Mark schemes

Q1.

(a) colourless

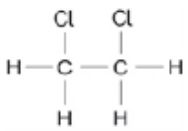
ignore clear

1

(b) damp litmus paper

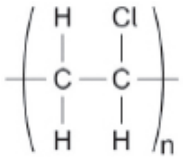
1

(c)



1

(d)



1

(e) 1.5 × 10 0.9 × 10

1

(ratio =) 15 : 9

1

= 5 : 3

allow correct determination of the simplest whole number ratio from an attempt at a density ratio

1

alternative approach

(ratio =)

$\frac{1.5}{0.9}$ $\frac{0.9}{0.9}$ (1)

1.666 : 1 (1)

= 5 **:** 3 (1)

allow correct determination of the simplest whole number ratio from an attempt at a density ratio

(f) the pipes will melt
or
the polymers will melt

allow the melting point of both polymers is below 300°C

1

(g) oil is non-renewable
or
paper is obtained from a renewable source
allow oil is finite

1

[9]

Q2.

(a) alloy

1

reinforcement

1

(b) burning (of methane) releases carbon dioxide
allow burning methane
ignore methane is a greenhouse gas

1

decomposition (of limestone) releases carbon dioxide
allow decomposition of limestone

1

(c) hydrochloric acid

1

limewater

1

(d) (pre-stressed concrete) can bear the weight of (heavy) traffic
allow converse for plain concrete
allow (pre-stressed concrete) bridge is less likely to collapse

1

(because pre-stressed concrete is) stronger
*do **not** accept (because prestressed concrete is) more dense*

1

(e) any **two** from:
(plain concrete slabs)
- are cheaper
- will be lighter (to transport / lay)
- do not need to carry vehicles

allow converse for pre-stressed concrete

2

[10]

Q3.

(a) (the poly(propene) beaker will begin to) melt

allow poly(propene) has a low melting point

1

(the poly(propene) beaker will) burn / ignite

allow poly(propene) is flammable

1

(b) (poly(propene) beakers are) less easily broken

allow (poly(propene) beakers are) less likely to shatter

allow (poly(propene) beakers are) tougher

allow (poly(propene) beakers have a) higher resistance to impact

1

(c) boron trioxide

1

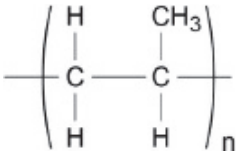
(d)

Symbol for element	Name of element	Number of atoms of element in one molecule of propene
C	carbon	3
H	hydrogen	6

*if no other mark awarded allow **1** mark for a correct column*

2

(e)



1

(f) (**Stage 1** is) fractional distillation

1

(**Stage 2** is) cracking

1

(**Stage 3** is) polymerisation

1

(g) alkene

1

monomer

1

[12]

Q4.

(a) carbon

1

(b) chromium

1

nickel

1

(c) hard

1

resistant to corrosion

1

in either order

(d) (percentage of titanium = 100 - 3.0 - 2.5) = 94.5 (%)

1

$$(\text{mass} =) \frac{94.5}{100} \times 5.0$$

allow correct use of incorrectly determined percentage of titanium

1

= 4.725 (kg)

allow 4.7 / 4.73 (kg)

1

alternative approach:

$$(\text{mass of Al + V} = \frac{5.5}{100} \times 5.0 =)$$

(mass of titanium =) 5 - 0.275 (1)

allow correct use of incorrectly determined mass of Al and V

= 4.725 (kg) (1)

allow 4.7 / 4.73 (kg)

(e) (both are) strong

allow (both contain) more aluminium

1

(f) tin is toxic

allow tin reacts in the body

1

[10]