



5.4H Standard Form: Higher Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1 Write 0.000742 in standard form.

(Total for Question 1 is 1 mark)

- 2 Write 4.06×10^5 as an ordinary number.

(Total for Question 2 is 1 mark)

- 3 Work out $(3.5 \times 10^4) \times (2.2 \times 10^{-3})$. Give your answer in standard form.

(Total for Question 3 is 2 marks)

- 4 Work out $(6.0 \times 10^7) / (2.5 \times 10^3)$. Give your answer in standard form.

(Total for Question 4 is 2 marks)

- 5 Work out $4.2 \times 10^6 + 3.6 \times 10^5$. Give your answer in standard form.

(Total for Question 5 is 2 marks)

- 6** Estimate the product of 9.8×10^2 and 4.05×10^{-1} to 2 significant figures. Give your answer in standard form.

(Total for Question 6 is 2 marks)

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

(Total for Question 7 is 3 marks)

- 8** Which is larger, 3.6×10^8 or 2.9×10^9 ? Explain your answer briefly.

(Total for Question 8 is 1 mark)

- 9** The luminosity of a distant star is 3.2×10^{26} W. The luminosity of the Sun is 3.828×10^{26} W. Find the ratio star : Sun to 2 significant figures and give your answer in standard form.

(Total for Question 9 is 3 marks)

- 10** A quantity y and x are related by $y/x = k$, where when $x = 3.2 \times 10^3$, $y = 6.4 \times 10^{-2}$. Work out k and give your answer in standard form.

(Total for Question 10 is 4 marks)

11 Write 0.000000432 in engineering notation (a power of 10 with exponent a multiple of 3).

(Total for Question 11 is 2 marks)

12 Given $A = 5.12 \times 10^3$ and $B = 3.87 \times 10^2$, calculate $(A + B) / (A - B)$. Give your answer to 4 significant figures.

(Total for Question 12 is 4 marks)

Mark scheme · 5.4H Standard Form: Higher Tier Practice

Question 1

- **B1** 7.42×10^{-4} cao
- **Answer:** 7.42×10^{-4}

Question 2

- **B1** 406000 cao
- **Answer:** 406000

Question 3

- **M1** multiply coefficients and add powers: 3.5×2.2 and $10^{4+ -3}$ method
- **A1** 7.7×10^1 cao
- **Answer:** 7.7×10^1

Question 4

- **M1** divide coefficients and subtract powers: $6.0/2.5$ and 10^{7-3}
- **A1** 2.4×10^4 cao
- **Answer:** 2.4×10^4

Question 5

- **M1** convert to same power of 10 and add (e.g. $4.2 \times 10^6 + 0.36 \times 10^6$ or equivalent shown)
- **A1** 4.56×10^6 cao
- **Answer:** 4.56×10^6

Question 6

- **M1** multiply the numbers: $9.8 \times 4.05 \times 10^{2+ -1}$ or equivalent method
- **A1** 4.0×10^2 cao (396.9 rounded to 2 s.f.)
- **Answer:** 4.0×10^2

Question 7

- **M1** divide both sides by 2.5×10^{-3} showing $6.25/2.5$ and $10^{1- -3}$ or equivalent
- **M1** evaluate $6.25/2.5 = 2.5$
- **A1** 2.5×10^4 cao
- **Answer:** 2.5×10^4

Question 8

- **B1** 2.9×10^9 is larger, because exponent $9 > 8$ so it is 10 times larger order of magnitude oe
- **Answer:** 2.9×10^9 is larger because its power of 10 is greater (10^9 vs 10^8).

Question 9

- **M1** divide 3.2×10^{26} by 3.828×10^{26} or show equivalent calculation
- **M1** evaluate ratio $3.2/3.828 = 0.8360...$ shown
- **A1** 8.4×10^{-1} cao (0.84 to 2 s.f.)
- **Answer:** 8.4×10^{-1}

Question 10

- **M1** substitute and divide: $k = (6.4 \times 10^{-2}) / (3.2 \times 10^3)$ shown
- **M1** divide coefficients $6.4/3.2 = 2.0$ and subtract exponents $-2 - 3 = -5$ or equivalent exponent step
- **A1** 2.0×10^{-5} cao
- **B1** statement that $k = 2.0 \times 10^{-5}$ (coefficient in standard form between 1 and 10) oe
- **Answer:** 2.0×10^{-5}

Question 11

- **M1** express number with exponent multiple of 3, e.g. move decimal to give 432×10^{-9} shown
- **A1** 432×10^{-9} cao
- **Answer:** 432×10^{-9}

Question 12

- **M1** convert to ordinary numbers or show sum and difference in standard form: $A + B = 5120 + 387$ and $A - B = 5120 - 387$
- **M1** evaluate sum 5507 and difference 4733 or show correct intermediate values
- **A1** $5507 / 4733 = 1.163532...$ correct to at least 4 s.f.
- **A1** 1.164 cao (answer rounded to 4 significant figures)
- **Answer:** 1.164