-pH)}} $						
		A3 : both $100\sqrt{\frac{K_a}{C}}$ and $\frac{100}{1+10^{(pK_a-pH)}}$						
		A4 : neither both $100\sqrt{\frac{K_a}{C}}$ and $\frac{100}{1+10^{(pK_a-pH)}}$						
Object	ive Question							
25	25	KI (avcess) is added to the following solutions congrately:	4.0	1.00				
	-	(I)CuSO <sub>4</sub>						
		(II)HgCl <sub>2</sub>						
		(III)Pb(NO <sub>3</sub> ) <sub>2</sub>						
		The correct observation is						
		A1 a white precipitate of $Cu_2I_2$ in (I), an orange precipitate of $Hgl_2$ in (II) which further dissolves and a yellow precipitate : of $Pbl_2$ in (III) are formed						
		$\stackrel{A2}{:}$ white precipitates of Cu <sub>2</sub> I <sub>2</sub> , HgI <sub>2</sub> and Pbl <sub>2</sub> are formed respectively :						
		A3 yellow precipitate in each case is formed						
		A4 a white precipitate of $Cu_2I_2$ in (I), an orange precipitate of $K_2Hg_4$ , in (II) and a yellow precipitate of PbI in (III) are $\therefore$ formed						

Objective Ouestic			
Objective Question 26 26	which-COOH group is lost due to heating? $ \begin{array}{c} \downarrow \\ \downarrow \\$		
	$\stackrel{A4}{:}$ 4		
Objective Questio	מ		
27 27	How many of the following compounds do not give NO <sub>2</sub> and O <sub>2</sub> simultaneously on heating at low temperature? Pb(NO <sub>3</sub> ) <sub>2</sub> , NaNO <sub>3</sub> , NH <sub>4</sub> NO <sub>3</sub> , NH <sub>4</sub> NO <sub>2</sub> , Mn(NO <sub>3</sub> ) <sub>2</sub> , CsNO <sub>3</sub>	4.0	1.00
	A1 NaNO <sub>3</sub> , NH <sub>4</sub> NO <sub>3</sub> , NH <sub>4</sub> NO <sub>2</sub> , Mn(NO <sub>3</sub> ) <sub>2</sub> , CsNO <sub>3</sub> :		
	A2 Pb(NO <sub>3</sub> ) <sub>2</sub> , NaNO <sub>3</sub> , NH <sub>4</sub> NO <sub>3</sub> , NH <sub>4</sub> NO <sub>2</sub> , Mn(NO <sub>3</sub> ) <sub>2</sub> , CsNO <sub>3</sub> :		
	A3 NH <sub>4</sub> NO <sub>3</sub> , NH <sub>4</sub> NO <sub>2</sub> :		
	A4 Pb(NO <sub>3</sub> ) <sub>2</sub> , NaNO <sub>3</sub> , Mn(NO <sub>3</sub> ) <sub>2</sub> , CsNO <sub>3</sub> :		
Objective Questio	n		
28 28	Number of hydrogen ions, a single molecule of the following species will lose on treatment with excess of NaOH is $\begin{array}{c} & \\ HO-CH_2 & \\ HS & \\ \end{array}$	4.0	1.00
	A1 1 A2 2 :		
	A3 3 :		
	A4 4		

Objec 29	etive Question	7. Be captures a K-electron into its nucleus. What will be the mass number of resulting nuclide?	4.0	1.00
		$\stackrel{\text{A1}}{:}$ 7		
		A2 6		
		A3 4		
		A.4		
		· · · · · · · · · · · · · · · · · · ·		
Objec	tive Question			
30	30	In the reduction of nitric oxide, 50 % of reaction was completed in 108 seconds when initial pressure was 336 mm of Hg and, in 147 seconds, when initial pressure was 288 mm of Hg. Then the order of the reaction is	4.0	1.00
		A2 1 :		
		43		
		A4 3		
Object 31	tive Question	F- 22	4.0	1.00
		For the reaction: $Zn + Cu_{(ag)}^{2+} \rightleftharpoons Cu + Zn_{(ag)}^{2+}$ reaction quotient, $Q = \frac{\lfloor Zn^{2+} \rfloor}{\lfloor Cu^{2+} \rfloor}$		
		Variation of $E_{cell}^{\circ}$ with $\log Q$ is of the type with $OA = 1.10$ V, then $E_{cell}$ will be 1.1591V when		
		$ \overset{A1}{:} [Cu^{++}]/[Zn^{++}] = 0.1 $		
		$\frac{A2}{2} [Cu^{++}]/[Zn^{++}] = 0.01$		
		$ \overset{A3}{:} [Zn^{++}]/[Cu^{++}] = 0.01 $		
		$\stackrel{A4}{:} [Zn^{*+}]/[Cu^{++}] = 0.1$		
Objec	tive Question			
32	32	A solution contains $Na_2CO_3$ and $NaHCO_3$ of the solution required 2.5mL of $0.1MH_2SO_4$ for neutralisation using phenolphthalein as indicator. Methyl orange is then added when a further 2.5mL of $0.2MH_2SO_4$ was required. The amount of $Na_2CO_3$ and $NaHCO_3$ in one litre of the solution respectively are	4.0	1.00



Object	tive Question			
33	33	The van der Waals parameters $a$ and $b$ for two gases are given as :	4.0	1.00
		Gas A Gas B		
		$a = 6.5 \text{ dm}^6 \text{ bar/mole}^2$ $a = 18.0 \text{ dm}^6 \text{ bar/mole}^2$		
		$b = 0.056 \text{ dm}^3 \text{ mole}$ $b = 0.011 \text{ dm}^3 \text{ mole}$		
		Which of the following is /are correct?		
		which of the following is/are correct:		
		(1) $(V_{\varepsilon})_{A} > (V_{\varepsilon})_{B}$ $(\mathrm{II})(P_{\varepsilon})_{A} > (P_{\varepsilon})_{B} (\mathrm{III})(T_{\varepsilon})_{A} > (T_{\varepsilon})_{B}$		
		Al I only		
		A2 : I and II only		
		A3 I, II and III		
		A4 : II and III only		
Object	tive Question			
34	34	Identify the product (P) in the following reaction	4.0	1.00
		AI and and		
		A4 :		
Object	tive Question			



4.(	0	1.00
4.0	.0	1.00
	4	4.0

		$ \stackrel{A3}{:} B_2 H_6 $		
		A4 PF <sub>5</sub>		
Object	tive Question		1	
38	38	Which of the following is electron deficient compound?	4.0	1.00
		$\stackrel{A1}{:}$ C <sub>2</sub> H <sub>6</sub>		
		A2 SiH <sub>4</sub>		
		A3 PH <sub>3</sub> :		
		$\overset{A4}{:} B_4 H_{10}$		
Object	tive Question			
39	39	Find the major product of following reaction:	4.0	1.00
		$\begin{array}{c} H_{3}C\\H\\CH_{3}CH_{2}\end{array} \xrightarrow{O} CH_{3}\\CH_{3}CH_{2}\end{array} \xrightarrow{O} CH_{3}\\\downarrow Pyridine\\\downarrow \tilde{KCN}\end{array}$		
		A1 H <sub>3</sub> C H C-CN CH <sub>3</sub> CH <sub>2</sub>		
		$\stackrel{A2}{:} CH_3 - CH = C \stackrel{H}{CH_3}$		
		A3 NC-CH <sub>3</sub> H CH <sub>2</sub> CH <sub>3</sub>		
		$\stackrel{A4}{:} H_3C \stackrel{H}{\underset{NC'}{\leftarrow}} C-CH_2CH_3$		
Object	tive Question			
40	40	Identify the final product of following sequence of reactions:	4.0	1.00
		$OH \xrightarrow{TsCl} alc.KOH \xrightarrow{OsO_4} HIO_4$		
		A1 :		

		$\bigcirc$		
		<sup>A2</sup> H O		
		A4 OH OH		
Object	ive Question		4.0	1.00
41	41	Which of the following statements is correct?	4.0	1.00
		A1 Elements of group 15 form electron deficient hydrides.		
		A2 All elements of group 14 form electron precise hydrides.		
		A3 Electron precise hydrides have octahedral geometries.		
		A4 Electron rich hydrides can act as Lewis acids.		
Object	ive Question			
42	42	The nucleus of an atom can be assumed to be spherical. The radius of the nucleus of mass number A is given by $1.25 \times 10^{-13} \times A^{1/3}$ radius of atom is 1A. If the mass number is 64, then the fraction of the atomic volume that is occupied by the nucleus is	4.0	1.00
		$\stackrel{A1}{:}$ 1.0 x 10 <sup>-3</sup>		
		$\stackrel{A2}{:}$ 5.0 x 10 <sup>-5</sup>		
		$^{A3}_{:}$ 2.5 x 10 <sup>-2</sup>		
		$^{A4}_{:}$ 1.25 x 10 <sup>-13</sup>		
Object	ive Question			
43	43	The dispersed phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged respectively, which of the following statements is not correct?	4.0	1.00
		A1 : Magnesium chloride solution coagulates gold sol readily than iron (III) hydroxide sol		
		A2 Sodium sulphate solution causes coagulation in both sols		

	A3 Mixing of the two sols has no effect		
	A4 Coagulation in both sols can be brought about by electrophoresis		
Objective Questi	n		
44 44	Match the CFSE (Crystal Field Stabilisation Energy) given in List-I with electronic configurations in octahedral field given in List-II and select the correct answer using the code given below the lists:	4.0	1.00
	List-I List-II		
	(P) $-0.8 \Delta_o$ (1) $t_{2g}^3, e_g^2$		
	(Q) zero (2) $t_{2g}^5, e_g^0$		
	(R) $-1.2 \Delta_{o}$ (3) $t_{2\sigma}^2, e_{\sigma}^0$		
	(S) $-2.0 \Delta_o$ (4) $t_{2g}^3, e_g^0$		
	A1 P=3, Q=1, R=4, S=2		
	A2 P=4, Q=3, R=1, S=2		
	A3 P=3, Q=2, R=4, S=1		
	A4 P=2, Q=1, R=4, S=3 :		
Objective Questi	on		
45 45	Which of the following is arranged in order of increasing bond strength?	4.0	1.00
	$ \stackrel{A1}{:} Zn_2^{2^+} < Hg_2^{2^+} < Cd_2^{2^+} $		
	$\overset{A2}{:} Cd_2^{2+} < Hg_2^{2+} < Zn_2^{2+}$		
	$ \overset{A3}{:} Zn_2^{2+} < Cd_2^{2+} < Hg_2^{2+} $		
	$\overset{A4}{:} \operatorname{Hg_2}^{2+} < \operatorname{Cd_2}^{2+} < \operatorname{Zn_2}^{2+}$		
Objective Ouesti	on		
46 46	$Cr_2O_7^{2-} + X \xrightarrow{H^+} Cr^{3+} + H_2O + oxidised product of X.$ Then, X in the above reaction cannot be	4.0	1.00
	$^{A1}_{:}$ C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>		
	$^{A2}_{:}$ SO <sub>4</sub> <sup>2-</sup>		

Object	ive Question	: A4 : Fe <sup>2+</sup>		
47	47	Which one of the following statements is correct regarding carbenes?	4.0	1.00
		A1 These are reactive, short-lived, diagonal in geometry and neutral species in which carbon atom has six electrons in the : outer shell		
		A2 : They are divalent carbon species containing two unpaired electrons and possess no charge		
		<ul> <li>A3 These are of two types, (I) singlet carbene where both the electrons go into one orbital and have opposite spins, (II)</li> <li>triplet carbene where the two electrons go into different orbitals and have same spin (parallel) hence, shows paramagnetic moment. They would exist in three closely grouped energy state if placed in magnetic field</li> </ul>		
		A4 : All of these		

Jojec	cuve Question			
8	48	The energy difference between $(d_{xy}, d_{yz}, d_{zx})$ orbitals and $(d_{x^2-y^2}, d_{x^2})$ orbitals in	4.0	1.00
		reasons is that,		
		A1 there are only four ligands in tetrahedral complex instead of six in octahedral complex :		
		A2 the direction of the orbital lobes coincides with the direction of the ligands :		
		A3 there is high steric repulsion between four ligands approaching tetrahedrally towards metal ion :		
		A4 all the lobes of <i>d</i> -orbitals point towards the ligands in octahedral but in tetrahedral only half of the lobes of <i>d</i> -orbitals : point towards the ligand.		
bje	ctive Question			
.9	49	Using the following information, choose the correct order of activity of the metals as reducing agents: (i) Cr reacts with NiBr <sub>2</sub> and CdBr <sub>2</sub> , but not with ZnBr <sub>2</sub> (ii) Cd reacts with NiBr <sub>2</sub> , but not with ZnBr <sub>2</sub> and CrBr <sub>3</sub>	4.0	1.00
		$\stackrel{A1}{:} Zn > Cr > Cd > Ni$		
		$\frac{A2}{2} Ni > Cr > Cd > Zn$		
		$\begin{array}{c} A3 \\ \vdots \\ Zn > Cr > Ni > Cd \\ \end{array}$		
		$\begin{array}{c} A4\\ \vdots\\ Zn > Cd > Cr > Ni \end{array}$		
bjeo	tive Question			
0	50	Which of the following diagrams is correct in relation to electron affinity of halogens?	4.0	1.00

		A1 F decrease increase decrease Br		
		$\begin{array}{c} A2 \\ \vdots \\ decrease \\ \hline decrease \\ \hline decrease \\ \hline decrease \\ \hline Br \end{array}$		
		$\begin{array}{c c} A3 & F & increase \\ \hline & & & \\ \hline \end{array} \\ \hline & & & \\ \hline \hline & & & \\ \hline \end{array} \end{array} $		
		A4 F increase decrease increase I decrease Br		
Object	tive Question			
51	51	What is the order of spin only magnetic moment of the following systems? I. $Mn^{2+}$ in presence of weak field ligand in octahedral field. III. $Ni^{2+}$ in presence of strong field ligand in octahedral field. III. $Cr^{3+}$ in presence of ligand in octahedral field. IV. $Sc^{3+}$ in presence of weak field ligand in octahedral field. $V. Sc^{3+}$ in presence of weak field ligand in octahedral field. $IV. Sc^{3+}$ in presence of weak field ligand in octahedral field. $A^{1-}$ II > III > IV > I $A^{2-}$ I > III > II > IV $A^{3-}$ III > IV > II > I $A^{4-}$ I > IV > III > II $A^{4-}$ I > IV > III > II	4.0	1.00
Object	tive Question			
52	52	<ul> <li>Which of the following properties shows given change in NH<sub>4</sub><sup>+</sup>, NH<sub>3</sub> and NH<sub>2</sub><sup>-</sup></li> <li>A1 Number of lone pairs at nitrogen</li> <li>A2 Total number of electrons</li> </ul>	4.0	1.00
		A3 Number of <i>p</i> -orbitals in hybridisation of nitrogen		
		A4 Bond angle at nitrogen		

Objec	ctive Question			
53	53	A cylinder of compressed gas that bears no label is supposed to contain ethylene and/or propylene. Combustion of the sample shows that 16mL of the gas required 72mL of oxygen for complete combustion. This indicates that the gas is	4.0	1.00
		A1 only ethylene		
		A2 only propylene		
		A3 : 1:1 mixture of two gases		
		A4 : some unknown mixture of two gases.		
Objec	ctive Question			
54	54	Hydrolysis product of which of the following compounds produces white precipitate with Tollens' reagent?	4.0	1.00
		A1 SiC		
		$\stackrel{A2}{:}$ Be <sub>2</sub> C		
		$\stackrel{A3}{:}$ Mg <sub>2</sub> C <sub>3</sub>		
		$\stackrel{A4}{:}$ Al <sub>4</sub> C <sub>3</sub>		
Obied	ctive Ouestion			
55	55	The incorrect statement amongst the following is	4.0	1.00
		$\stackrel{A1}{:}$ LiAH <sub>4</sub> and NaBH <sub>4</sub> act as reducing agents due to the presence of hydride ion :		
		A2 AI-H bond is more ionic than B-H bond and hence, LiAlH <sub>4</sub> can produce larger concentration of hydride ions than NaBH <sub>4</sub>		
		A3 LiAlH <sub>4</sub> cannot reduce group		
		A4 in spite of very small rate constant of reduction of any carbonyl function other than aldehydes and ketones, the rate of reduction with LiAlH <sub>4</sub> becomes appreciable due to large concentration of hydride ions		
Objec	ctive Question			
56	56	A compound is analysed and found to consist of 50.4%Ce, 15.1% N and 34.5%O by mass. What is the correct empirical formula of the compound? (At. wt. of Ce = 140)	4.0	1.00
		$\stackrel{A1}{:} Ce_2(NO_3)_2$		
		$\stackrel{A2}{:} Ce_2(NO_2)_3$		
		$\stackrel{A3}{:} Ce(NO_3)_2$		
	11		11	

		$\overset{A4}{\cdot}$ Ce(NO <sub>2</sub> ) <sub>3</sub>		
bjec	tive Question	1 1		
7	57	$n_1$ and $n_2$ moles of two ideal gases having molecular weights $M_1$ and $M_2$ respectively at temperatures $T_1$ K and $T_2$ K are mixed. Assuming no loss of energy, the temperature of mixture will become	4.0	1.00
		$\begin{array}{c} A1 \\ \vdots \\ n_1T_1 + n_2T_2 \end{array}$		
		$\begin{array}{c} A2 \\ \vdots \\ T_1 + T_2 \end{array}$		
		$\begin{array}{c} A3 \\ \vdots \\ n_1 + n_2 T_2 \\ n_1 + n_2 \end{array}$		
		$\stackrel{A4}{:} \frac{T_1 \times T_2}{n_1 \times n_2}$		
Dbjec	tive Question	n		
58	58	The hydrolysis constant for the reaction, $H_3PO_4^- + H_3O \rightleftharpoons H_3PO_4^- + OH^-$ is $1.4 \times 10^{-12}$ . The	4.0	1.00
		ionisation constant for $H_3PO_4 + H_2O \rightleftharpoons H_2PO_4^- + H_3O^+$ will be		
		$ \stackrel{A1}{:} 7.14 \text{ x } 10^{-3} $		
		$ \stackrel{A2}{:} 1.4 \times 10^{-12} $		
		$ \stackrel{A3}{:} 7.14 \ge 10^{-12} $		
		$^{A4}: 1.4 \times 10^{-3}$		
Ohiec	tive Question			
59	59	The rate of reaction, $2NO + Cl_2 \rightarrow 2NOCl$ is given by the rate equation, rate = $k[NO]^2 [Cl_2]$ . The value of the rate constant can be increased by	4.0	1.00
		A1 increasing the temperature		
		A2 increasing the concentration of NO		
		A3 increasing the concentration of $Cl_2$ :		
		A4 all of these		
NL '				
лојес 60	60	The combustion of 10.0g coke raised the temporature of 1.0kg water from $1000$ to $5000$ . If specific heat of U.O. is $1 - 1 / 1$	4.0	1.00
		$(g^{\circ}C)$ then, the fuel value of coke is		

A1 : 1000 cal / g	
A2 2000 cal / g	
A3 3000 cal / g	
A4 4000 cal / g	

Objec	ctive Question			
61	61	If 3 faradays of electricity is passed through each of the solutions of AgNO <sub>3</sub> , CuSO <sub>4</sub> and AuCl <sub>3</sub> , the molar ratio of the cations deposited at the cathode will be	4.0	1.00
		A1 1: 1: 1 :		
		A2 : 1: 2: 3		
		A3 3: 2: 1		
		A4 : 6: 3: 2		
Objec	tive Question			
62	62	A crystalline solid has a cubic structure in which tungsten (W) atoms are located at the cube corners of the unit cell, oxygen atoms at the cube edges and sodium atoms at the cube centre. The molecular formula of the compound is	4.0	1.00
		A1 Na <sub>2</sub> WO <sub>3</sub>		
		A2 NaWO <sub>4</sub>		
		A3 NaWO <sub>3</sub>		
		A4 Na <sub>2</sub> WO <sub>4</sub> :		
Objec	ctive Question		4.0	1.00
63	03	Which of the following colligative properties can provide molar mass of proteins (or polymers or colloids) with greater precision?	4.0	1.00
		A1 Relative lowering of vapour pressure		
		A2 Elevation in boiling point		
		A3 Depression in freezing point		

	A4 Osmotic pressure		
Objective Ouestion			
64 64	Compound ( $A$ ) reacts with SOCl <sub>2</sub> to give compound (B). The compound (B) reacts with Mg metal to give Grignard reagent, which is treated with acetone and product is hydrolysed to give 2-methyl - 2-butanol. Which of the following is compound ( $A$ )	4.0	1.00
	A1 CH <sub>3</sub> CH <sub>2</sub> OH		
	A <sup>2</sup> CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OH :		
	A3 CH <sub>3</sub> OH :		
	A4 CH <sub>3</sub> COOH :		
Objective Question			
65 65	Half-life of a radioactive sample is $2x$ years. What fraction of this sample will remain undecayed after $x$ years?	4.0	1.00
	$\stackrel{A1}{:} \frac{1}{2}$		
	$\stackrel{A2}{:} \frac{1}{\sqrt{2}}$		
	$\stackrel{A3}{:} \frac{1}{\sqrt{3}}$		
	A4 2		
Objective Question			
66 66	Identify A in the following reaction, Ethene $Ethene \xrightarrow{1000-2000  dm}_{350-570K,O_2} \rightarrow A$	4.0	1.00
	A1 HDPE		
	A2 LDPE		
	A3 teflon		
	A4 melamine		
Objective Question		][	
67 67	When sulphur in the form of $S_8$ is heated at 900K, the initial pressure of 1 atm falls by 29% at equilibrium. This is because of conversion of some $S_8$ into $S_2$ . The value of equilibrium constant for this reaction is	4.0	1.00
	A1 2.55		









 $\overset{A3}{\phantom{}}$  The temperature of the polished floor is lower than that of the rough floor :

A4 There is greater heat loss from the soles of the feet when in contact with the polished floor than with the rough floor :

Object	tive Question			
75	75	Popular use of which of the following fertilizers increases the acidity of soil?	4.0	1.00
		A1 Potassium Nitrate		
		A2 : Urea		
		A3 Ammonium sulphate		
		A4 Superphosphate of lime		
01.1				
76	76	If the atmospheric concentration of carbon dioxide is doubled and there are favourable conditions of water, nutrients, light and temperature. What would happen to water requirement of plants?	4.0	1.00
		A1 : It decreases initially for a short time and then returns to the original value		
		A2 : It increases		
		A3 : It decreases		
		A4 It increases initially for a short time and then returns to the original value		
Object	tive Ouestion			
77	77	The correct order of stability of difluorides is	4.0	1.00
		$\overset{A1}{:} \operatorname{GeF}_2 > \operatorname{SiF}_2 > \operatorname{CF}_2$		
		$ \overset{A2}{:} CF_2 > SiF_2 > GeF_2 $		
		$\overset{A3}{:} \operatorname{SiF}_2 > \operatorname{GeF}_2 > \operatorname{CF}_2$		
		$\stackrel{A4}{:} CF_2 > GeF_2 > SiF_2$		
Object	tive Question			
78	78		4.0	1.00
		The species <sup>19</sup> Ne and <sup>14</sup> C emit a positron and $\beta$ – particle respectively. The resulting species formed are respectively		

A1 19Na and <sup>14</sup> B:	
$^{A2}_{T}$ $^{19}$ F and $^{14}$ N	
$^{A3}_{PNa}$ and $^{14}N$	
$\stackrel{A4}{:} {}^{19}F \text{ and } {}^{14}B$	

Object	live Question			
79	79	Which of the following particles has the largest range in a given medium if their initial energies are the same?	4.0	1.00
		Al alpha		
		A2 electron		
		A3 positron		
		A4 : gamma		
Object	tive Question			
80	80	The variation of solubilities of two compounds X and Y in water with temperature is depicted below. Which of the following statements is true?	4.0	1.00
		90- 10- 10- 10- 10- 10- 10- 10- 1		
		A1 Solubility of <i>Y</i> is less than that of <i>X</i> :		
		A2 Solubility of X varies with temperature :		
		A3 Solubilities of X and Y are the same at $75^{\circ}$		
		A4 Solubilities of X and Y are independent of temperature :		
Object	tive Question			
81	81	Living beings get energy from food through the process of aerobic respiration. One of the reactants is	4.0	1.00

	A2 water vapour :		
	A3 oxygen		
	A4 phosphorus :		
Dbjective Question			
32 82	Restriction endonuclease cleaves DNA molecules at specific 'recognition sites'. One such enzyme has four recognition sites on a circular DNA molecule. After complete digestion, how many fragments would be produced upon reaction with this enzyme?	4.0	1.00
	A1 4 :		
	A2 5		
	A3 3		
	A4 6		
Dbjective Question			
83 83	Which of the following statements about the concentration of CO <sub>2</sub> in the Earth's atmosphere is true?	4.0	1.00
	A1 It was the highest in the very early atmosphere of the Earth :		
	A2 It has steadily decreased since the formation of the Earth's atmosphere		
	A3 It has steadily increased since the formation of the Earth's atmosphere		
	A4 Its levels today are the highest in the Earth's history :		
Objective Question			
84 84	Magnesium powder, placed in an air-tight glass container at 1.0 bar, is burnt by focusing sunlight. Part of the magnesium burns off, and some is left behind. The pressure of the air in the container after it has returned to room temperature is approximately	4.0	1.00
	A1 : 1.0 bar		
	A2 0.2 bar		
	A3 1.2 bar		
	A4 0.8 bar :		
Dbjective Question			
-		4.0	1.00

		When a magnet is made to fall free in air, it falls with an acceleration of 9.8 ms <sup>-2</sup> . But when it is made to fall through a long aluminium cylinder, its acceleration decreases, because		
		A1 a part of the gravitational potential energy is lost in heating the magnet		
		A2 a part of the gravitational potential energy is lost in heating the cylinder		
		A3 the said experiment was done in the magnetic northern hemisphere		
		A4 the cylinder shields the gravitational force		
Objec 86	86	A solid cube of side $L$ floats on water with 20% of its volume under water. Cubes identical to its are piled one-by-one on it. Assume that the cubes do not slip or topple, and the contact between their surfaces is perfect. How many cubes are required to submerge one cube completely?	4.0	1.00
		A1 4 :		
		A2 5		
		A3 6		
		A4 Infinite :		
87	87	An overweight person runs 4km every day as an exercise. After losing 20% of his body weight, if he has to run the same distance in the same time, the energy expenditure would be	4.0	1.00
		A1 20% more :		
		A2 the same as earlier		
		A3 20% less		
		A4 40% less		
Objec	tive Question			
88	88	On exposure to desiccation, which of the following bacteria are least likely to experience rapid water loss?	4.0	1.00
		A1 Isolated rods		
		A2 Rods in chain		
		A3 Cocci in chain		

		A4 Cocci in clusters		
Objec 89	tive Question	A cupboard is filled with large numbers of balls of 6 different colours. You already have one ball of each colour. If you are	4.0	1.00
		blind-folded, how many balls do you need to draw to be sure of having 3 colour-matched pairs of balls?		
		A1 3		
		A2 4		
		A3 5		
		A4 6 :		
Objec	ctive Question			
90	90	For a system of constant composition, the pressure (P) is given by	4.0	1.00
		$ \stackrel{A1}{:}  -\left(\frac{\partial U}{\partial S}\right)_{v} $		
		$\stackrel{A2}{:} - \left(\frac{\partial U}{\partial V}\right)_{s}$		
		$ \stackrel{A3}{:} - \left(\frac{\partial V}{\partial S}\right)_{T} $		
		$\begin{array}{c} A4 \\ \vdots \\ -\left(\frac{\partial U}{\partial V}\right)_{T} \end{array}$		
Ohia	tive Question			
91	91	If $(1 + \tan 1^{\circ})(1 + \tan 2^{\circ})(1 + \tan 3^{\circ}) \dots (1 + \tan 45^{\circ}) = 2^{n}$ then <i>n</i> equals to	4.0	1.00
		A1 21 :		
		A2 24		
		A3 23		
		A4 22		
Objec	tive Question			
92	92	The value of $a^2$ for which the equation $4 \operatorname{cosec}^2(\pi(a+x)) + a^2 - 4a = 0$ has a real solution is	4.0	1.00
		A1 $a = 1$		

$\begin{array}{c} A2\\ \vdots \end{array} a=2 \end{array}$		
$\stackrel{A3}{:}a=3$		
$\stackrel{A4}{:} a = 4$		

93	93		4.0	1.00
		If $x \in \left(\frac{3\pi}{2}, 2\pi\right)$ , then value of the expression $\sin^{-1}\left(\cos\left(\cos^{-1}(\cos x) + \sin^{-1}(\sin x)\right)\right)$ , equals		
		$A1 = -\pi/2$		
		$\overset{A2}{:}$ $\pi/2$		
		A3 : 0		
		A4 : π		
Object	tive Ouestion			
94	94	$A, B, C$ is a triangle whose medians $A, D$ and $B, E$ are perpendicular to each other. If $AD = p$ and $BE = q$ then area of $\Delta ABC$ is	4.0	1.00
		$\stackrel{A1}{:}  \frac{2}{3} pq$		
		$\stackrel{A2}{:} \frac{3}{2} pq$		

## Objective Question

A3  $\frac{4}{3}pq$ 

 $\begin{array}{c} A4 \\ \vdots \\ 4 \\ 9 \\ 7 \\ 4 \\ pq \end{array}$ 

05			4.0	1.00
95	95	The value of so that the sum of the squares of the roots of the equation $x^2 - (a - 2)x - a + 1$ assume the least value, is	4.0	1.00
		A1 2		
		A2 0 :		
		A3 3		
		A4 1 :		

Objective Questio	n		
96 96	The number of numbers lying between 100 and 500 that are divisible by 7 but not by 21 is	4.0	1.00
	A1 19 :		
	A2 38		
	A3 57 :		
	A4 76		
Objective Questio	n		
97 97	If $a, b, c$ are in H.P., then straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point $P$ with coordinates	4.0	1.00
	A1 (-1,-2) :		
	A2 (-1,2)		
	A3 (1,-2)		
	A4 (0,0)		
Objective Questio			
98 98	Integral part of $(5\sqrt{5}+11)^{2n+1}$ is	4.0	1.00
	A1 even		
	A2 odd		
	A3 cannot say anything		
	A4 neither even nor odd		
Objective Ouestio	n		
99 99	Three equal circles each of radius <i>r</i> touch one another. The radius of the circle touching all the three given circles internally, is	4.0	1.00
	$^{A1}: (2+\sqrt{3})r$		
	$\stackrel{A2}{:} \frac{(2+\sqrt{3})}{\sqrt{3}}r$		

$$\stackrel{A3}{:} \frac{(2-\sqrt{3})}{\sqrt{3}}r$$

$$\stackrel{A4}{:} (2-\sqrt{3})r$$

Objec	Objective Question				
100	100	The abscissae and ordinates of the end points <i>A</i> and <i>B</i> of the focal chord of the parabola $y^2$ are respectively the roots of $x^2 - 3x + a = 0$ and $y^2 + 6y + b = 0$ The equation of the circle with <i>AB</i> as diameter is	4.0	1.00	
		$A1 : x^2 + y^2 - 3x + 6y + 3 = 0$			
		$ \overset{A2}{:} x^2 + y^2 - 3x + 6y - 3 = 0 $			
		$A3 : x^2 + y^2 + 3x + 6y - 3 = 0$			
		$ \overset{A4}{:} x^2 + y^2 - 3x - 6y - 3 = 0 $			