

## N5 Scientific Notation - Solutions

1. 2009 Paper 2 Q1

$$1000 \text{ g} \div 3.27 \times 10^{-22} = 3.058... \times 10^{24} \checkmark$$
$$= \underline{\underline{3.1 \times 10^{24}}} \quad (2 \text{ sig figs}) \quad (3\text{ku})$$

---

2. 2006 Paper 2 Q1

$$r = (4.96 \times 10^7) \text{ km}$$

$$C = \pi d$$

$$C = \pi \times 2 \times (4.96 \times 10^7) \checkmark \checkmark$$

$$C = 311645991.2$$

$$C = \underline{\underline{3.12 \times 10^8 \text{ km}}} \checkmark$$

(3ku)

---

3. 2005 Paper 2 Q1

$$E = mc^2$$

$$E = 3.6 \times 10^{-2} \times (3 \times 10^8)^2 \checkmark$$

$$E = 3.24 \times 10^{15} \checkmark \checkmark$$

(3ku)

---

4. 2004 Paper 2 Q1

$$\text{Speed} = 3 \times 10^8 \text{ m/s}$$

$$\text{Time} = 8 \text{ hrs} = 8 \times 60 \times 60$$
$$= 28800 \text{ seconds} \checkmark$$

$$\text{Distance} = S \times T$$

$$= 3 \times 10^8 \times 28800 \checkmark$$

$$= \underline{\underline{8.64 \times 10^{12} \text{ m}}} \checkmark$$

(4ku)

---

5. 2002 Paper 2 Q1

$$\text{weight} = 19.06 \times 10^{-5} \times 18 \checkmark$$

$$= \underline{\underline{3.4308 \times 10^{-3} \text{ kg}}} \checkmark$$

(2ku)

.6. 2001 Paper 2 Q1

10000  $\Rightarrow$  1 minute

$$1 \text{ year} \Rightarrow 10000 \times 60 \times 24 \times 365 \quad \checkmark$$

$\uparrow \quad \uparrow \quad \uparrow$   
1 hour 1 day 1 yr

$$\begin{aligned} \text{no of chops} &= 5256000000 \\ &= \underline{\underline{5.256 \times 10^9}} \quad \checkmark \end{aligned} \quad (2 \text{kw})$$

.7. 2000 Paper 2 Q2

$$\% = \frac{1.41 \times 10^{18}}{5.97 \times 10^{21}} \times 100 \quad \checkmark$$

$$\% = 0.0236... \quad \checkmark$$

$$\% = \underline{\underline{2.36 \times 10^{-2} \%}} \quad \checkmark$$

(3kw)

.8. 1999 Paper 2 Q.2

$$\text{Distance} = 7.1 \times 10^7 \div 300 \quad \checkmark$$

$$= 236666.\dot{6}$$

$$= 2.4 \times 10^5 \text{ miles (sig figs)}$$

(3kw)

(1 mark for rounding, 1 for scientific notation)

.9. 1998 Paper 2 Q1

$$1 \text{ year} \Rightarrow 3.2 \times 10^9$$

$$1 \text{ second} \Rightarrow 3.2 \times 10^9 \div 365 \div 24 \div 60 \div 60 \quad \checkmark$$

$\uparrow \quad \uparrow \quad \uparrow \quad \uparrow$   
per day per hr per min per sec.

$$\text{Profit per second} = 101.47$$

$$= \underline{\underline{\pounds 101}} \quad (3 \text{ sig figs}) \quad \checkmark$$

(2kw)

must be rounded correctly.

.10. 1995 Q2

$$\begin{aligned}\text{Distance} &= 50 \text{ million} \times (9.46 \times 10^{12}) \quad \checkmark \\ &= \underline{4.73 \times 10^{20}} \text{ km.} \quad \checkmark\end{aligned}$$

---

.11. 1994 Q7

$$\text{Time} = 88 \text{ days} = 88 \times 24 = 2112 \text{ hours.} \quad \checkmark$$

$$\begin{aligned}\text{Distance} &= \text{circumference of orbit} \\ &= \pi d \\ &= \pi \times (1.2 \times 10^7) \\ &= 37699111.84 \text{ km} \quad \checkmark\end{aligned}$$

$$\begin{aligned}\text{Speed} &= D/T \\ &= 37699111.84 \div 2112 \quad \checkmark \\ &= 17849.96 \quad (4 \text{kw}) \\ &= \underline{1.8 \times 10^4} \text{ km/hr.} \quad \checkmark \quad (2 \text{ sig figs}) \\ &\quad (\text{must be rounded correctly.})\end{aligned}$$

---

.12. 1992 Paper 1 Q.4 (kw - use a calculator)

$$\begin{aligned}\text{No. red blood cells} &= 5500 \times (5 \times 10^9) \quad \checkmark \\ &= \underline{2.75 \times 10^{13}} \quad \checkmark \quad (3 \text{kw})\end{aligned}$$

---

.13. 1990 Paper 1 Q.5 (kw - use a calculator)

$$d = 5.9 \times 10^9 \text{ km}$$

$$s = 3.0 \times 10^5 \text{ km/sec}$$

$$s = (3.0 \times 10^5) \times 60 \times 60 \text{ km/hr.} \quad \checkmark$$

$$T = d/s$$

$$T = (5.9 \times 10^9) \div ((3.0 \times 10^5) \times 60 \times 60) \quad \checkmark \quad (4 \text{kw})$$

$$T = 5.4629... \text{ hrs.} \quad \checkmark$$

$$T = 5\frac{1}{2} \text{ hrs (nearest } \frac{1}{2} \text{ hr.)} \quad \checkmark$$