

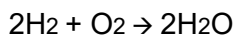
GCSE Chemistry B (Twenty First Century Science)

J258/03 Breadth in chemistry (Higher Tier)

Question Set 18

1 Some cars use hydrogen fuel cells instead of petrol.

This is the reaction that happens in the hydrogen fuel cell:

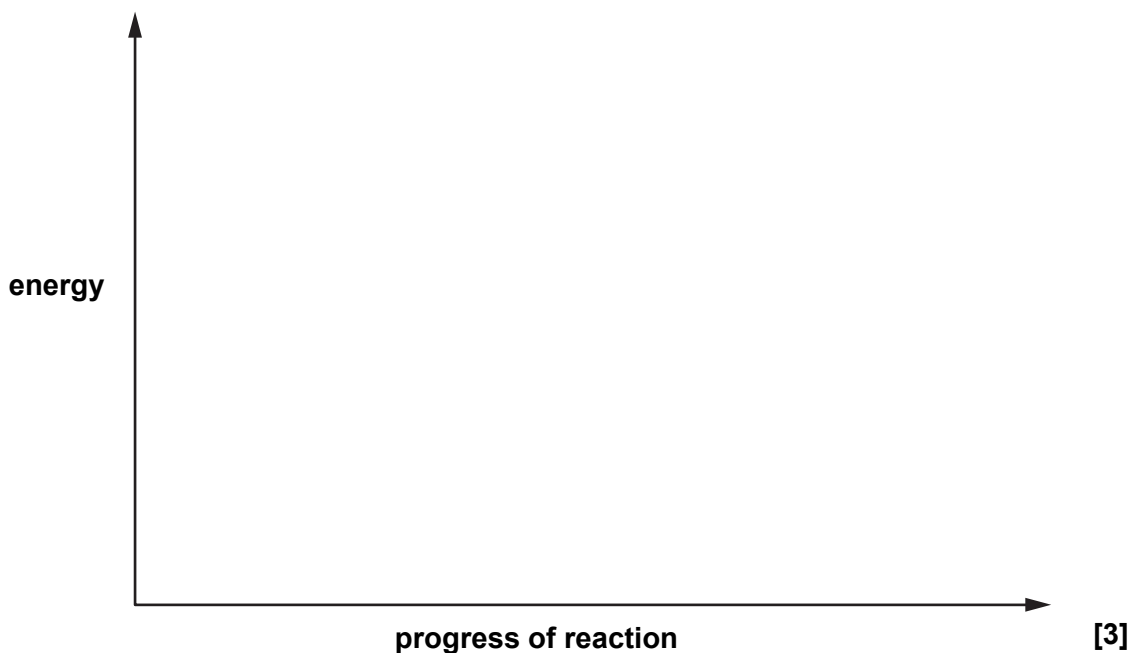


(a) Suggest **one** advantage and **one** disadvantage of using fuel cells instead of petrol. [2]

(b) Complete a reaction profile for the above reaction of hydrogen with oxygen.

On the profile, show:

- the formulae of reactants and products
- the activation energy.



(c) Burning 10 g of hydrogen gives out 1200 kJ of energy.

How much energy is given out when 1.0 mole of H_2 burns?

Use the formula: number of moles = $\frac{\text{mass of substance}}{\text{relative formula mass}}$

Energy = kJ [2]

Total Marks for Question Set 18 : 7

Resource Materials

The Periodic Table of the Elements

| (1) | (2) | | | | | | | | | | | (3) | (4) | (5) | (6) | (7) | (0) | |
|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|---------------------------------|
| 1 | 2 | | | | | | | | | | | 13 | 14 | 15 | 16 | 17 | 18 | |
| 1 H hydrogen 1.0 | | | | | | | | | | | | | | | | | | 2 He helium 4.0 |
| 3 Li lithium 6.9 | 4 Be beryllium 9.0 | | | | | | | | | | | 5 B boron 10.8 | 6 C carbon 12.0 | 7 N nitrogen 14.0 | 8 O oxygen 16.0 | 9 F fluorine 19.0 | 10 Ne neon 20.2 | |
| 11 Na sodium 23.0 | 12 Mg magnesium 24.3 | | | | | | | | | | | 13 Al aluminium 27.0 | 14 Si silicon 28.1 | 15 P phosphorus 31.0 | 16 S sulfur 32.1 | 17 Cl chlorine 35.5 | 18 Ar argon 39.9 | |
| 19 K potassium 39.1 | 20 Ca calcium 40.1 | 21 Sc scandium 45.0 | 22 Ti titanium 47.9 | 23 V vanadium 50.9 | 24 Cr chromium 52.0 | 25 Mn manganese 54.9 | 26 Fe iron 55.8 | 27 Co cobalt 58.9 | 28 Ni nickel 58.7 | 29 Cu copper 63.5 | 30 Zn zinc 65.4 | 31 Ga gallium 69.7 | 32 Ge germanium 72.6 | 33 As arsenic 74.9 | 34 Se selenium 79.0 | 35 Br bromine 79.9 | 36 Kr krypton 83.8 | |
| 37 Rb rubidium 85.5 | 38 Sr strontium 87.6 | 39 Y yttrium 88.9 | 40 Zr zirconium 91.2 | 41 Nb niobium 92.9 | 42 Mo molybdenum 95.9 | 43 Tc technetium | 44 Ru ruthenium 101.1 | 45 Rh rhodium 102.9 | 46 Pd palladium 106.4 | 47 Ag silver 107.9 | 48 Cd cadmium 112.4 | 49 In indium 114.8 | 50 Sn tin 118.7 | 51 Sb antimony 121.8 | 52 Te tellurium 127.6 | 53 I iodine 126.9 | 54 Xe xenon 131.3 | |
| 55 Cs caesium 132.9 | 56 Ba barium 137.3 | ● 57–71 lanthanoids | 72 Hf hafnium 178.5 | 73 Ta tantalum 180.9 | 74 W tungsten 183.8 | 75 Re rhenium 186.2 | 76 Os osmium 190.2 | 77 Ir iridium 192.2 | 78 Pt platinum 195.1 | 79 Au gold 197.0 | 80 Hg mercury 200.6 | 81 Tl thallium 204.4 | 82 Pb lead 207.2 | 83 Bi bismuth 209.0 | 84 Po polonium | 85 At astatine | 86 Rn radon | |
| 87 Fr francium | 88 Ra radium | ● 89–103 actinoids | 104 Rf rutherfordium | 105 Db dubnium | 106 Sg seaborgium | 107 Bh bohrium | 108 Hs hassium | 109 Mt meitnerium | 110 Ds darmstadtium | 111 Rg roentgenium | 112 Cn copernicium | | 114 Fl flerovium | | 116 Lv livermorium | | | |

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|---|
| Key atomic number Symbol <small>name</small> relative atomic mass |
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