Past Year JEE Questions

Questions

Quetion: 01

If the third term in the binomial expansion

of $\left(1 + x^{\log_2 x}\right)^5$ equals 2560, then a possible value of x is -

A. $2\sqrt{2}$

B. $4\sqrt{2}$

C. $\frac{1}{8}$

D. $\frac{1}{4}$

Solutions

Solution: 01

Explanation

$$\left(1 + x^{\log_2 x}\right)^5$$

$$T_3 = {}^5C_2 . \left(x^{\log_2 x}\right)^2 = 2560$$

$$\Rightarrow \quad 10.x^{2\log_2 x} = 2560$$

$$\Rightarrow \quad x^{2\log_2 x} = 256$$

$$\Rightarrow \quad 2(\log_2 x)^2 = \log_2 256$$

$$\Rightarrow 2(\log_2 x)^2 = 8$$

$$\Rightarrow \quad (\log_2 x)^2 = 4$$

$$\Rightarrow \quad \log_2 x = 2 \ \text{ or } -2$$

$$x = 4 \quad \text{or} \ \frac{1}{4}$$