

Binomial Theorem - Class XI

Past Year JEE Questions

Questions

Question: 01

If $\binom{30}{4^k}$ is the term, independent of x , in the binomial expansion of $(\frac{x}{4} - \frac{12}{x^2})^{12}$, then k is equal to _____.

Solutions

Solution: 01

Answer

Correct Answer is **55**

Explanation

$$(\frac{x}{4} - \frac{12}{x^2})^{12}$$

$$T_{r+1} = (-1)^r \cdot {}^{12}C_r (\frac{x}{4})^{12-r} (\frac{12}{x^2})^r$$

$$T_{r+1} = (-1)^r \cdot {}^{12}C_r (\frac{1}{4})^{12-r} (12)^r \cdot (x)^{12-3r}$$

Term independent of $x \Rightarrow 12 - 3r = 0 \Rightarrow r = 4$

$$T_5 = (-1)^r \cdot {}^{12}C_r (\frac{1}{4})^8 (12)^4 = \frac{30}{4^k} \cdot k$$

$$\Rightarrow k = 55$$