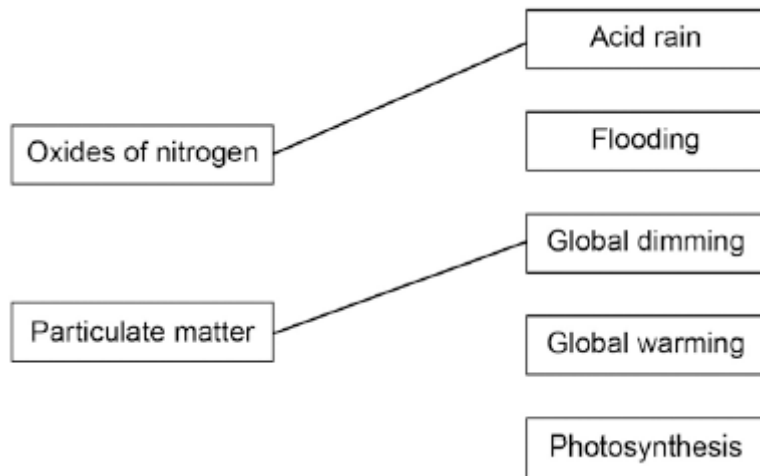


M1.(a)	C_5H_{12}	1
(b)	Alkanes	1
(c)	(3) CO_2	1
	(4) H_2O	1
	<i>allow for 1 mark</i> $4 CO_2 + 3 H_2O$	
(d)	contains hydrogen and carbon	1
	(hydrogen and carbon) <u>only</u>	1
(e)	<i>(diesel)</i> produces more oxides of nitrogen <i>allow converse answers in terms of petrol</i>	1
	produces (more) particulate 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • shorter hydrocarbon used • volume of hydrocarbon too small • started timing late • stopped timing too early / when liquid left in funnel <p><i>must suggest why the result is lower than the others.</i></p> <p><i>allow the temperature was higher or the students used a wider funnel.</i></p>	1
(c)	(i)	flammable	1
	(ii)	suitable safety precaution	1
		reason that links the safety precaution to the hazard symbols	
		<i>eg:</i>	
		<ul style="list-style-type: none"> • wear gloves • (because) it is hazardous to health / harmful / toxic / irritant 	
		or	
		<ul style="list-style-type: none"> • 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	
		<i>allow correct formulae</i>	1
		(products)	
		<i>products in any order</i>	
		carbon dioxide	
		<i>allow carbon or carbon monoxide</i>	
		and	
		water	
		<i>allow water vapour or steam or hydrogen oxide</i>	1
	(iii)	(burning sulfur) produces sulfur dioxide / SO ₂	
		<i>allow it / sulfur reacts with oxygen ignore sulfur oxide</i>	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]