Q1(A):

The oxidation number of ClO_2^- in $NaClO_2$ is -1 and O in ClO_2^- is -2. Therefore, the oxidation number of Cl is +3.

(1): -3

$\boxed{(2)}$: +3

(3): +2

(4): +7

(5): +5

Q1(B):

A chain aliphatic hydrocarbon with a double bond has the general formula C_nH_{2n}. The option statisfies this fact is $\boxed{(5)}$.

Q1(C):

The half equation at the anode is $Cr^{3+} + 8OH^- \rightarrow CrO_4^{2-} + 4H_2O + 3e^-$.

The half equation at the cathode is $H_2O_2 + 2e^- \rightarrow 2OH^-$.

Therefore, the full equation is $2Cr^{3+} + 10OH^- + 3H_2O_2 \rightarrow 2CrO_4^{2-} + 8H_2O$.

The answer is $\boxed{(4)}$.

Q1(D):

$\rho = \frac{M}{V} = \frac{m_A}{22.4}$.

(1): $\frac{2 \cdot 35.5}{22.4} \approx 3.17$.

(2): $\frac{2 \cdot 1.0 + 32.1}{22.4} \approx 1.52$.

(3): $\frac{14.0 + 3 \cdot 1.0}{22.4} \approx 0.759$.

(4): $\frac{12.0 + 2 \cdot 16.0}{22.4} \approx 1.96$.

$\boxed{(5)}$: $\frac{1.0 + 35.5}{22.4} \approx 1.63$.

Q1(E):

The erythrocyte explodes when too many water molecules get into the cell. For a semipermeable membrane, the factor determining the permeability is the $\boxed{\text{osmotic pressure}}$.

Q1(F):

The repeating unit for a polyethylene is $-CH_2CH_2-$, which has a formula weight of $2 \cdot 12.0 + 4 \cdot 1.0 = 28$.

Therefore, the degree of polymerisation is $\frac{1.50 \times 10^5}{28} \approx \boxed{5.36 \times 10^3}$.

Q2:

$\Delta H_r = \Delta H_f[CO(l)] + \Delta H_f[CH_4(g)] - \Delta H_f[CH_3HO(l)]$

$= -(110.5 + 74.9 - 192.0) = 6.6\ kJ/mol.$

Therefore, the heat of reaction is $\boxed{-6.6\ kJ/mol}$.

Note: The heat released has the opposite sign to the enthalphy change.

Q3:

(A): Cryolite can dissolve bauxite for the extraction of Al. Hence the temperature required to melt the bauxite is lowered to the melting point of cryolite $\boxed{(2)}$.

(B): The half equation for aluminium in the electrolysis is $Al^{3+} + 3e^- \to Al.$

Therefore, the molar ratio $Al : e^- = 1 : 3$ and hence $3 \cdot \frac{20.0}{27.0} \approx 2.22\ F$ of electricity is needed.

(C): $2.22\ F \approx 21.4 \times 10^4\ C.$

The energy required$=qV \approx \boxed{1.07 \times 10^6\ J}$.

(D): Consider one face of the crystal, by Pythagoras theorem, we have

$a^2 + a^2 = (4r)^2$, i.e. $r = \sqrt{\frac{a^2}{8}} \approx \sqrt{\frac{0.4^2}{8}} \approx \boxed{1.43 \times 10^{-1}\ nm}$.

Q4:

(A): $\frac{\frac{87.0}{2 \cdot 1.0+16.0}}{\frac{87.0}{2 \cdot 1.0+16.0} + \frac{13.0}{23.0+16.0+1.0}} \approx \boxed{0.937}$.

(B): The density of $NaOH = 1.142 \times 10^3 \cdot \frac{13.0}{13.0+87.0} = 148.46\ kg/m^3 = 148.46\ g/l$.

Therefore, $[NaOH] = \frac{148.46}{40} \approx \boxed{3.71\ mol/l}$.

Q5:

(A): Ions prensent in the solution are Na^+, OH^- and H^+.

The one with the highest reducing power is OH^- and that with the highest oxidising power is H^+.

Therefore, H^+ is reduced to $\boxed{H_2}$ at the cathode.

(B): The half equation at the cathode is $2H^+ + 2e^- \rightarrow H_2$, where the molar ratio $e^- : H_2 = 2 : 1$.

Therefore, when 56.0 ml , i.e. $\frac{56}{22.4} \times 10^{-3}\ mol$ of gas is evolved, $\frac{56}{11.2} \times 10^{-3}\ F$, i.e. $\frac{9.65 \cdot 56}{11.2} \times 10\ C$ of charges are cosummed.

By $Q = It$, we have $t = \frac{\frac{9.65 \cdot 56}{11.2} \times 10}{0.500} = \boxed{965\ sec}$ is required.

Q6:

(A): Refer to the table:

Chemical	N_2	H_2	NH_3
Before	2 mol	5 mol	0 mol
After	(2-x) mol	(5-3x) mol	2x mol

The molar fraction of $NH_3 = \frac{2x}{(2-x)+(5-3x)+2x} = 0.25$, i.e. $x = 0.7$.

Therefore, heat evolved$=0.7 \cdot 92 = \boxed{64.4\ kJ}$.

(B): As partial pressure is proportional to the number of mole, we have

$p_{N_2} = 1.01 \times 10^6 \cdot \frac{2-0.7}{5.6} \approx \boxed{2.34 \times 10^5\ Pa}$.

Q7:

(A): The molar ratio $H : C : O : N = \frac{6.67}{1.0} : \frac{32.0}{12.0} : \frac{42.7}{16.0} : \frac{18.7}{14.0} \approx 5 : 2 : 2 : 1$.

Therefore, the empirical formula of the amino acid is $H_5C_2O_2N$. Among the options, the one satisfies it is H_2NCH_2COOH $\boxed{(1)}$.

(B): The name of the amino acid is $\boxed{\text{glycine}}$.

Q8:

The reaction is $H(CH_2)_nOH + CH_3COOH \to CH_3COO(CH_2)_nH$.

The molecular weight of the ester is $12.0 \cdot (n+2) + 1.0 \cdot (4+2n) + 2 \cdot 16.0 = 60 + 14n$.

The molecular weight of the alcohol is $12.0n + 16.0 + 1.0 \cdot (2 + 2n) = 18 + 14n$.

Solving $1.7(18 + 14n) = 60 + 14n$, we have $n = 3$.

Therefore, the alcohol is $\boxed{C_3H_7OH}$.