1 (a) Write 2.46×10^6 as an ordinary number.

$$2.46\,0\,0\,0\,0 \quad \leftarrow \times 10 \text{ six times}$$

$$= 2460\,000 \; ①$$

2460 000

(1)

(b) Write 0.00074 in standard form.

$$0.00074 \quad \leftarrow 4 \text{ times}$$

$$= 7.4 \times 10^{-4} \; ①$$

7.4×10^{-4}

(1)

(c) Work out $(5.6 \times 10^6) + (2.3 \times 10^5)$

$$(5.6 \times 10^6) + (2.3 \times 10^5)$$

$$= (56 \times 10^5) + (2.3 \times 10^5) \leftarrow \text{convert to } 10^5$$

$$= (56 + 2.3) \times 10^5$$

$$= 58.3 \times 10^5 \; ①$$

$$= 5.83 \times 10^6 \; ① \qquad \text{convert back to } 10^6 \text{ for standard form}$$

5.83×10^6

(2)

(Total for Question 1 is 4 marks)

2 (a) Write 5.7×10^{-3} as an ordinary number.

$0 . 0 0 5 . 7$

0.0057 ①

(1)

(b) Write 800 000 in standard form.

$800\,000$

5 times

8.0×10^5 ①

(1)

(c) Work out $\dfrac{3 \times 10^5 - 2.7 \times 10^4}{6 \times 10^{-2}}$

$3 \times 10^5 \rightarrow 30 \times 10^4$

$\dfrac{30 \times 10^4 - 2.7 \times 10^4}{6 \times 10^{-2}} = \dfrac{(30 - 2.7) \times 10^4}{6 \times 10^{-2}}$

$= \dfrac{273\,000}{0.06}$ ①

$= 4550\,000$ ①

$4550\,000$

(2)

(Total for Question 2 is 4 marks)

3 The table shows information about the surface area of each of the world's oceans.

Ocean	Surface area in square kilometres
Pacific	1.56×10^8
Indian	6.86×10^7
Southern	2.03×10^7
Arctic	1.41×10^7
Atlantic	1.06×10^8

(a) Write 1.56×10^8 as an ordinary number.

1.56 000 000.

156 000 000 ①

....

(1)

(b) Which ocean has the least surface area?

Arctic ①

....

(1)

(c) Work out the difference, in square kilometres, between the surface area of the
Atlantic Ocean and the surface area of the Indian Ocean.
Give your answer in standard form.

Atlantic : 1.06×10^8 = 10.6×10^7 ①

Indian : 6.86×10^7

$10.6 \times 10^7 - 6.86 \times 10^7$

$= (10.6 - 6.86) \times 10^7$

$= 3.74 \times 10^7$ ①

3.74×10^7 .... square kilometres

(2)

(Total for Question 3 is 4 marks)

4 (a) Write 7.8×10^{-4} as an ordinary number.

0.00078

0.00078 ①

(1)

(b) Work out $\dfrac{5.6 \times 10^4 + 7 \times 10^3}{2.8 \times 10^{-3}}$

Give your answer in standard form.

$5.6 \times 10^4 \rightarrow 56 \times 10^3$

$\dfrac{56 \times 10^3 + 7 \times 10^3}{2.8 \times 10^{-3}}$ ①

$= \dfrac{63 \times 10^3}{2.8 \times 10^{-3}}$

$= 2.25 \times 10^7$ ①

2.25×10^7

(2)

(Total for Question 4 is 3 marks)

5 The table shows the populations of five countries.

Country	Population
China	1.4×10^9
Germany	8.2×10^7
Sweden	9.9×10^6
Fiji	9.1×10^5
Malta	4.3×10^5

(a) Work out the difference between the population of China and the population of Germany.
Give your answer in standard form.

China : $1.4 \times 10^9 = 140 \times 10^7$

Difference : $140 \times 10^7 - 8.2 \times 10^7$ Ⓘ

$= (140 - 8.2) \times 10^7$

$= 131.8 \times 10^7$

$= 1.32 \times 10^9$ Ⓘ

.............1.32×10^9.............

(2)

Given that

$$\text{population of Fiji} = \frac{1}{k} \times \text{population of Sweden}$$

(b) work out the value of k.
Give your answer correct to the nearest whole number.

Fiji $= 9.1 \times 10^5$

Sweden $= 9.9 \times 10^6 = 99 \times 10^5$

$9.1 \times 10^5 = \frac{1}{k} \times 99 \times 10^5$

$k = \dfrac{99 \times 10^5}{9.1 \times 10^5}$ Ⓘ

$= 11$ Ⓘ

$k = $ ....11.............

(2)

(Total for Question 5 is 4 marks)

6 The table gives the length of the coastline, in kilometres, of each of five oceans.

Ocean	Length of coastline (km)
Arctic	4.539×10^4
Atlantic	1.119×10^5
Pacific	1.357×10^5
Indian	6.653×10^4
Southern	1.797×10^4

11.19×10^4

13.57×10^4

(a) Which ocean has the greatest length of coastline?

Pacific ①

....

(1)

(b) Calculate the difference between the length of the Atlantic Ocean's coastline and the length of the Southern Ocean's coastline.
Give your answer in standard form.

$11.19 \times 10^4 - 1.797 \times 10^4$ ①

$= (11.19 - 1.797) \times 10^4$

$= 9.393 \times 10^4$ ①

9.393×10^4 .... km

(2)

(Total for Question 6 is 3 marks)

7 (a) Write $2.840\,000\,000$ in standard form.

$2 \cdot 84 \times 10^9$ ①

$2 \cdot 84 \times 10^9$

(1)

(b) Write 2.5×10^{-4} as an ordinary number.

$2 \cdot 5 \times 10^{-4} = 0 \cdot 00025$

①

$0 \cdot 00025$

(1)

(Total for Question 7 is 2 marks)

8 (b) Work out $\dfrac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$

Give your answer in standard form.

$$= \frac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$$

$$= \frac{9.6 \times 10^{141} + 0.64 \times 10^{141}}{3.2 \times 10^{16}}$$

$$= \frac{10.24 \times 10^{141}}{3.2 \times 10^{16}} \quad ①$$

$$= \frac{10.24}{3.2} \times 10^{141-16} \quad ①$$

$$= 3.2 \times 10^{125} \quad ①$$

3.2×10^{125}

....

(3)

(Total for Question 8 is 3 marks)

9 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	7.7×10^6
Barcelona	5.5×10^6
Chicago	8.8×10^6
Lagos	1.3×10^7
Tokyo	3.7×10^7

(a) Write 8.8×10^6 as an ordinary number.

8 800 000

.... 8 800 000 ①

(1)

(b) Which of these cities had the least population in 2018?

.... Barcelona ①

(1)

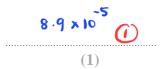(c) Work out the difference between the population of Tokyo and the population of Ahmedabad in 2018
Give your answer in standard form correct to 2 significant figures.

Tokyo = 37×10^6

Ahmedabad = 7.7×10^6

Difference: $(37 - 7.7) \times 10^6$ ①

$= 29.3 \times 10^6$

$= 2.9 \times 10^7$ ①

.... 2.9×10^7

(2)

(Total for Question 9 is 4 marks)

10 (a) Write 0.000 089 in standard form.

8.9×10^{-5} ①

(1)

(b) Write 8.34×10^4 as an ordinary number.

83 400 ①

(1)

(Total for Question 10 is 2 marks)

11 (a) Write 5×10^4 as an ordinary number.

50 000 ①

(1)

(b) Write 0.000 06 in standard form.

6×10^{-5} ①

(1)

(c) Work out $(4 \times 10^{512}) \div (1.6 \times 10^{700})$
Give your answer in standard form.

$$\frac{4}{1.6} \times 10^{512-700} \quad ①$$

$$= 2.5 \times 10^{-188} \quad ①$$

2.5×10^{-188}

(2)

(Total for Question 11 is 4 marks)

12                      $a = 4.2 \times 10^{-24}$ $b = 3 \times 10^{145}$

Work out the value of $a \times b$
Give your answer in standard form.

$$(4.2 \times 3) \times 10^{-24 + 145} \;①$$

$$= 12.6 \times 10^{121}$$

$$= 1.26 \times 10^{122} \;①$$

1.26×10^{122}

(Total for Question 12 is 2 marks)

13 (a) Write 9.32×10^{-5} as an ordinary number.

0.0000932 ①

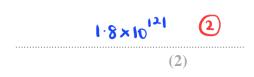..

(1)

(b) Work out $3 \times 10^5 - 6 \times 10^4$

Give your answer in standard form.

$$3 \times 10^5 - 0.6 \times 10^5$$

$$= 2.4 \times 10^5$$

2.4×10^5 ②

....

(2)

(c) Work out $(3 \times 10^{55}) \times (6 \times 10^{65})$

Give your answer in standard form.

$$3 \times 6 \times 10^{55 + 65}$$

$$= 18 \times 10^{120}$$

$$= 1.8 \times 10^{121}$$

1.8×10^{121} ②

....

(2)

(Total for Question 13 is 5 marks)

14 (a) Write 6.25×10^{-4} as an ordinary number.

0.000625 ①

(1)

(b) Work out $(2.4 \times 10^{12}) \div (9.6 \times 10^4)$
Give your answer in standard form.

$$\frac{2.4}{9.6} \times 10^{12-4}$$

$$= 0.25 \times 10^8 \ ①$$

$$= 2.5 \times 10^7 \ ①$$

2.5×10^7

(2)

(Total for Question 14 is 3 marks)

15 (a) Write 5.6×10^{-3} as an ordinary number.

$0 . \overset{0}{\frown}\overset{0}{\frown}\overset{5}{\frown}.6 \times 10^{-3}$

$0 \cdot 0056$ ①

....

(1)

(b) Work out $\dfrac{6 \times 10^3}{2.1 \times 10^{-4} + 9 \times 10^{-5}}$

Give your answer in standard form.

$2.1 \times 10^{-4} + 0.9 \times 10^{-4} = 3 \times 10^{-4}$

$\dfrac{6 \times 10^3}{3 \times 10^{-4}}$ ① $= \dfrac{6}{3} \times 10^{3-(-4)}$

$= 2 \times 10^7$ ①

2×10^7

....

(2)

(Total for Question 15 is 3 marks)

16 (a) Write 76 000 000 in standard form.

7.6×10^7 ①

....

(1)

(b) Write 5.4 × 10⁻⁴ as an ordinary number.

0.00054 ①

....

(1)

(Total for Question 16 is 2 marks)