Questions

Quetion: 01

If the greatest value of the term independent of 'x' in the

expansion of $\left(x \sin \alpha + a \frac{\cos \alpha}{x}\right)^{10}$ is $\frac{10!}{(5!)^2}$, then the value of 'a' is equal to :

A. -1
B. 1
C. -2
D. 2

Solutions

Solution: 01

Explanation

$T_{r+1} = {}^{10}C_r (x \sin \alpha)^{10-r} \left(\frac{a \cos \alpha}{x}\right)^r$

r = 0, 1, 2, ..., 10

T_{r+1} will be independent of x when $10 - 2r = 0 \Rightarrow r = 5$

$T_6 = {}^{10}C_5 (x \sin \alpha)^5 \times \left(\frac{a \cos \alpha}{x}\right)^5$

$= {}^{10}C_5 \times a^5 \times \frac{1}{2^5}(\sin 2\alpha)^5$

will be greatest when $\sin 2\alpha = 1$

$\Rightarrow {}^{10}C_5 \frac{a^5}{2^5} = {}^{10}C_5 \Rightarrow a = 2$