



26. If 12 identical balls are to be placed in 3 identical boxes, then the probability that one of the boxes contains exactly 3 balls is

(1) $\frac{55}{3} \left(\frac{2}{3}\right)^{11}$

(2) $55 \left(\frac{2}{3}\right)^{10}$

(3) $220 \left(\frac{1}{3}\right)^{12}$

(4) $22 \left(\frac{1}{3}\right)^{11}$

Answer:

Let's assume balls are different and 1 particular box to have 3 balls.

Out of 12 balls selecting 3 for a particular box = ${}^{12}C_3$
Remaining 9 balls in 2 boxes can be distributed in 2^9 ways

Favourable cases = ${}^{12}C_3 \times 2^9$

Total no. Of cases (sample space) = 3^{12}

$$\text{Required probability} = \frac{{}^{12}C_3 \times 2^9}{3^{12}} = \frac{12 \times 11 \times 10 \times 9!}{9! \times 3 \times 2 \times 3} \times \frac{2^9}{3^{11}} = \frac{55}{3} \left(\frac{2}{3}\right)^{11}$$

Correct option (1) $\frac{55}{3} \left(\frac{2}{3}\right)^{11}$

However as per the questions without our assumption answer should be 5/19