

Question -

The coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is **(1983**

(a) $\frac{405}{256}$

(b) $\frac{504}{259}$

(c) $\frac{450}{263}$

(d) None of these

Ans - A

Solution -

The general term in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is

$$t_{r+1} = (-1)^r {}^{10}C_r \left(\frac{x}{2}\right)^{10-r} \left(\frac{3}{x^2}\right)^r = (-1)^r {}^{10}C_r \cdot \frac{3^r}{2^{10-r}} \cdot x^{10-3r}$$

For coefficient of x^4 , we put $10 - 3r = 4$

$$\Rightarrow 3r = 6$$

$$\Rightarrow r = 2$$

$$\begin{aligned} \therefore \text{Coefficient of } x^4 \text{ in } \left(\frac{x}{2} - \frac{3}{x^2}\right)^{10} &= (-1)^2 \cdot {}^{10}C_2 \cdot \frac{3^2}{2^8} \\ &= \frac{45 \times 9}{256} = \frac{405}{256} \end{aligned}$$