Unit 1: Scientific Notation ($a \times 10^k$)
IB Math AA SL

Answer all questions. Show all working where appropriate. Give all numerical answers exactly or correct to three significant figures unless otherwise stated.

1. **[Paper 1 Style, Short Answer, 2 marks]**
Calculate $4 \times (6.2 \times 10^{-5})$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

2. **[Paper 1 Style, Short Answer, 2 marks]**
Calculate $(4 \times 10^5) - (5 \times 10^4)$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

3. **[Paper 1 Style, Short Answer, 2 marks]**
Calculate $(4321^{-1})(1.2 \times 10^{-1})$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

4. **[Paper 1 Style, Short Answer, 2 marks]**
Consider the numbers $p = 2.41 \times 10^4$ and $q = 4.12 \times 10^5$. Calculate $p + q$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

5. **[Paper 1 Style, Short Answer, 2 marks]**
Using $p = 2.41 \times 10^4$ and $q = 4.12 \times 10^5$, calculate $p - q$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

6. **[Paper 1 Style, Short Answer, 2 marks]**
Using $p = 2.41 \times 10^4$ and $q = 4.12 \times 10^5$, calculate $\frac{p}{q}$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

7. **[Paper 1 Style, Short Answer, 2 marks]**
Consider the numbers $a = 0.272$, $b = 0.0272 \times 10^5$, $c = e(10e)^{-1}$, and $d = 2.72 \times 10^2$. Write down the number that is in the correct scientific notation form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

8. **[Paper 1 Style, Short Answer, 3 marks]**
Consider the numbers $a = 0.272$, $b = 0.0272 \times 10^5$, $c = e(10e)^{-1}$, and $d = 2.72 \times 10^2$. Find the value of $a + b - c + d$, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

9. **[Paper 2 Style, Short Answer, 3 marks]**
Consider the numbers $a = 4.14 \times 10^6$ and $b = 2.54 \times 10^{-7}$. Calculate $C = \sqrt{\left(\frac{a}{b}\right)^3}$. Give your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

10. **[Paper 2 Style, Short Answer, 4 marks]**
The diameter of a spherical planet is 6×10^4 km. The volume of the planet can be expressed in the form $\pi(a \times 10^k)$ km^3 where $1 \leq a < 10$ and $k \in \mathbb{Z}$. Find the value of a and the value of k.