**M1.**(a) $C_5H_{12}$

**1**

(b) Alkanes

**1**

(c) (3) $CO_2$

**1**

(4) $H_2O$

**1**

*allow for **1** mark*

*4 $CO_2$ + 3 $H_2O$*

(d) contains hydrogen and carbon

**1**

(hydrogen and carbon) only

**1**

(e) *(diesel)*
produces more oxides of nitrogen

*allow converse answers in terms of petrol*

**1**

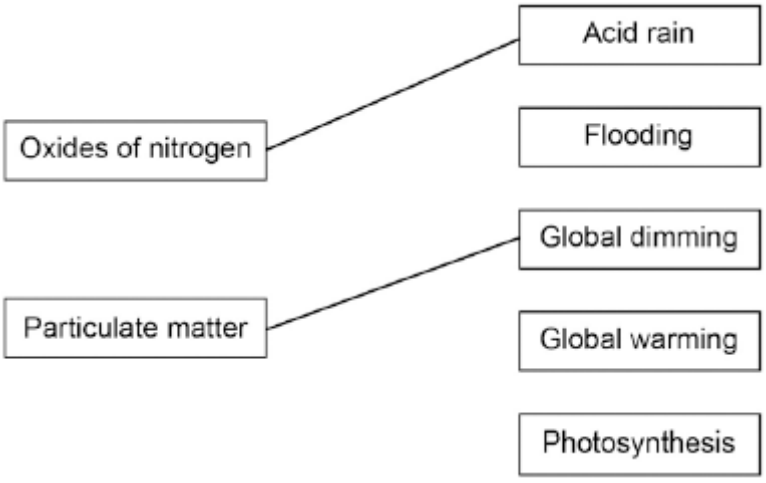
produces (more) particulate matter

**1**

produces less carbon dioxide

**1**

(f)


Oxides of nitrogen
Particulate matter
Acid rain
Flooding
Global dimming
Global warming
Photosynthesis

**2**

**[11]**

**M2.**(a) (i) mixture (of different substances)

**1**

(ii) boiling (points)

**1**

(iii) distillation

**1**

(b) (i) combustion

**1**

(ii) (reactant)

oxygen

*allow correct formulae*

**1**

(products)

*products in any order*

carbon dioxide

*allow carbon or carbon monoxide*

**and**

water

*allow water vapour or steam or hydrogen oxide*

**1**

(iii) (burning sulfur) produces sulfur dioxide / $SO_2$

*allow it / sulfur reacts with oxygen ignore sulfur oxide*

**1**

causes acid rain

**1**

(c) (i) propane is a fuel

**1**

(ii) double bond drawn between carbon atoms

*do not allow any other bonds or symbols*

**1**

(iii) orange to colourless

**1**

(iv) poly(pentene)

*allow polymer(s)*

**1**

**[12]**

**M3.** (a) (i) bar drawn between 84 and 86

**1**

(ii) sulfur dioxide linked to acid rain

**1**

carbon particles linked to global dimming

**1**

(b) (i) any **one** from:

- plants / trees <u>absorb</u> (carbon dioxide)
- coal '<u>locks up</u>' (carbon dioxide)

**1**

(ii) it <u>increases</u> the amount (of $CO_2$)

**1**

because carbon in coal (forms carbon dioxide)

*accept because carbon / coal burns / reacts <u>with oxygen</u> (to produce $CO_2$)*

**1**

**[6]**

**M4.** (a) (i) increase

**1**

(ii) energy is given out to the surroundings

**1**

(b) (i) NO

*allow 2NO*

*ignore nitrogen oxide*

*do **not** allow equations*

**1**

(ii) harmful / poisonous (owtte)

*allow dangerous*

*ignore reference to pollution / global warming*

*do **not** accept references to ozone layer*

**1**

(c) a catalyst can speed up a chemical reaction

**1**

different reactions need different catalysts

**1**

(d) (i) smaller

*accept less / tiny / very small*

*allow $10^{-9}$*

*do **not** allow small unless qualified*

**1**

(ii) reduce cost (owtte) **or**

*ignore references to energy*

save resources / raw materials (owtte)

**1**

**[8]**

**M5.** (a) sulfur dioxide / $SO_2$

*allow sulfur oxide*

**1**

(b) global dimming

**1**

(c) oxygen / $O_2$

**1**

(d) (oil is a) limited resource / finite / non-renewable

*accept running out of oil **or** wood is sustainable*

*accept (burning oil) increases amount of carbon dioxide in the atmosphere / global warming **or** releases locked up carbon / global dimming / acid rain*

*accept the oil (may become) too expensive*

**1**

(e) carbon dioxide produced (from burning wood)

*ignore global warming*

**1**

carbon dioxide used by plants / trees **or** for photosynthesis

*if no other mark awarded*

*allow carbon emissions used by plants / trees **or** for photosynthesis for **1** mark*

**1**

**[6]**

**M6.** (a) acid rain → sulfur dioxide

**1**

global warming → carbon dioxide

**1**

global dimming → carbon particles

**1**

(b) (i) oxygen

**1**

(ii) carbon monoxide

**1**

(c) (i) decreasing

*accept running out / none left*

**1**

(ii) any **two** from:

*it = coal*

- world needs (more) energy
  *accept population is increasing*
  *allow (greater) demand for coal / fuels / energy*
- plentiful supply
  *accept readily available*
  *allow coal will 'last longer'*
- (many) countries have coal
- easy to find / extract
- oil / gas is running out

*accept need to use less oil / gas*
*accept need to use it to replace oil / gas*

- cheap **or** cheaper than oil

**2**

**[8]**

**M7.** (a) good (electrical) conductor

*allow low reactivity / resistance to corrosion*

*do **not** accept heat conductor*

**1**

(b) a mixture of metals

*accept contains more than one type of metal*

**1**

(c) (i) any **one** from:

- eyesore
- destruction of habitats
- pollution of water
- dust pollution
- noise
- traffic pollution

**1**

(ii) acid rain

*allow sulfur dioxide is a pollutant*

**1**

(d) (i) running out of copper (ores)

**1**

(ii) any **two** from:

- any <u>specific example</u> of using less copper
- reuse / recycle
  *allow do **not** throw copper / brass away*
- use low-grade copper ores
- use other metals / materials in place of copper

**2**

**[7]**