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

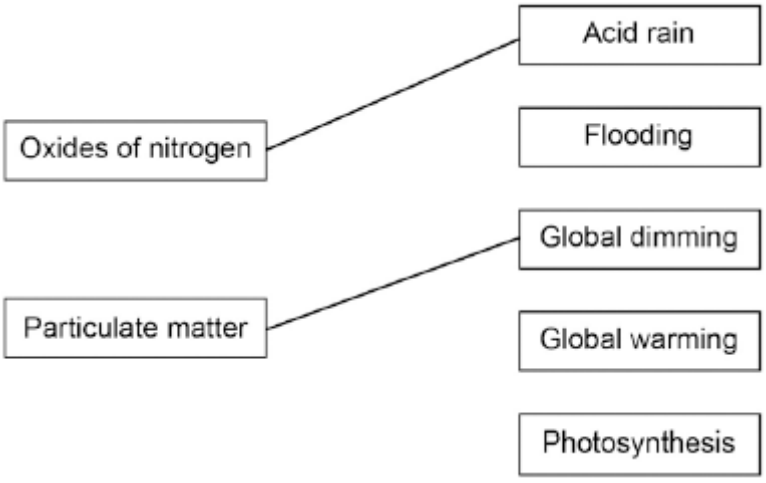
produces (more) particulate matter

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) (conical) flask

1

(ii) measuring cylinder / pipette / burette

1

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

- so anomalous results could be identified / ignored
- so a mean / average could be taken
- (to improve) accuracy

2

(ii) 19

1

(iii) increases / gets longer / gets bigger

1

(iv) anomalous / does not agree with other times for $C_{10}H_{22}$

1

(v) any **one** from:

- shorter hydrocarbon used
- volume of hydrocarbon too small
- started timing late
- stopped timing too early / when liquid left in funnel

*must suggest why the result is **lower** than the others.*

*allow the temperature was higher **or** the students used a wider funnel.*

1

(c) (i) flammable

1

(ii) suitable safety precaution

1

reason that links the safety precaution to the hazard symbols

eg:

- *wear gloves*
- *(because) it is hazardous to health / harmful / toxic / irritant*

or

- *do not pour down sink **or** dispose of properly*
- *(because) it is harmful to the environment / kills fish*

or

- *wear a mask or do it in the fume cupboard or a well-ventilated area*
- *respiratory irritant*

1

(d) (i) points plotted correctly (within half small square)

*all six points correct scores **2***

*3, 4 or 5 points correct scores **1***

2

smooth curve of best fit

1

(ii) point at 46 °C circled

allow point furthest from the line as drawn

1

(iii) working shown on graph

1

value read from graph line drawn (within half small square)

1

(iv) the higher the temperature the lower the viscosity

*allow the higher the temperature the lower / shorter the time taken for **1** mark*

2

non-linear **or** change gets smaller as temperature gets higher

*answer relating temperature to time taken can score a maximum of **2** marks.*

1

(v) identifying source of the error

1

method of avoiding the error

eg:

- *the temperature will drop*
- *insulate the funnel*

or

- *runs out before all added*
- *put a tap on the funnel*

1

[22]

M3.(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 / $S0_2$

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]

M4.(a) (i) Neutron (top label)

1

Electron (bottom label)

1

(ii) 13

1

(iii) electrons

1

(b) (i) compound

1

hydrogen

1

bond

1

(ii) C_4H_{10}

1

[8]