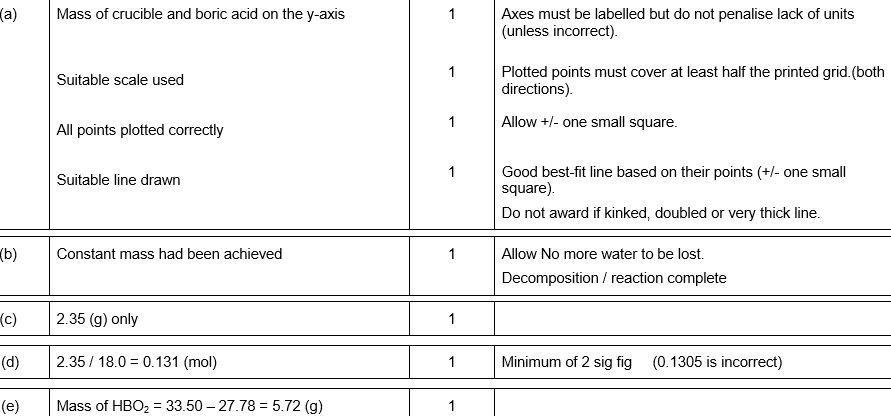
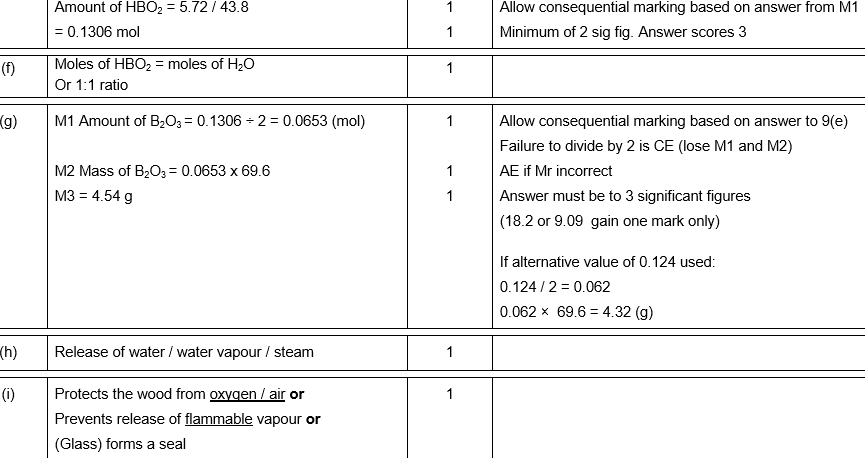
AS-LEVEL PAPER 2 PP20 MS

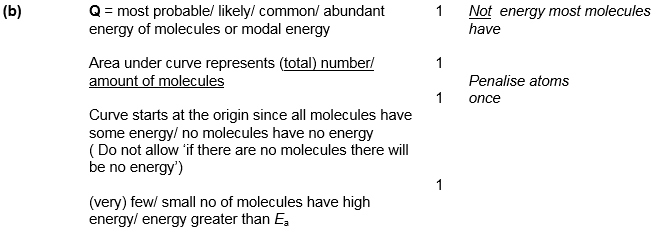
**1.**



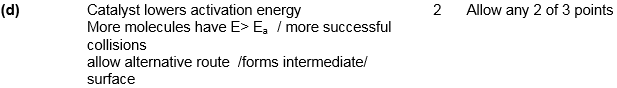
**[16]**

**2.**

****







**[15]**

**3.**       (a)     (Different) boiling points

*Ignore mp’s, references to imf, different volatilities*

**1**

(b)     (i)      Compound which have the same molecular formula

*Accept same no and type of atom for M1  
But If same (chemical) formula M1 = 0 but allow M2  
If empirical formula CE = 0/2*

**1**

but different structures/different structural  
formulae/different displayed formulae

*M2 dependent on M1*

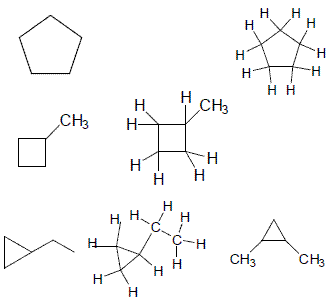
**1**

(ii)     3-methylbut-1-ene

*only  
ignore commas and hyphens*

**1**

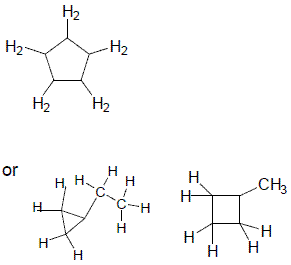
(iii)



*Allow any correct structure with a cyclic alkane*

**1**

*Do not allow*

**

*i.e with an H missing on one C*

(c)     C13H28

*only*

**1**

Making plastics/used to make polymers or polythene/used  
to make antifreeze/make ethanol/ripening fruit/any named  
additional polymer

*not used* ***as*** *a plastic/polymer/antifreeze  
not just ‘polymers’ – we need to see that they are being made*

**1**

**[7]**

**4.**       (a)     C16H34 + 24.5O2 → 16CO2 + 17H2O

*Allow multiples*

*Ignore state symbols in equation*

**1**

(b)     Solidifies/freezes/goes viscous/waxing occurs

*Allow does not vapourise/less volatile*

*Lack of Oxygen = 0*

*Apply list principle*

**1**

(c)     (i)      N2 + O2 → 2NO

*Allow multiples/Ignore state symbols in equation*

**1**

Spark/(very) high temp/2500 °C – 4000 °C

*Ignore pressure/catalyst/low % of oxygen*

*Not just heat/hot*

*Apply list principle eg if high temp 150 °C = 0*

**1**

(ii)     2CO + 2NO → 2CO2 + N2

*Allow multiples/Ignore state symbols in equation*

***OR***

C8H18 + 25NO → 8CO2 + 12.5 N2 + 9H2O

*Allow other alkane reacting with NO in correctly balanced equation*

***OR***

C + 2NO → CO2 + N2

***OR***

2NO → N2 + O2

**1**

Pt/Pd/Rh/Ir

*Penalise contradiction of name and symbol*

**1**

(iii)     4NO2 + 2H2O + O2 → 4HNO3

*Allow multiples/Ignore state symbols in equation*

**1**

(d)     (i)      High temp/

anywhere in range 400 °C – 900 °C/

anywhere in range 670-1200K/high pressure/anywhere  
in range 5000 kPa up to 8000 kPa/

*Not catalyst/heat*

**1**

(ii)           C16H34 → C6H14 + 2C4H8 + C2H4

Or C16H34 → C6H14 + C4H8 + 3C2H4

*Do not allow multiples*

*Ignore state symbols in equation*

**1**

(iii)     Polymers/plastics/named polymer

*Allow polyesters or polyamides*

*Ignore object made from polymer*

**1**

**[10]**

**5.**       (i)      C15H32 + 23 O2 → 15 CO2 +16 H2O

*Products (1)  
Balance (1)  
If wrong reactant C.E*

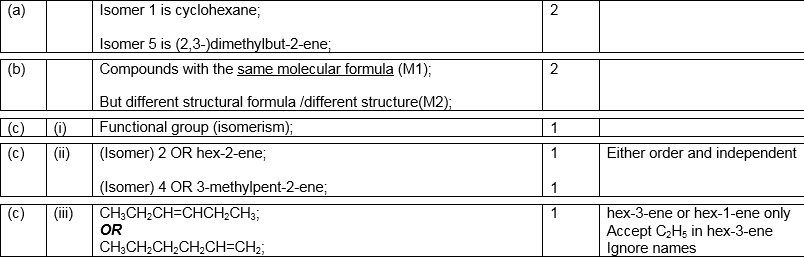
(ii)      Identity of product: CO or carbon monoxide **(1)**

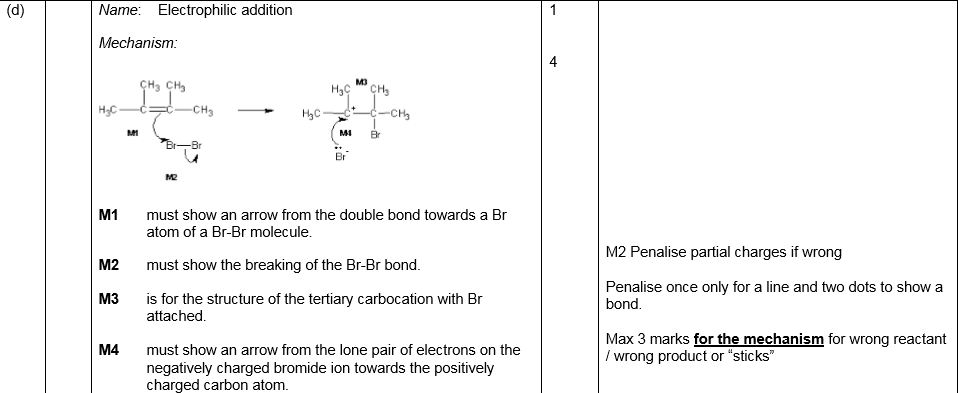
Equation: CH4 + O2 → CO +2 H2O **(1)**

*Any balanced equation using CH4, producing CO  
could also make C + CO2*

**[4]**

**6.**





**(Total 13 marks)**

**7.**

