

Find the coefficient of  $x$  in the expansion of  $(1 - 3x + 7x^2)(1 - x)^{16}$

**Sol.** The given expression is  $(1 - 3x + 7x^2)(1 - x)^{16}$   
 $= (1 - 3x + 7x^2) [{}^{16}C_0(1)^{16}(-x)^0 + {}^{16}C_1(1)^{15}(-x)$   
 $+ {}^{16}C_2(1)^{14}(-x)^2 + \dots]$   
 $= (1 - 3x + 7x^2)(1 - 16x + 120x^2 \dots)$

Collecting the term containing  $x$ , we get  $-16x - 3x = -19x$   
Hence, the coefficient of  $x = -19$