# MARK SCHEME

## MAXIMUM MARK: 80

<table>
<thead>
<tr>
<th>SYLLABUS/COMPONENT : 0620/2</th>
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<tbody>
<tr>
<td>CHEMISTRY (CORE)</td>
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</table>
1 (a)(i) alkane
(ii) correct formula showing all atoms and bonds
ALLOW: correct dot and cross diagrams
(iii) natural gas

(b)(i) 78%
ALLOW: 77-79%
(ii) boron/ carbon/ oxygen/ fluorine/ neon

(c)(i) speed up reaction/ lower activation energy etc
NOT: starts the reaction/ alters the rate of the reaction
(ii) increases

(d)(i) 2 (NH₃)
(ii) reversible reaction/ reaction reaches equilibrium/ equilibrium reaction/ reaction can go backwards as well as forwards

(e) molecules arranged randomly;
molecules close together
gas structure = 0

(f) (damp red) litmus paper/ universal indicator paper
turns blue
ALLOW: HCl vapour; white fumes

(g)(i) increase growth of plants
(ii) sulphuric acid

2 (a) charged species/ charged atom/ charged group of atoms

(b) calcium/ Ca²⁺

(c) 2 (in front of e⁻)

(d) any two of: calcium sulphate/ sodium chloride/ sodium hydrogen carbonate/ sodium sulphate
ALLOW: calcium hydrogen carbonate; calcium carbonate

(e) CaCl₂

(f) √√√
(2 if all correct 1 if one mistake)

(g) filter paper in filter funnel;
receptacle underneath with water shown in it - labelled;
clay/ residue on filter paper -labelled
3 (a) chlorine: yellow-green/ green;
    NOT: yellow
    iodine: black/ grey/ grey-black;
    fluorine: gas
    bromine: liquid

(b) ALLOW: between 140 and 250°C (inclusive) [actual = 184°C]

(c)(i) chlorine + potassium bromide → bromine + potassium chloride
    (2 if all correct / -1 per error)

    (ii) chlorine
    bromine
    iodine

(d) Any suitable use e.g. in swimming pools/ disinfection/ sterilizing water supplies etc/
    killing bacteria / for bleaching/ in making insecticides/ making dry cleaning fluids/
    making correct, named inorganic or organic chemical/ making matches/
    making fireworks/ recovery of tin or aluminium from scrap metal

(e) covalent

4 (a) Substance containing carbon and hydrogen and perhaps other elements/ oxygen

(b) B and C
    ALLOW: correct formulae/ names

(c) A
    ALLOW: correct formula/ name

(d) D
    ALLOW: correct formula/ name

(e) A
    ALLOW: correct formula/ name

(f)(i) gives out heat/ raises temperature of surroundings
    ALLOW: gives out energy

(ii) carbon dioxide; water
    ALLOW: correct symbols

(iii) carbon monoxide
    ALLOW: CO

(g) C₄H₆O₂

(h) 88

(i) chromatography
5 (a) rock which contains a particular metal / rock from which metal can be extracted
ALLOW: mineral (in place of rock) [1]

(b) limestone [1]

(c)(i) iron oxide + carbon → iron + carbon monoxide
ALLOW: iron(III) oxide
NOT: iron(II) oxide [1]

(ii) removal of oxygen from compound / decrease in oxidation number / gain of electrons
ALLOW: addition of hydrogen [1]

(d)(i) the air [1]

(ii) absorbs heat / takes in heat from the atmosphere/ temperature of surroundings falls
ALLOW: absorbs/ takes in energy [1]

(e)(i) heated / made molten;
oxygen/ oxygen enriched air blasted through it [2]

(ii) car bodies/ machinery etc
NOT: cutlery/ chemical plants [1]

(f)(i) lower pH, the faster the corrosion
NOT: more acidic, the faster the corrosion [1]

(ii) higher temperature leads to greater corrosion;
(acid/ air) particles moving faster at higher temperatures / particles have more energy at higher temperatures;
NOT: steel particles moving faster
NOT: vibrating faster
more collisions (with steel) [2]

(iii) sulphur dioxide / nitrogen oxides;
sulphur dioxide: burning fossil fuels/ power stations/ volcanoes etc
nitrogen oxides: car exhausts/ burning fossil fuels etc [2]
6 (a) distillation

(b) (round-bottomed) flask

(c) cools down vapour / lowers temperature / idea of cooling;
   so that vapour is changed to liquid / so vapour condenses

(d)(i) pH 7
   (ii) 100°C
   NOT: 100

(e)(i) 24(g)
   (ii) calcium carbonate / CaCO₃
   (iii) magnesium chloride
   (iv) acidify with hydrochloric or nitric acid;
        add barium chloride;
        white precipitate.

(f)(i) ions;
   (free to) move
   (ii) anode: chlorine; cathode: sodium
   (iii) graphite / carbon (allow Pt)