5.4 Standard Form: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write 9.3×10^2 as an ordinary number.

(Total for Question 1 is 1 mark)

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2 Work out $(8 \times 10^6) / (2 \times 10^2)$. Give your answer in standard form.

(Total for Question 2 is 2 marks)

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3 A school measures the length of a small model as 0.023 m. A real object is 2.3×10^3 times longer than the model. Work out the length of the real object in standard form.

(a) Write 0.023 in standard form. **(1)**

(b) Use your answer to part (a) to find the real length in standard form. **(3)**

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(Total for Question 3 is 4 marks)

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4 A single red blood cell has a volume of 9.0×10^{-11} cm^3.
An adult has approximately 2.5×10^{13} red blood cells in their body.
Work out the total volume of all the red blood cells in the adult's body. Give your answer, in cm^3, in standard form, correct to 2 significant figures.

(Total for Question 4 is 4 marks)

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5 Here are four numbers written in standard form.

7.1×10^2 6×10^3 8.4×10^1 2.3×10^3

Put the numbers in order of size, starting with the smallest.

(Total for Question 5 is 2 marks)

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6 A small satellite has mass 4.8×10^3 kg. Another satellite has mass 0.0096×10^6 kg. Are the two masses equal? Show your working and give your answer in ordinary numbers.

(Total for Question 6 is 6 marks)

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7 Show that if $2.5 \times 10^{-3} \times = 6.25 \times 10^{1}$ then $x = 2.5 \times 10^{4}$.

(Total for Question 7 is 3 marks)

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8 $(4 \times 10^{n}) \times (2 \times 10^{3}) = 8 \times 10^{8}$

Find the value of n.

(Total for Question 8 is 2 marks)

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Mark scheme · 5.4 Standard Form: 30-minute Pack

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

Question 1

930 cao **B1**

Answer: 930

Question 2

8 / 2 = 4 and $10^6 / 10^2 = 10^4$ seen, or 4 x 10^4 oe unsimplified **M1**

4 x 10^4 cao **A1**

Answer: 4 x 10^4

Question 3

(a) 2.3 x 10^{-2} cao **B1**

(a) Answer: 2.3 x 10^{-2}

(b) multiply 2.3 x 10^{-2} by 2.3 x 10^3 or show 2.3 x 2.3 x $10^{-2 + 3}$ **M1**

(b) evaluate product 5.29 x 10^1 or show 5.29 x 10^1 **M1**

(b) 5.29 x 10^1 cao **A1**

(b) Answer: 5.29 x 10^1

Question 4

multiplies coefficients, 9.0 x 2.5 = 22.5 **M1**

adds powers of 10, -11 + 13 = 2, giving 22.5 x 10^2 **M1**

2.25 x 10^3 (unrounded standard form value) **A1**

ft, awrt 2.3 x 10^3 (cm^3) **B1**

Answer: 2.3 x 10^3 cm^3 (awrt, 2 sig figs)

Question 5

converts numbers to a comparable form, e.g. as ordinary numbers 84, 710, 2300, 6000 oe **M1**

8.4 x 10^1, 7.1 x 10^2, 2.3 x 10^3, 6 x 10^3 cao, all four in correct order **A1**

Answer: 8.4 x 10^1, 7.1 x 10^2, 2.3 x 10^3, 6 x 10^3

Question 6

convert 4.8 x 10^3 to ordinary number or show method **M1**

4800 cao **A1**

convert 0.0096 x 10^6 to ordinary number or show method ($0.0096 * 10^6$) **M1**

9600 cao **A1**

compare the two numbers and state whether equal or not with working **M1**

conclusion: not equal, 4800 and 9600 cao **A1**

Answer: No. 4.8 x 10^3 = 4800 kg. 0.0096 x 10^6 = 0.0096 * 1000000 = 9600 kg. The masses are not equal.

Question 7

divide both sides by 2.5 x 10^{-3} showing 6.25/2.5 and $10^{1 - -3}$ or equivalent **M1**

evaluate 6.25/2.5 = 2.5 **M1**

2.5 x 10^4 cso **A1**

Answer: 2.5 x 10^4

Question 8

multiplies coefficients, 4 x 2 = 8, matching the given coefficient, so equates powers of 10, giving n + 3 = 8 **M1**

n = 5 cao **A1**

Answer: n = 5

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