1.13 Standard Form: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write these numbers in order, smallest first.
4.3×10^3, 1.3×10^1, 9.3×10^5, 9.3×10^3

(2)

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2 Write 0.006265 in standard form.

(1)

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3 A rocket travels at 7.3×10^5 metres per second for 4.9×10^3 seconds. How far does it travel?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

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4 Write these numbers in order, smallest first.
1.5×10^5, 8.6×10^{-2}, 6.3×10^3, 7.3×10^2

(2)

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5 Write 0.00003131 in standard form.

(1)

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6 Work out $(9.7 \times 10^{-2}) \times (3.2 \times 10^{3})$.
Give your answer in standard form.

(3)

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7 Write these numbers in order, largest first.
8.1×10^{-2}, 3.6×10^{2}, 8.6×10^{0}, 8.5×10^{3}

(2)

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8 Write 3.21×10^{7} as an ordinary number.

(1)

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9 Work out $(6.6 \times 10^{-5}) \times (6.5 \times 10^{4})$.
Give your answer in standard form.

(3)

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10 Write these numbers in order, smallest first.
7.6×10^{-4}, 6.0×10^{0}, 1.3×10^{-3}, 7.0×10^{6}

(2)

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11 Write 0.018378 in standard form.

(1)

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12 Write these numbers in order, smallest first.
2.4×10^{6}, 4.6×10^{-1}, 5.7×10^{-1}, 5.0×10^{-4}

(2)

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13 Work out $(6.1 \times 10^{7}) - (3.5 \times 10^{6})$.
Give your answer in standard form.

(3)

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14 Write 0.0053842 in standard form.

(1)

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15 Write these numbers in order, smallest first.
6.7×10^{-1}, 6.9×10^{4}, 1.8×10^{0}, 3.9×10^{-1}

(2)

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16 Write these numbers in order, smallest first.
6.3×10^{-4}, 8.1×10^{6}, 1.3×10^{4}, 8.5×10^{5}

(2)

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17 Work out $(1.6 \times 10^{7}) \div (5 \times 10^{0})$.
Give your answer in standard form.

(3)

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18 Write these numbers in order, largest first.
7.0×10^{4}, 4.1×10^{-5}, 3.1×10^{2}, 5.6×10^{-5}

(2)

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19 Calculate and give your answer in standard form, simplifying coefficients to be between 1 and 10 if needed: $(7 \times 10^{4}) \times (5 \times 10^{-7}) + (3 \times 10^{-2})$.

(3)

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20 The mass of a bacterium is about 2.5×10^{-12} kg. Write the mass of 1 million such bacteria in standard form.

(2)

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21 Work out $(5 \times 10^{-3}) \times (6 \times 10^{6})$. Give your answer in standard form.

(2)

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22 A satellite signal travels 5.4×10^{11} metres in 3.0×10^{6} seconds. Find its average speed in metres per second. Give your answer in standard form.

(3)

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23 Write 8.3×10^{3} as an ordinary number.

(1)

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Mark scheme · 1.13 Standard Form: 1-hour Pack

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

Question 1

compares the powers of 10 first, or at least three numbers in order — **M1**

1.3×10^1, 4.3×10^3, 9.3×10^3, 9.3×10^5 cao — **A1**

Answer: **1.3×10^1, 4.3×10^3, 9.3×10^3, 9.3×10^5**

Question 2

6.265×10^{-3} cao — **B1**

Answer: **6.265×10^{-3}**

Question 3

chooses the correct operation (x or ÷) — **M1**

correct calculation with the numbers and the powers of 10 — **M1**

3.58×10^9 cao — **A1**

Answer: **3.58×10^9**

Question 4

compares the powers of 10 first, or at least three numbers in order — **M1**

8.6×10^{-2}, 7.3×10^2, 6.3×10^3, 1.5×10^5 cao — **A1**

Answer: **8.6×10^{-2}, 7.3×10^2, 6.3×10^3, 1.5×10^5**

Question 5

3.131×10^{-5} cao — **B1**

Answer: **3.131×10^{-5}**

Question 6

$9.7 \times 3.2 = 31.04$ seen — **M1**

powers combined: $10^{-2} \times 10^3 = 10^1$ — **M1**

3.104×10^2 cao (answer adjusted into standard form) — **A1**

Answer: **3.104×10^2**

Question 7

compares the powers of 10 first, or at least three numbers in order — **M1**

8.5×10^3, 3.6×10^2, 8.6×10^0, 8.1×10^{-2} cao — **A1**

Answer: **8.5×10^3, 3.6×10^2, 8.6×10^0, 8.1×10^{-2}**

Question 8

32100000 (accept 32100000.00) — **B1**

Answer: **32100000**

Question 9

$6.6 \times 6.5 = 42.9$ seen — **M1**

powers combined: $10^{-5} \times 10^4 = 10^{-1}$ — **M1**

4.29×10^0 cao (answer adjusted into standard form) — **A1**

Answer: **4.29×10^0**

Question 10

compares the powers of 10 first, or at least three numbers in order — **M1**

7.6×10^{-4}, 1.3×10^{-3}, 6.0×10^0, 7.0×10^6 cao — **A1**

Answer: **7.6×10^{-4}, 1.3×10^{-3}, 6.0×10^0, 7.0×10^6**

Question 11

1.8378×10^{-2} cao — **B1**

Answer: **1.8378×10^{-2}**

Question 12

compares the powers of 10 first, or at least three numbers in order — **M1**

5.0×10^{-4}, 4.6×10^{-1}, 5.7×10^{-1}, 2.4×10^6 cao — **A1**

Answer: **5.0×10^{-4}, 4.6×10^{-1}, 5.7×10^{-1}, 2.4×10^6**

Question 13

writes both numbers with the same power of 10 or as ordinary numbers — **M1**

adds or subtracts correctly — **M1**

5.75×10^7 cao — **A1**

Answer: **5.75×10^7**

Question 14

5.3842×10^{-3} cao — **B1**

Answer: **5.3842×10^{-3}**

Question 15

compares the powers of 10 first, or at least three numbers in order — **M1**

3.9×10^{-1}, 6.7×10^{-1}, 1.8×10^0, 6.9×10^4 cao — **A1**

Answer: **3.9×10^{-1}, 6.7×10^{-1}, 1.8×10^0, 6.9×10^4**

Question 16

compares the powers of 10 first, or at least three numbers in order — **M1**

6.3×10^{-4}, 1.3×10^4, 8.5×10^5, 8.1×10^6 cao — **A1**

Answer: **6.3×10^{-4}, 1.3×10^4, 8.5×10^5, 8.1×10^6**

Question 17

$1.6 \div 5 = 0.32$ or powers subtracted — **M1**

both parts combined correctly — **M1**

3.2×10^6 cao — **A1**

Answer: **3.2×10^6**

Question 18

compares the powers of 10 first, or at least three numbers in order — **M1**

7.0×10^4, 3.1×10^2, 5.6×10^{-5}, 4.1×10^{-5} cao — **A1**

Answer: **7.0×10^4, 3.1×10^2, 5.6×10^{-5}, 4.1×10^{-5}**

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Question 19

multiply first two terms: $7 \times 5 = 35$ and $10^{4-7} = 10^{-3}$ giving 35×10^{-3}	**M1**
convert 35×10^{-3} to 3.5×10^{-2} and add 3×10^{-2} to get 6.5×10^{-2}	**M1**
6.5×10^{-2} cao	**A1**

Answer: **6.5×10^{-2}**

Question 20

1 million = 10^6 so multiply coefficients: $2.5 \times 10^{-12} \times 10^6$	**M1**
2.5×10^{-6} kg cao	**A1**

Answer: **2.5×10^{-6} kg**

Question 21

multiply coefficients and add powers: $5 \times 6 = 30$ and $10^{-3} \times 10^6 = 10^3$, giving 30×10^3	**M1**
3×10^4 cao	**A1**

Answer: **3×10^4**

Question 22

set up division: distance / time = $(5.4 \times 10^{11}) / (3.0 \times 10^6)$	**M1**
divide coefficients and subtract powers: $5.4 / 3.0 = 1.8$ and $10^{11-6} = 10^5$	**M1**
1.8×10^5 m/s cao	**A1**

Answer: **1.8×10^5 m/s**

Question 23

8300 cao	**B1**

Answer: **8300**

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