

Mathematical Aptitude

Exponents and Powers

Application Based Questions

Q.1. Multiple choice questions:

Directions: Read the following questions and choose the answer that best answer that best answer the questions.

1. The value of $x^a + y^b$, if $a^y = 19683$, where y is a multiple of a and $b^x = 1024$, where b is a factor of x .
 a, b, x and y being positive integers is
(a) 1081 (b) 829 (c) 181 (d) 1729
2. Standard form the product of 3.2×10^6 and 4.1×10^{-2} is
(a) 13.12×10^5 (b) 131.2×10^5 (c) 1.312×10^5 (d) 1312×10^5
3. If $4(4x)^7 = 4^{6^2}$, then the value of x is
(a) 5 (b) 25 (c) 64 (d) 256
4. If $(81)^x = \frac{1}{(125)^y}$ and x, y are integers, then the value of $12xy$ is
(a) 0 (b) 1 (c) 12 (d) None of these
5. If $a = (2^{-2} - 2^{-3}), b = (2^{-3} - 2^{-4})$ and $c = (2^{-4} - 2^{-3})$ then the value of $a^3 + b^3 + c^3$ is
(a) $\frac{-9}{1024}$ (b) $\frac{-9}{2048}$ (c) 0 (d) 1

Q.2. Subjective questions:

1. If $2^{-m} \times \frac{1}{2^m} = \frac{1}{4}$ then find the value of $\frac{1}{14} \left[(4^m)^{\frac{1}{2}} + \left(\frac{1}{5m} \right)^{-1} \right]$.

Ans.
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2. Is $n = 8$ the perfect choice for given expression $a^{-2} \times b^{n-3} \times (ab)^{-5} = \left(\frac{1}{a}\right)^{-(1-n)}$.

Ans.
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3. Find n so that

(i) $\left(\frac{4}{5}\right)^3 \times \left(\frac{4}{5}\right)^{-6} = \left(\frac{4}{5}\right)^{2n-1}$ (ii) $n(-5)^4 \div n^2 = 5$.

Ans.
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4. Find the standard form of $\frac{1.5 \times 10^6}{2.5 \times 10^{-4}}$.

Ans.
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5. The distance from the earth to the sun is 1.5×10^8 km. The distance from Pluto to the sun is 6.0×10^9 km.
(i) Find the ratio of the shorter distance to the longer. Give your answer in its simplest form.
(ii) How much further is Pluto from the sun than the Earth from the sun? Give your answer in standard form.

Ans.
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6. In 1987, there were about 5×10^9 people on earth. The land area of the earth is about 1.4×10^8 sq km.
How many people are there per sq km?

Ans.
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