Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

STEM | Exam Builder

Speed, density and pressure

Time allowed: 45 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 36

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 36 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

STEM | Exam Builder

Print at 100% (Actual size) so diagrams keep their real measurements.

1 Kiran leaves home at 9.45 am.
She drives 135 km to visit a friend.
She arrives at her friend's house at 11.15 am.

Work out her average speed in km/h.

..... km/h [2]

Speed, density and pressure Click for more variations

1	90	**2**	**M1** for 135 ÷ *their* time

2 An athlete runs at a speed of 9.5 m/s.

Convert this speed into km/h.

..... km/h [2]

Speed, density and pressure Click for more variations

2	34.2	**2**	**M1** for figs 342 or for $k \times 60 \times 60$ or for $k \div 1000$

3 Amar cycles at a speed of 18 km/h.
It takes him 55 minutes to cycle between two villages.

Calculate the distance between the two villages.

STEM | Exam Builder

..... km [2]

Speed, density and pressure Click for more variations

3	16.5	**2**	**M1** for $\frac{55}{60}$ or speed × time (numerical)

4 A car travels a distance of 1280 **metres** at an average speed of 64 kilometres per hour.

Calculate the time it takes for the car to travel this distance.
Give your answer in **seconds**.

Answer ..... s [3]

Speed, density and pressure Click for more variations

4	72	**3**	**M2** for $\frac{1280}{64} \times \frac{60 \times 60}{1000}$ **M1** for working out distance ÷ speed e.g. figs 1280 ÷ 64 or figs $\frac{1280}{\textit{their speed}}$ or for working out km/h to m/s conversion e.g. $64 \times \frac{1000}{60 \times 60}$ oe or *their* $\left(\frac{1280}{64}\right) \times \frac{60 \times 60}{1000}$ oe

STEM | Exam Builder

5 A car of length 4.3 m is travelling at 105 km/h.
It passes over a bridge of length 36 m.

Calculate the time, in seconds, it takes to pass over the bridge **completely**.

..... s [3]

Compound measures Click for more variations

5	1.38 or 1.381 to 1.382	**3**	**M2** for $(36 + 4.3) \div (105 \times \frac{1000}{60 \times 60})$ oe or **M1** for $105 \times \frac{1000}{60 \times 60}$ or for a distance ÷ a speed or **SC2** for answer 1.23(4...)

6 Beatrice walks 1 km at a speed of 4 km/h and then 2 km at a speed of 4.5 km/h.

Work out Beatrice's average speed for the whole journey.

STEM | Exam Builder

..... km/h [3]

Speed, density and pressure Click for more variations

6	4.32	**3**	**B1** for $\frac{1}{4}$ oe or $\frac{2}{4.5}$ oe seen **M1 dep** on **B1** for $\frac{1+2}{their\frac{1}{4} + their\frac{2}{4.5}}$ oe

7 A bar of gold in the shape of a cuboid has dimensions 2 cm by 4 cm by 6.5 cm.
The density of gold is 19.32 g/cm^3.

Calculate the mass of this bar of gold.

$\left[\text{Density} = \frac{\text{mass}}{\text{volume}}\right]$

..... g [3]

Speed, density and pressure Click for more variations

7	1004.64	**3**	**M1** for $2 \times 4 \times 6.5$ oe implied by 52 **M1 f**or $19.32 = \frac{[mass]}{their\ 52}$ or better

8 There is a straight road between town *A* and town *B* of length 130 km.

Maxi travels from town *A* to town *B*.
Pippa travels from town *B* to town *A*.
Both travel at a constant speed of 40 km/h.
Maxi leaves 30 minutes before Pippa.

Work out how far from town *A* they will be when they pass each other.

STEM | Exam Builder

..... km [4]

Speed, density and pressure Click for more variations

8	75	**4**	**B3** for 55 or **B2** for 110 or **B1** for 20 seen OR **M1** for $\frac{30}{60}\times 40$ or better seen **M1dep** for $130-$*their* 20 **M1dep** for $\frac{\textit{their}110}{2}$ OR **M1** for $130 \div 40$ or better seen **M1** for *their* $3.25 - 0.50$ **M1** for *their* $\frac{2.75}{2} \times 40$

9 **(a)** Sara rides her bicycle at a speed of 420 metres per minute.

Work out her speed in kilometres per hour.

..... km/h [2]

(b) Jan cycles a distance of 51 km.
She starts at 11 55.
She has a rest stop for 25 minutes.
She finishes at 14 41.

Calculate her average speed, in km/h, **for the time she is cycling**.

..... km/h [4]

(a) Compound measures (b) Speed, density and pressure Click for more variations

STEM | Exam Builder

9(a)	25.2	**2**	**M1** for 420 ÷ 1000 × 60 or **B1** for figs 252 final answer
9(b)	21.7 or 21.70…..	**4**	**B2** for 2 h 21 [min] or 2°21° or 2.35 [h] or 141 [min] or **B1** for 2 h 46 [min] or 2°46° or 2.76… [h] or 2.77[h] or 166 [min] or 1416 or 1220 **M1** for 51 ÷ *their* time period

STEM | Exam Builder

10 **(a)** Naomi runs 100 m in 15 seconds.

Calculate Naomi's average speed in kilometres per hour.

..... km/h [2]

(b) Olav runs for 45 minutes at a speed of 9.5 km/h.
He then runs 8.1 km at a speed of 7.5 km/h.

Calculate Olav's average speed for the whole run.

..... km/h [3]

(c) A train has length p metres.
The train passes through a station of length q metres.
The speed of the train is v kilometres per hour.

Find an expression for the time the train takes to completely pass through the station.
Give your answer in seconds, in terms of p, q and v.

STEM | Exam Builder

..... s [3]

(a) Speed, density and pressure (b) Speed, density and pressure (c) Compound measures

Click for more variations

10(a)	24	**2**	**M1** for $\frac{100 \text{ or } 0.1}{\text{time}}$ or **B1** for figs 24
10(b)	8.32 or 8.319 to 8.320	**3**	**M1** for $9.5 \times \frac{45}{60}$ oe **M1** for $\frac{8.1}{7.5}$
10(c)	$\frac{18(p+q)}{5v}$ oe final answer	**3**	**M1** for $[k \times] \frac{(p+q)}{v}$ for some $k \neq 0$ **M1** for $v \times \frac{1000}{3600}$ oe soi

STEM | Exam Builder