Chapter: Exponents and Powers **Class:** 7
Test Code: 2026/Exponents/VII/01
Max Marks: 15

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1. Rewrite 4 as 2^2:

$$2^{n-3} \times (2^2)^{2n+1} = 2^9 \implies 2^{n-3} \times 2^{4n+2} = 2^9$$

   Combine the exponents:

$$2^{n-3+4n+2} = 2^9 \implies 2^{5n-1} = 2^9$$

   Equate the exponents:

$$5n - 1 = 9 \implies 5n = 10 \implies n = 2$$

   Answer: $\boxed{A}$

2. Simplify each term:

$$\left(\frac{1}{3}\right)^{-3} = 3^3 = 27, \quad \left(\frac{1}{2}\right)^{-3} = 2^3 = 8, \quad \left(\frac{1}{4}\right)^{-2} = 4^2 = 16$$

   Substitute and simplify:

$$\frac{27-8}{16} = \frac{19}{16}$$

   Answer: $\boxed{A}$

3. Rewrite the expression:

$$\frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} = \frac{25 \times t^4}{5^{-3} \times 10}$$

   Simplify the constants:

$$25 = 5^2, \quad 10 = 2 \times 5 \implies \frac{5^2 \times t^4}{5^{-3} \times 2 \times 5} = \frac{5^2 \times t^4}{2 \times 5^{-2}} = \frac{5^4 \times t^4}{2} = \frac{625t^4}{2}$$

   Answer: $\boxed{B}$

4. Rewrite 25 and 125 as powers of 5:

$$5^{2x+1} \boldsymbol{\nabla} \cdot 5^2 = 5^3 \implies 5^{2x+1-2} = 5^3 \implies 5^{2x-1} = 5^3$$

   Equate the exponents:

$$2x - 1 = 3 \implies 2x = 4 \implies x = 2$$

   Answer: $\boxed{A}$

5. Move the decimal point to the right until it is after the first non-zero digit:

$$0.00001275 = 1.275 \times 10^{-5}$$

   Answer: $\boxed{A}$

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6. Simplify each term:

$$\left(\frac{2}{3}\right)^0 = 1, \quad \left(\frac{1}{3}\right)^{-1} = 3, \quad 2^2 = 4$$

Substitute and simplify:

$$1 + 3 - 4 = 0$$

Answer: $\boxed{C}$

7. Simplify the expression:

$$\left(\frac{3}{2}\right)^{-2} \nabla \cdot 1 = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

Therefore:

$$\frac{a}{b} = \frac{4}{9} \implies \left(\frac{a}{b}\right)^{-3} = \left(\frac{9}{4}\right)^3 = \frac{729}{64}$$

Answer: $\boxed{B}$

8. Simplify each term:

$$6^{-1} - 8^{-1} = \frac{1}{6} - \frac{1}{8} = \frac{4-3}{24} = \frac{1}{24} \implies \left(\frac{1}{24}\right)^{-1} = 24$$

$$2^{-1} - 3^{-1} = \frac{1}{2} - \frac{1}{3} = \frac{3-2}{6} = \frac{1}{6} \implies \left(\frac{1}{6}\right)^{-1} = 6$$

Add the results:

$$24 + 6 = 30$$

Answer: $\boxed{B}$

9. Add the masses:

$$5.97 \times 10^{24} + 7.35 \times 10^{22} = 5.97 \times 10^{24} + 0.0735 \times 10^{24} = 6.0435 \times 10^{24} \text{ kg}$$

Answer: $\boxed{A}$

10. Let $2^x = 3^y = 6^{-z} = k$. Then:

$$x = \log_2 k, \quad y = \log_3 k, \quad z = -\log_6 k$$

The sum of reciprocals is:

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{1}{\log_2 k} + \frac{1}{\log_3 k} - \frac{1}{\log_6 k}$$

Using the change of base formula:

$$\frac{1}{\log_2 k} = \log_k 2, \quad \frac{1}{\log_3 k} = \log_k 3, \quad \frac{1}{\log_6 k} = \log_k 6$$

Therefore:

$$\log_k 2 + \log_k 3 - \log_k 6 = \log_k(2 \times 3) - \log_k 6 = \log_k 6 - \log_k 6 = 0$$

Answer: $\boxed{B}$

11. Simplify the numerator and denominator:

$$\frac{3^n + 3^{n-1}}{3^{n+1} - 3^n} = \frac{3^{n-1}(3+1)}{3^n(3-1)} = \frac{3^{n-1} \times 4}{3^n \times 2} = \frac{4}{2 \times 3} = \frac{2}{3}$$

Answer: $\boxed{B}$

12. Rewrite 4 as 2^2:

$$4^{-3} \times 2^{-2} = (2^2)^{-3} \times 2^{-2} = 2^{-6} \times 2^{-2} = 2^{-8}$$

Answer: $\boxed{A}$

13. Combine the exponents:

$$(-3)^{m+1} \times (-3)^5 = (-3)^{m+6} = (-3)^7$$

Equate the exponents:

$$m + 6 = 7 \implies m = 1$$

Answer: $\boxed{A}$

14. Rewrite 27 and 243 as powers of 3:

$$3^{x-y} = 3^3 \implies x - y = 3 \quad (1)$$

$$3^{x+y} = 3^5 \implies x + y = 5 \quad (2)$$

Add equations (1) and (2):

$$2x = 8 \implies x = 4$$

Answer: $\boxed{A}$

15. The multiplicative inverse of 10^{-100} is:

$$10^{100}$$

Answer: $\boxed{A}$