Binomial Theorem - Class XI

Past Year JEE Questions

Questions

Quetion: 01

The coefficient of x^7 in the expansion of $(1-x-x^2+x^3)^6$ is

A. -132

B. -144

C. 132

D. 144

Solutions

Solution: 01

Explanation

Given,

$(1-x-x^2+x^3)^6$

$= [(1-x)-x^2(1-x)]^6$

$= (1-x)^6(1-x^2)^6$

$= \left(1+{}^6C_1(-x)+{}^6C_2(-x)^2+{}^6C_3(-x)^3+.....\right)\times$
$\left(1+{}^6C_1(-x^2)+{}^6C_2(-x^2)^2+{}^6C_3(-x^2)^3+.....\right)$

$\therefore$ Coefficient of $x^7 = -{}^6C_1\times -{}^6C_3+(-{}^6C_3)\times {}^6C_2+(-{}^6C_5)\times -{}^6C_1$

$= 120 - 300 + 36 = -144$