## Limestone and building materials

## Mark scheme

**1.** (a) any **one** from:

- wear safety goggles
- use mat under apparatus
- wear lab coat 1

(b) (i) 0.89 (g) 1

(ii) to check accuracy etc 1

(iii) experimental error or any other sensible answer 1

(iv) not accurate enough or other sensible answers 1

(v) 0.89 (g) 1

*accept 0.88 g/0.90 g*
*accept their average from (ii)*

(c) (i) any **two** from: 2

- dust
- noise
- eyesore
- pollution
- destroys habitats
- lorries along local roads

*accept any sensible answer*

(ii) any **two** from:

- makes useful products
- named useful products / uses (could get both marks here)
- building material / stone
- employment
- makes money 2

**[13]**

**2.** (a) (i) calcium oxide / CaO 1

carbon dioxide / $CO_2$ 1

*products can be in either order*
*ignore chemical names other than calcium oxide **or** carbon dioxide*

(ii) (thermal) decomposition 1

*accept endothermic*

(b) (i) (chemical) reaction / react 1

*accept calcium hydroxide / slaked lime produced; ignore incorrect products*

energy / heat released / exothermic 1

*ignore gets hot / heats up*

*if neither mark awarded then allow 'mixing the chemicals heats up the coffee' for **1** mark*

(ii) any **two** from:

- foil has been broken(*)
- ring pull used(*)

*(*)if neither mark awarded accept 'cannot / difficult to repair' for **1** mark*
*ignore button pushed*

- quicklime and / or water mixed / reacted 2

*accept reaction not reversible*
*accept cannot / difficult to replace quicklime / water / chemicals*

**[7]**

**3.** (a) (i) calcium oxide / quicklime 1

*allow calcium monoxide; do **not** accept calcium dioxide;*
*ignore chemical formulae*

(ii) any **three** from:

- carbon dioxide / $CO_2$
- (carbon dioxide) reacts (with the calcium hydroxide / slaked lime / plaster)

*allow reaction 3 identified; do **not** allow incorrect reaction;*
*ignore mixes, unless they state the correct product*

- limestone / calcium carbonate / $CaCO_3$ forms

*allow marble / chalk*

- water is lost / evaporates 3

*it = plaster*
*allow moisture*
*ignore dries*

(b) (i) as the amount / volume of sand decreases the strength of the mortar increases 1

*accept as sand decreases the mortar is stronger / harder to crack*
*allow as sand decreases the mortar increases*
*allow converse; ignore references to height of metal ball*

(ii) any **two** from:

- 400 / 5$^{th}$ result is anomalous

*accept two results (36 and 37 / 400 and 500 / 4$^{th}$ and 5$^{th}$) are almost the same; accept result at 400 should be 42*

- the interval between the others is similar or the interval is about 6/7

*allow the other results fit a pattern / are on a straight line*

- he has only one set of results 2

*allow he has only done it once; ignore reliable*

**[7]**

**4.** (a) (i) clay 3

*for one mark*

(ii) calcium oxide / quicklime / CaO

*for one mark*

(iii) sensible answers such as cost of fuel etc. / *accept* a wide range of appropriate answers

*for one mark*

(b) sand
gravel (owtte) e.g. crushed rock
water

*any* two *for 1 mark each* 2

**[5]**

**5.** (a) (i) oxygen / air reacts with carbon / methane (to form carbon dioxide) 1

*accept from the decomposition / reaction of calcium carbonate*
*ignore $CO_2$ from the air*

nitrogen is (unreacted) from the air 1

(ii) CaO 1

$CO_2$ 1

*any order; ignore words; any incorrect balancing max **1** mark*

(b) any **one** from: 1

- more energy / efficient
  *allow converse for present fuel*
- from a sustainable / renewable resource
- produces less / no carbon dioxide / greenhouse gases / global warming
  *ignore no pollution / environmental damage*
- more profit **or** money for local economy
  *accept fuel is cheap(er)*
- more readily available
  *it = different fuel*

(c) (i) any **two** from: 2

- not near where people / residents live
  *accept not between cement works and where people live*
  *ignore sensors are unsightly*
- not positioned where concentration of particles was likely to be highest
- not positioned downwind

(ii) the average / concentration was 1.8(ppm) **or** the average / concentration was below 2(ppm) 1

*accept 1.8(ppm) is less than 2.0 (ppm)*

(iii) any **three** from: 3

- children / people suffering asthma attacks
- result was an average
- readings (at some (2/3) sensors) could have been higher than 2ppm
- sensors did not detect particles below 0.5mm
- small particles / particles below 0.5mm / 0.4mm / 0.3mm / 0.2mm could (still) cause cancer / asthma

*ignore global dimming **or** cars becoming dirty **or** position of sensors*

**[11]**