1.13 Standard Form: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write 8.71×10^2 as an ordinary number.

(1)

2 Work out $(9 \times 10^7) \div (2 \times 10^{-2})$.
Give your answer in standard form.

(3)

3 Write 1.58×10^4 as an ordinary number.

(1)

4 Work out $(9.6 \times 10^6) \div (8 \times 10^6)$.
Give your answer in standard form.

(3)

5 Write 9.2×10^{-4} as an ordinary number.

(1)

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6 A rocket travels at 5.8×10^5 metres per second for 8.7×10^6 seconds. How far does it travel?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

---

7 Write 4.68×10^3 as an ordinary number.

(1)

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8 A grain of sand has a mass of 6.2×10^7 grams. How many grains are in 7.2×10^9 grams of sand?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

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9 Write 8.43×10^{-2} as an ordinary number.

(1)

---

10 Work out $(6.4 \times 10^{11}) \div (2 \times 10^5)$.
Give your answer in standard form.

(3)

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11 A computer chip contains 2.0×10^3 transistors. A phone has 2.8×10^5 of these chips. How many transistors are there altogether?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

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12 Write 8.97×10^{-4} as an ordinary number.

(1)

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13 A grain of sand has a mass of 1.4×10^7 grams. How many grains are in 2.6×10^{12} grams of sand?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

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14 Write 0.00000020225 in standard form.

(1)

---

15 Work out $(6.7 \times 10^4) - (3.3 \times 10^3)$.
Give your answer in standard form.

(3)

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16 Write 7.13×10^{-4} as an ordinary number.

(1)

---

17 Work out $(3.4 \times 10^{8}) \times (7.6 \times 10^{5})$.
Give your answer in standard form.

(3)

---

18 Work out $(2.4 \times 10^{4}) \div (2 \times 10^{4})$.
Give your answer in standard form.

(3)

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19 Work out $(8.3 \times 10^{-5}) \times (6.2 \times 10^{0})$.
Give your answer in standard form.

(3)

---

20 Work out $(9.6 \times 10^{3}) + (3.3 \times 10^{0})$.
Give your answer in standard form.

(3)

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21 Work out $(6.5 \times 10^6) + (4.6 \times 10^3)$.
Give your answer in standard form.

(3)

---

22 Work out $(7 \times 10^{-6}) \times (5.6 \times 10^{-6})$.
Give your answer in standard form.

(3)

---

23 Work out $(7.9 \times 10^{-2}) \times (1.6 \times 10^0)$.
Give your answer in standard form.

(3)

---

24 Work out $(7.5 \times 10^{-1}) \times (7.1 \times 10^{-5})$.
Give your answer in standard form.

(3)

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25 Work out $(1.9 \times 10^8) + (7.7 \times 10^7)$.
Give your answer in standard form.

(3)

---

26 Work out $(9.8 \times 10^8) + (3.1 \times 10^7)$.
Give your answer in standard form.

(3)

---

27 Work out $(6.5 \times 10^3) \times (5.4 \times 10^{-4})$.
Give your answer in standard form.

(3)

---

28 A small library has 7.5×10^3 books. A national library holds 8.8×10^8 books. How many times as many books does the national library hold?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

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29 Work out $(3.75 \times 10^7) \div (5 \times 10^5)$.
Give your answer in standard form.

(3)

---

30 A rocket travels at 1.6×10^6 metres per second for 6.3×10^4 seconds. How far does it travel?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

---

31 Write 52000 in standard form.

(1)

---

32 Work out $(8.4 \times 10^4) / (2 \times 10^{-1})$. Give your answer in standard form.

(2)

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33 A sheet of card has thickness 9.0×10^{-5} metres. A pack contains 500 sheets.

(a) Find the thickness of the whole pack in metres. Give your answer in standard form. **(2)**

(b) Given that 1 metre = 100 centimetres, convert the thickness of the pack to centimetres. Give your answer in standard form. **(2)**

34 Write 0.0067 in standard form.

(1)

35 The population of Town A is 3.2×10^5. The population of Town B is 8.5×10^4. Find the difference between the two populations. Give your answer in standard form to 2 significant figures.

(4)

36 Write 910000 in standard form.

(1)

37 Write 0.00038 in standard form.

(1)

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38 Write 5.6×10^{-4} as an ordinary number.

(1)

---

39 Write 7.5×10^{-2} as an ordinary number.

(1)

---

40 Work out $(2 \times 10^{3}) \times (4 \times 10^{5})$. Give your answer in standard form.

(2)

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Mark scheme · 1.13 Standard Form: 2-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

871 (accept 871.00)	B1

Answer: **871**

Question 2

9 ÷ 2 = 4.5 or powers subtracted	M1
both parts combined correctly	M1
4.5×10^9 cao	A1

Answer: **4.5×10^9**

Question 3

15800 (accept 15800.00)	B1

Answer: **15800**

Question 4

9.6 ÷ 8 = 1.2 or powers subtracted	M1
both parts combined correctly	M1
1.2×10^0 cao	A1

Answer: **1.2×10^0**

Question 5

0.00092 cao	B1

Answer: **0.00092**

Question 6

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
5.05×10^{12} cao	A1

Answer: **5.05×10^{12}**

Question 7

4680 (accept 4680.00)	B1

Answer: **4680**

Question 8

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
1.16×10^2 cao	A1

Answer: **1.16×10^2**

Question 9

0.0843 cao	B1

Answer: **0.0843**

Question 10

6.4 ÷ 2 = 3.2 or powers subtracted	M1
both parts combined correctly	M1
3.2×10^6 cao	A1

Answer: **3.2×10^6**

Question 11

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
5.6×10^8 cao	A1

Answer: **5.6×10^8**

Question 12

0.000897 cao	B1

Answer: **0.000897**

Question 13

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
1.86×10^5 cao	A1

Answer: **1.86×10^5**

Question 14

2.0225×10^{-7} cao	B1

Answer: **2.0225×10^{-7}**

Question 15

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
6.37×10^4 cao	A1

Answer: **6.37×10^4**

Question 16

0.000713 cao	B1

Answer: **0.000713**

Question 17

3.4 x 7.6 = 25.84 seen	M1
powers combined: $10^8 \times 10^5 = 10^{13}$	M1
2.584×10^{14} cao (answer adjusted into standard form)	A1

Answer: **2.584×10^{14}**

Question 18

2.4 ÷ 2 = 1.2 or powers subtracted	M1
both parts combined correctly	M1
1.2×10^0 cao	A1

Answer: **1.2×10^0**

Question 19

8.3 x 6.2 = 51.46 seen	M1
powers combined: $10^{-5} \times 10^0 = 10^{-5}$	M1
5.146×10^{-4} cao (answer adjusted into standard form)	A1

Answer: **5.146×10^{-4}**

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Question 20

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
9.6033×10^3 cao	A1

Answer: **9.6033×10^3**

Question 21

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
6.5046×10^6 cao	A1

Answer: **6.5046×10^6**

Question 22

$7 \times 5.6 = 39.2$ seen	M1
powers combined: $10^{-6} \times 10^{-6} = 10^{-12}$	M1
3.92×10^{-11} cao (answer adjusted into standard form)	A1

Answer: **3.92×10^{-11}**

Question 23

$7.9 \times 1.6 = 12.64$ seen	M1
powers combined: $10^{-2} \times 10^0 = 10^{-2}$	M1
1.264×10^{-1} cao (answer adjusted into standard form)	A1

Answer: **1.264×10^{-1}**

Question 24

$7.5 \times 7.1 = 53.25$ seen	M1
powers combined: $10^{-1} \times 10^{-5} = 10^{-6}$	M1
5.325×10^{-5} cao (answer adjusted into standard form)	A1

Answer: **5.325×10^{-5}**

Question 25

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
2.67×10^8 cao	A1

Answer: **2.67×10^8**

Question 26

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
1.011×10^9 cao	A1

Answer: **1.011×10^9**

Question 27

$6.5 \times 5.4 = 35.1$ seen	M1
powers combined: $10^3 \times 10^{-4} = 10^{-1}$	M1
3.51×10^0 cao (answer adjusted into standard form)	A1

Answer: **3.51×10^0**

Question 28

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
1.17×10^5 cao	A1

Answer: **1.17×10^5**

Question 29

$3.75 \div 5 = 0.75$ or powers subtracted	M1
both parts combined correctly	M1
7.5×10^1 cao	A1

Answer: **7.5×10^1**

Question 30

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
1.01×10^{11} cao	A1

Answer: **1.01×10^{11}**

Question 31

5.2×10^4 cao	B1

Answer: **5.2×10^4**

Question 32

divide coefficients and subtract powers: $8.4 / 2 = 4.2$ and $10^{4-(-1)} = 10^5$	M1
4.2×10^5 cao	A1

Answer: **4.2×10^5**

Question 33

(a) multiply coefficients and powers: $9.0 \times 10^{-5} \times 5 \times 10^2$ ($500 = 5 \times 10^2$)	M1
(a) 4.5×10^{-2} m cao	A1

(a) Answer: **4.5×10^{-2} m**

(b) multiply the answer to part (a) by 100 (10^2)	M1
(b) 4.5×10^0 cm (4.5 cm) cao	A1

(b) Answer: **4.5×10^0 cm (4.5 cm)**

Question 34

6.7×10^{-3} cao	B1

Answer: **6.7×10^{-3}**

Question 35

convert both numbers to the same power of ten or to ordinary numbers: $3.2 \times 10^5 = 320000$, $8.5 \times 10^4 = 85000$	M1
subtract correctly: $320000 - 85000 = 235000$	M1
write 235000 in standard form: 2.35×10^5	M1
2.4×10^5 cao, rounded to 2 significant figures	A1

Answer: **2.4×10^5**

Question 36

9.1×10^5 cao	B1

Answer: **9.1×10^5**

Question 37

3.8×10^{-4} cao	B1

Answer: **3.8×10^{-4}**

Question 38

0.00056 cao	B1

Answer: **0.00056**

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Question 39

0.075 cao	**B1**

Answer: **0.075**

Question 40

multiply coefficients and add powers: $2 \times 4 = 8$ and $10^3 \times 10^5 = 10^8$	**M1**
8×10^8 cao	**A1**

Answer: **8×10^8**

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