

Task 1 – Complete the following operations. Give your answers in standard form.

- 1)  $(3.2 \times 10^5) + (4.5 \times 10^5)$
- 2)  $(7.1 \times 10^6) - (3.9 \times 10^6)$
- 3)  $(5.6 \times 10^4) + (2.3 \times 10^3)$
- 4)  $(8.9 \times 10^{-3}) + (1.2 \times 10^{-3})$
- 5)  $(4.7 \times 10^{-2}) - (2.8 \times 10^{-2})$
- 6)  $(3 \times 10^4) \times (2 \times 10^3)$
- 7)  $(5.2 \times 10^5) \times (4 \times 10^{-2})$
- 8)  $(6 \times 10^{-3}) \times (7 \times 10^{-6})$
- 9)  $(8.5 \times 10^2) \times (3.2 \times 10^4)$
- 10)  $(9 \times 10^{-5}) \times (2.1 \times 10^3)$
- 11)  $(4.8 \times 10^7) \div (1.2 \times 10^3)$
- 12)  $(6 \times 10^{-2}) \div (3 \times 10^4)$
- 13)  $(9 \times 10^6) \div (3 \times 10^2)$
- 14)  $(2.1 \times 10^{-3}) \div (7 \times 10^{-7})$
- 15)  $(5 \times 10^3) \div (2 \times 10^5)$

Task 2 – Give your answers in standard form.

- 16) The population of Country A is  $3.5 \times 10^7$ . The population of Country B is  $2.2 \times 10^7$ . Find the total population of the countries.
- 17) A city has  $8.1 \times 10^6$  people in 2020. By 2025, the population increased by  $4.9 \times 10^5$ . What is the population in 2025?
- 18) A scientist measures the mass of a rock as  $6.2 \times 10^3$  g and the mass of another rock as  $4.8 \times 10^3$  g. Find their total mass.

19) The Sun's diameter is  $1.39 \times 10^6$  km and Earth's diameter is  $1.28 \times 10^4$  km. How much bigger is the Sun's diameter?

20) A microbe is  $5 \times 10^{-6}$  m long. Another microbe is  $3 \times 10^{-6}$  m long. What is their combined length?

21) The speed of light is  $3 \times 10^8$  m/s. How far does light travel in  $2 \times 10^2$  seconds?

22) A machine produces  $4.5 \times 10^3$  screws each hour. How many screws does it produce in  $3 \times 10^2$  hours?

23) A grain of sand has a mass of  $3 \times 10^{-5}$  g. Find the total mass of  $2 \times 10^3$  grains of sand.

24) A spacecraft travels  $7.2 \times 10^6$  kilometres in  $1.8 \times 10^3$  seconds. What is the speed of the spacecraft in km/s?

25) A car's engine produces  $4 \times 10^5$  watts of power. A train's engine produces  $1.2 \times 10^7$  watts of power. How many times more powerful is the train's engine than the car's?

26) Work out the value of  $\frac{0.04 \times 0.008}{0.002}$ . Give your answer in standard form.

27) Work out the value of  $\frac{4.587 \times 10^{-11}}{3.4 \times 10^4}$ . Give your answer in standard form to 4 significant figures.

28) A sphere has a radius of  $3.5 \times 10^4$  mm. Work out the volume of the sphere. Give your answer in standard form to 3 decimal places.

$$V = \frac{4}{3}\pi r^3$$

## Challenge

29) The mass of a neutron is  $1.675 \times 10^{-27}$  kg. The mass of a helium nucleus is  $6.646 \times 10^{-27}$  kg. How many neutrons would have the same mass as 50 helium nuclei? Give your answer to the nearest unit.

30) Given that,

$a = 2.5 \times 10^7$  and  $b = 4 \times 10^{-3}$ , calculate  $\frac{a^2 \times b^3}{5 \times 10^5}$ . Give your answer in standard form.

31) The speed of light is  $3 \times 10^8$  m/s. A particle travels at  $6 \times 10^{-4}$  times the speed of light for  $2.5 \times 10^6$  s. How far does it travel? Give your answer in standard form in kilometres.

32) The product of two quantities is:

$$1.728 \times 10^5$$

If one quantity is  $4.5 \times 10^2$ , work out the other in standard form. Then check your answer using ordinary numbers.