

Binomial Theorem - Class XI

Past Year JEE Questions

Questions

Question: 01

If the coefficient of a^7b^8 in the expansion of $(a + 2b + 4ab)^{10}$ is $K \cdot 2^{16}$, then K is equal to

Solutions

Solution: 01

Answer

Correct Answer is **315**

Explanation

$$\frac{10!}{\alpha!\beta!\gamma!} a^\alpha (2b)^\beta (4ab)^\gamma$$

$$\frac{10!}{\alpha!\beta!\gamma!} a^{\alpha+\gamma} b^{\beta+\gamma} 2^\beta \cdot 4^\gamma$$

$$\alpha + \beta + \gamma = 10 \dots (1)$$

$$\alpha + \gamma = 7 \dots (2)$$

$$\beta + \gamma = 8 \dots (3)$$

$$(2) + (3) - (1) \Rightarrow \gamma = 5$$

$$\alpha = 2$$

$$\beta = 3$$

$$\text{so coefficients} = \frac{10!}{2!3!5!} \cdot 2^{10}$$

$$= \frac{10 \times 9 \times 8 \times 7 \times 6 \times 5!}{2 \times 3 \times 2 \times 5!} \times 2^{10}$$

$$= 315 \times 2^{16} \Rightarrow k = 315$$