

Q3. If the integers $r > 1$, $n > 2$ and coefficients of $(3r)$ th and $(r + 2)$ nd terms in the binomial expansion of $(1 + x)^{2n}$ are equal, then

- (a) $n = 2r$
- (b) $n = 3r$
- (c) $n = 2r + 1$
- (d) none of these

Sol. (a) The given expression is $(1 + x)^{2n}$

$$\therefore T_{3r} = T_{(3r-1)+1} = {}^{2n}C_{3r-1} x^{3r-1}$$

$$\text{and } T_{r+2} = T_{(r+1)+1} = {}^{2n}C_{r+1} x^{r+1}$$

$$\text{Given, } {}^{2n}C_{3r-1} = {}^{2n}C_{r+1}$$

$$\Rightarrow 3r - 1 + r + 1 = 2n$$

$$\therefore n = 2r$$

$$[\because {}^nC_x = {}^nC_y \Rightarrow x + y = n]$$