

Roll Number		
--------------------	--	--

SET

A/B/C



**INDIAN SCHOOL MUSCAT
SECOND TERM EXAMINATION
CHEMISTRY(043)**

CLASS: XI

TERM 2

Max.Marks: 35

MARKING SCHEME

SET	QN.NO	VALUE POINTS	MARKS SPLIT UP
A	1	(a) Alkyl halides react with sodium in dry ether to give hydrocarbons containing double the number of carbon atoms present in the halide. This reaction is known as Wurtz reaction. $RX + 2Na + XR' \rightarrow R-R' + 2NaX$. (b) The numbers of σ bonds are 7 and the numbers of π bonds are 5. (c) C(2) is sp -hybridized, and C(3) is sp^2 hybridized.	1+1
	2	(i) Dipole-induced dipole forces (ii) Hydrogen bonding (iii) Dispersion forces (iv) Ion-dipole forces	2
	3	Derivation and relation	2
	4	The standard enthalpy of formation of benzene. $\Delta H = 960 - 857.4 = 48.6 \text{ kJ/mol}$ Or Enthalpy of combustion-1 Formula-1/2 Substitution-1/2 Answer-1 Enthalpy of combustion of ethane = -1174 kJ/mol	$(1 \frac{1}{2} + 1 + \frac{1}{2}) = 3$
	5	(a) (i) 3-methylpent-1-en-4-yne. (ii) 5-methylhepta-1, 3, 6-triene (b) Propene and propyne can be distinguish by using ammoniacal silver nitrate test. Propyne has an acidic hydrogen due to which it readily reacts with ammoniacal silver nitrate gives white precipitate while propene does not give any precipitate. Or (a) Propene will be formed (b) 5 π bonds \rightarrow 10 π electrons \rightarrow $(4n+2)$ rule satisfied (c) $\begin{array}{c} \text{CH}_3\text{H} \\ \quad \\ \text{CH}_3 - \text{C} = \text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \end{array}$ 2-Methylhex-2-ene	

6	<p> $3\text{CH}\equiv\text{CH} \xrightarrow[\text{Iron tube, 873K}]{\text{Red hot}} \text{Benzene}$ </p> <p>(a)</p> <p>(b) Unlike olefins, π-electrons of benzene are delocalized (resonance) and hence these are uncreative towards addition reactions.</p> <p>(c) Branching result into a more compact (nearly spherical) structure. This reduces the effective surface area and hence the strength of the Vander wall's forces, thereby leading to a decrease in the boiling point.</p>	
7	<p>(a) Real gas definition-1</p> <p>Reason-1</p> <p>High temp & low Pressure-1/2+1/2</p>	1+1+1
8	<p>(a) $\text{H}_2(\text{g}) + 2/1 \text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l}) \Delta_f H_0 = -286 \text{KJ/mol}$</p> <p>From the above equation,</p> <p>At 298K, when 1 mole of $\text{H}_2\text{O}(\text{l})$ is formed, 286KJ of heat is released. The same amount of heat is absorbed by the surroundings.</p> <p>$\therefore q_{\text{surr.}} = +286 \text{KJ/mol}; T = 298 \text{K}$</p> <p>As we know that,</p> <p>$\Delta S_{\text{surr.}} = q_{\text{surr.}}/T$</p> <p>$\therefore \Delta S_{\text{surr.}} = 298/286 = 0.96 \text{KJ/mol-K}$</p> <p>Hence the entropy change in surroundings will be 0.96KJ/mol.</p> <p>(b) (i) ΔS is positive</p> <p>(ii) ΔS is negative</p>	
9	<p>(a) NH_3 & H_2CO_3</p> <p>(b) $\text{HCN} < \text{CH}_3\text{COOH} < \text{HNO}_2 < \text{H}_2\text{SO}_3$</p> <p>(c) Definition of Lewis acids and bases</p> <p>Or</p> <p>(a)</p> <p>$2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$</p> <p>$\Delta n_g = -1$</p> <p>Hence $K_p = K_c (\text{RT})^{-1}$</p> <p>or $K_p/K_c = 1/\text{RT} = \frac{1}{0.0821 \times 298} = 0.04$.</p> <p>(b) when sum of coefficients of product is equal to sum of coefficients of reactants or $\Delta n_g = 0$</p>	3
10	<p>1mark each</p> <p>Or</p> <p>This reaction follows Markovnikov's rule where the negative part of the addendum is attached to the carbon atom having a lesser number of hydrogen atoms.</p> <p>In the presence of benzoyl peroxide, an addition reaction takes place anti to Markovnikov's rule.</p> <p>Two chemical equations (1+1+1)</p>	
11	<p>(a) Electron-donating groups increase the reactivity towards an electrophile E^+, while electron-withdrawing groups decrease the reactivity. Thus</p> <p>(i) Benzene > p - Nitrochlorobenzene > 2,4-Dinitrochlorobenzene</p> <p>(b) Cis - 2 - butene is polar ($\mu = 0.33 \text{ D}$) and trans - 2 - butene is non-polar</p>	

		$(\mu = 0)$ (c) a is propene-1 B is 1-bromopropane-1 Correct example of Friedel crafts alkylation <i>Or</i> (a) <div style="text-align: center;"> $\begin{array}{c} \text{H} \\ \\ \text{H}_3\text{C}-\text{C}-\text{CH}_3 \\ \\ \text{Br} \end{array} \xrightarrow{\text{Alc.KOH}} \begin{array}{c} \text{H} \\ \\ \text{H}_2\text{C}=\text{C}-\text{CH}_3 \\ \text{(A)} \end{array}$ $\begin{array}{c} \text{Benzoyl peroxide} \\ \downarrow \\ \text{HBr} \\ \text{H}_2\text{C}-\text{CH}_2-\text{CH}_3 \\ \\ \text{Br} \\ \text{(B)} \end{array}$ </div>	
	12	(a) (i) Increases (ii) decreases (iii) decreases (iv) No change-4x1/2 $\text{Alpha}=1.767 \times 10^{-2} \text{ M} \quad \text{---1}$ $[\text{H}^+]=1.413 \times 10^{-3} \text{ M} \quad \text{----1}$ $\text{pH}=2.85 \quad 1$	