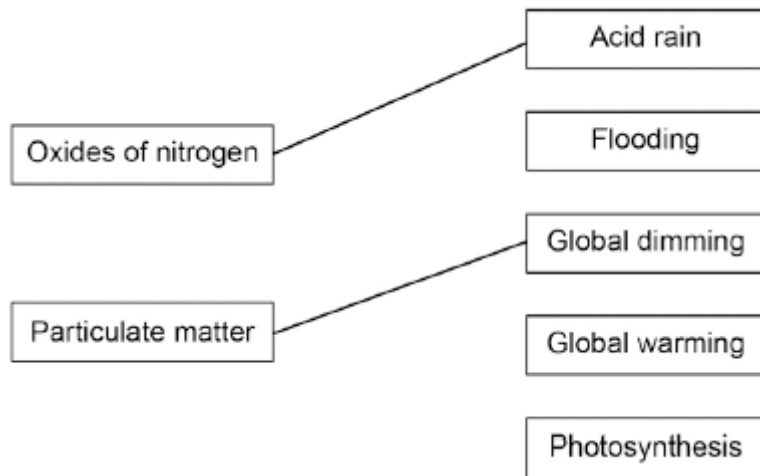


M1.(a)	C_5H_{12}	1
(b)	Alkanes	1
(c)	(3) CO_2	1
	(4) H_2O	1
	<i>allow for 1 mark</i> $4 CO_2 + 3 H_2O$	
(d)	contains hydrogen and carbon	1
	(hydrogen and carbon) <u>only</u>	1
(e)	<i>(diesel)</i> produces more oxides of nitrogen <i>allow converse answers in terms of petrol</i>	1
	produces (more) particulate matter	1
	produces less carbon dioxide	1

(f)



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 C₁₀H₂₂ 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 / SO₂
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) C₄H₁₀ 1

[8]