Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1_Oxidation, Reduction and Redox Equations

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Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

B

magnesium in MgO

[1]

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Q2.

C

Fluorine in F_2O is –1

[1]

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Q3.

(a) Lithium would react with the electrolyte/water

Allow water will oxidise Li to Li^+ or Li will reduce water to hydrogen

1

$E^{\ominus}$ for Li^+(/Li) more negative than for water or EMF= 2.21(V)
or $E^{\ominus}$ Li^+ (/Li) < H_2O(/H_2 ,OH^-)

Ignore EMF is negative

1

(b) 0.54 – (–3.04) = <u>3.58</u> (V)

1

(c) Non-standard conditions

Allow non-aqueous conditions or different conditions

1

(d) (+) 7

Accept VII

1

(e) $Li^+ + CoO_2 + e^- \rightarrow Li^+CoO_2^-$ or
$Li^+ + CoO_2 + e^- \rightarrow LiCoO_2$

1

(f) $Li \rightarrow Li^+ + e^-$

1

[7]

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Q4.

D

$$CoO + 4\ HCl \rightarrow [CoCl_4]^{2-} + H_2O + 2\ H^+$$

[1]

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Q5.

(a) **M1** reaction of nitrogen/N_2 and oxygen/O_2 from the air

Must be at least one reference to air.

NOT reference to nitrogen/oxygen from the fuel.

Allow equation plus a reference to the air.

Allow combustion of nitrogen plus reference to the air.

NOT M1 if reference to reaction taking place in the catalytic converter.

1

M2 at high temperatures

Allow high energy/heat or very hot.

Allow heat/energy in the engine <u>provides Ea</u>

IGNORE references to pressure/spark

1

(b) Formation of acid rain / causes respiratory problems

Allow (contributes to) <u>ground level</u> ozone / (photochemical) smog / toxic / poisonous

Allow makes water acidic / reacts with water to form nitric acid / (NO_x gases are) acidic

IGNORE greenhouse gases / global warming / damages ozone layer

IGNORE vague answers such as 'harmful to environment'/polluting/harmful

NOT reference to pH rising

1

(c) **M1** $NO_2 = (+)4$ $NH_3 = -3$ $N_2 = 0$

1

M2 $3NO_2 + 4NH_3 \rightarrow 7/2N_2 + 6H_2O$

ALLOW multiples/fractions
($6NO_2 + 8NH_3 \rightarrow 7N_2 + 12H_2O$ OR
$1½NO_2 + 2NH_3 \rightarrow 1¾N_2 + 3H_2O$)

1

(d) **M1** Catalyst in different phase/state (to reactants)

*NOT (catalyst in different phase/state to) products allow catalyst in different phase/state to reactants **and** products*

1

M2 Speeds up reaction without being used up

ALLOW speeds up the reaction by (providing alternative route for reaction and) lowering E_a

NOT does not take part in the reaction

1

(e) incomplete combustion

***ignore** equations*

ALLOW description of incomplete combustion (e.g. not enough oxygen)

Allow O_2 but NOT O for oxygen

1

[8]

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