Comprehension type

Question	Calomel cell is a secondary reference electrode. It is metal, metal sparingly soluble salt, anion electrode. In this mercury (l) and a paste of Hg_2Cl_2 (Calomel) is in equilibrium with Cl^-ions. When saturated KCl is taken then it is called saturated calomel electrode, when $1MCl^-$taken then it is called standard calomel electrode. Calomel electrode is used to calculate the electrode potential of other electrodes. $E^\circ_{Hg_2^{2+}(aq)/Hg^{2+}(aq)} = -0.92$ V, $E^\circ_{Hg(l)/Hg_2^{2+}(aq)} = -0.79$ V $Hg_2Cl_{2(S)} + 2e^- \rightarrow 2Hg(l) + 2Cl^-$(saturated); $E = +0.24$ V k_{sp} of Hg_2Cl_2(Calomel) is $10^{-52/3}$; $2.303RT/F = 0.06$ V	
Type	comprehension	
Question	Concentration of KCl in saturated KCl solution is $\sqrt{X}M$, X value is	
Type	multiple_choice	
Option	10	correct
Option	20	incorrect
Option	15	incorrect
Option	30	incorrect
Solution		
Marks	4	1
Question	When standard calomel electrode is coupled with $X^-(1M)/X_2$(bar)/Pt (acts as cathode) potentiometer reading is 1.09 V · $E_{Pt/X_2(0.01\text{bar})/X^{-1}(0.1\text{M})}$ in milli volts is _____.	
Type	multiple_choice	

Option	1460	incorrect
Option	1360	correct
Option	1320	incorrect
Option	1160	incorrect
Solution		
Marks	4	1

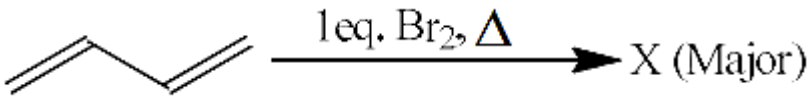
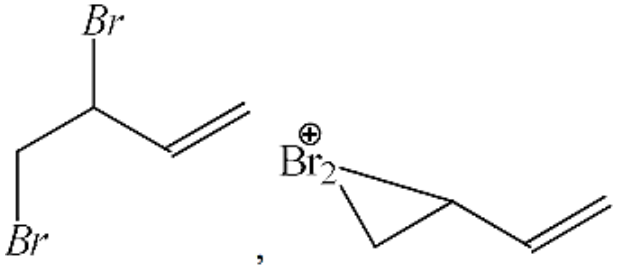
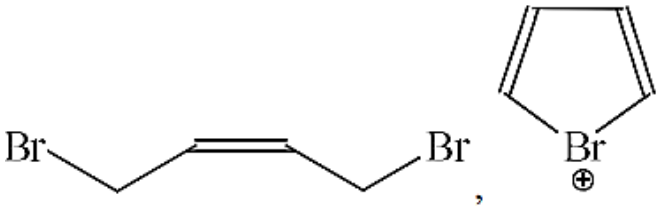
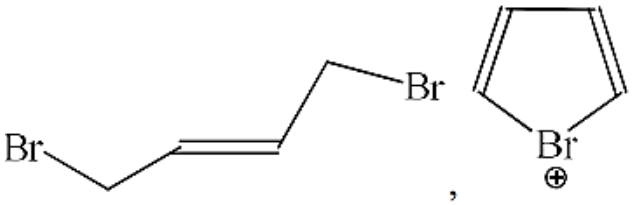
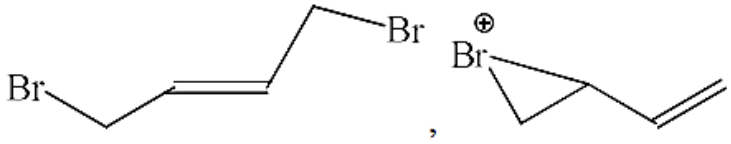
Question	The ground state of O_2 has two unpaired electrons with parallel spins. There are two known low - lying excited states of O_2. State (A) has two $\overset{*}{\pi}$ electrons paired in the same orbital. State (B) has two $\overset{*}{\pi}$ electrons with the spins antiparallel but in different orbitals. The energies of the excited from ground state are 95.00KJ/mol and 157.85KJ/mol respectively.
Type	comprehension
Question	Oxygen in gaseous state is paramagnetic with two unpaired electrons in $\overset{+}{\pi}$ antibonding orbitals and it is triplet ground state. Oxygen have some blue colour due to excitation of triplet ground state to excited state The energy required for the excitation of triplet ground state to singlet excited state is 95kJmol^{-1}. Calculate the wavelength (nanometer) of the absorbed light for the excitation of two O_2

	molecules by absorbing one photon for excitation (h value 6.626×10^{-34}JS).	
Type	multiple_choice	
Option	650	incorrect
Option	630	correct
Option	610	incorrect
Option	730	incorrect
Solution		
Marks	4	1
Question	Sum of the spin multiplicities of ground state, first and second excited states are equals to X then 5X equals to	
Type	multiple_choice	
Option	15	incorrect
Option	30	incorrect
Option	25	correct
Option	40	incorrect
Solution		
Marks	4	1

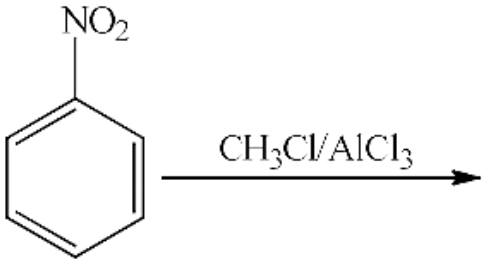
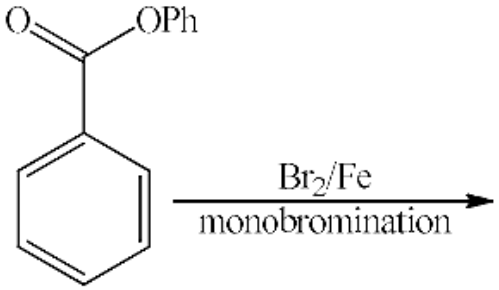
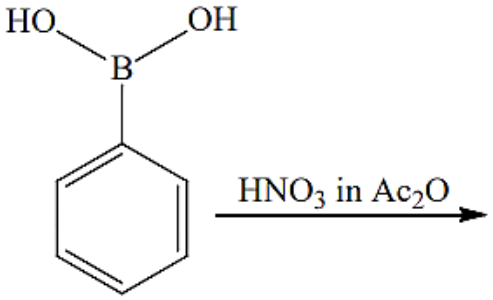
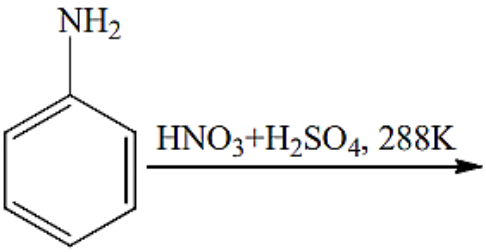
Single correct answer

Question	The ratio of uncertainty in wave length and uncertainty in velocity of electron revolving in an atom is equal to:	
Type	multiple_choice	
Option	$\frac{\lambda}{v}$	correct
Option	$\frac{h}{mv}$	incorrect

Option	$\frac{h^2}{mv^2}$	incorrect
Option	$\frac{\lambda^2}{v}$	incorrect
Solution		
Marks	4	1

Question	 Major product X and the intermediate involved in the formation of 'X' is	
Type	multiple_choice	
Option		incorrect
Option		incorrect
Option		incorrect
Option		correct
Solution		

Marks	4	1

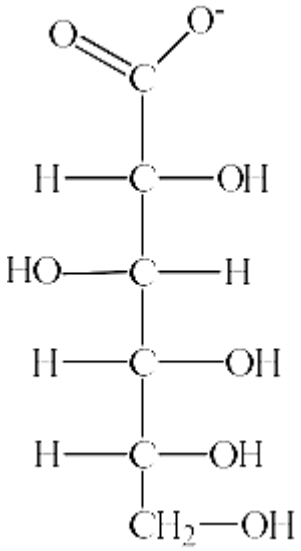
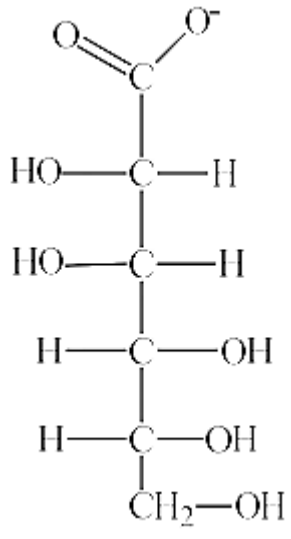
Question	In which of the following reaction meta substitution product formed majorly or nearly as much as para substitution product.	
Type	multiple_choice	
Option		incorrect
Option		incorrect
Option		incorrect
Option		correct
Solution		
Marks	4	1

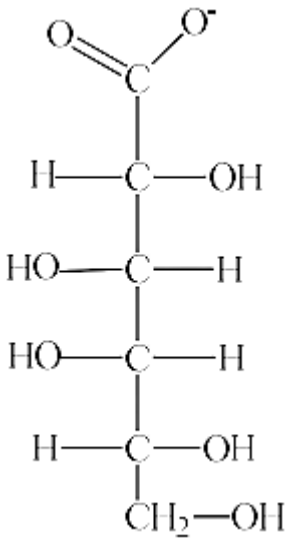
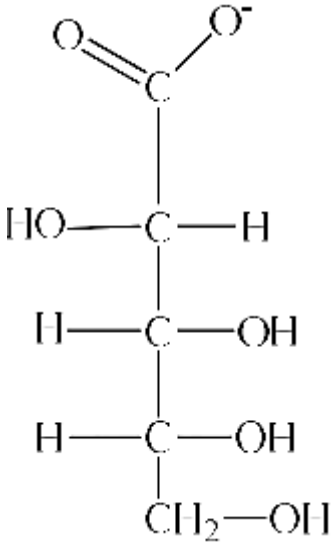
Question	The main reason for the distinct difference in the properties of CO_2 and SiO_2 is (1086 kJ mol^{-1} for C and 786 kJ mol^{-1} for Si)	
Type	multiple_choice	
Option	carbon is more electronegative than O and in case of SiO_2 oxygen is more electronegative than silicon	incorrect
Option	carbon has small size and forms a π bond with good overlap whereas silicon has larger size hence has a poor π overlap	correct
Option	carbon has only 'p' orbitals and lacks 'd' orbitals whereas silicon has 'd' orbitals	incorrect
Option	first ionization potential of carbon is higher than that of silicon	incorrect
Solution		
Marks	4	1

Multiple Select question

Question	The equivalent mass of substance is:	
Type	multiple_choice	
Option	The mass of substance which combines or displaces 8 gm of oxygen in any reaction.	incorrect
Option	The Mass of substance which combines with 35.5 gm of Cl to form chloride salt.	correct
Option	The mass of substance which exchange 1 mole of electrons in a redox reaction	correct

Option	The mass of substance which combines with 1gm of H.	correct
Solution		
Marks	4	1

Question	D –Fructose on oxidation with Tollens reagent gives	
Type	multiple_choice	
Option		correct
Option		correct

Option		incorrect
Option		incorrect
Solution		
Marks	4	1

Question	If trans $[Cr(en)_2(NCS)_2](SCN)$ is heated, it forms gaseous ethylene diamine and ionic solid is produced, which contains both complex cation and complex anion and both containing two types of ligands The correct statements about this process is
Type	multiple_choice

Option	In this process chromium ion undergoes disproportionation	incorrect
Option	It can exhibit coordination isomerism as well as linkage isomerism	correct
Option	It can exhibit geometrical as well as optical isomerism	correct
Option	It is a redox reaction	incorrect
Solution		
Marks	4	1

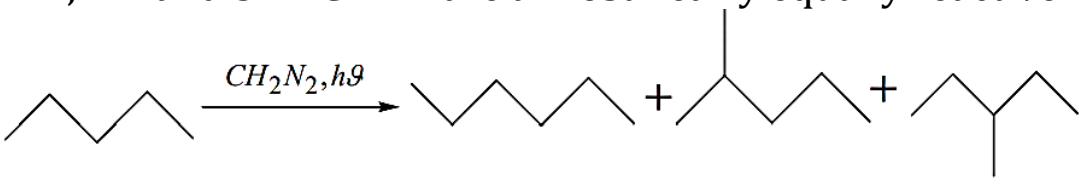
Integer Type questions

Question	For a reaction $\underset{0.1M}{A} + \underset{5M}{B} \longrightarrow C$, rate constant is found to be 6×10^{-3} lt/mol/sec. Half-life 0.1 M 5 M period of reaction is (in sec).	
Type	integer	
Answer	23	
Solution		
Marks	4	0

Question	10 g of Ne gas at 500 k pa and 300 K is expanded adiabatically to a pressure of 250 k pa. If the expansion is carried out irreversibly, change in entropy of the gas is $P \times 10^{-3}$cal/k. P value is _____. (Given: ln $x = 2.3\log x, \log 2 = 0.3$)
Type	integer

Answer	115	
Solution		
Marks	4	0

Question	Methoxychlor is an insecticide that was intended to take DDT's place because it is not as soluble in fatty tissues and is more readily biodegradable. It is prepared by the reaction of chloral with excess anisole in conc. H_2SO_4. G.M.W. of methoxychlor (in g) is _____. (Given: At. wt. of H is 1, C is 12, O is 16, Cl is 35)	
Type	integer	
Answer	344	
Solution		
Marks	4	0

Question	Singlet methylene carbene inserts at C − H bonds in alkanes. Since singlet: CH_2 is highly reactive, it is very less selective 1°−, 2° - and 3° − C − H are almost nearly equally reactive  Percentage yield of major product is _____.
Type	integer
Answer	50
Solution	

Marks	4	0

Question	Find the number of substances which contain metal (chief) in their elemental form: Copper matte, Argentite, Pig iron, Alumina, Blister copper, Black Jack, Spelter	
Type	integer	
Answer	3	
Solution		
Marks	4	0

Question	How many of the following atoms/ions are smaller in size than silicon atom. B, C, N, F, Ga, P, S, Cl, Ca^{2+}, Cr^{3+}.	
Type	integer	
Answer	9	
Solution		
Marks	4	0