Assignment 1
Ncert Exampler

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EE22BTECH11042

I. QUESTION 12.13.2.74

A bag contain 5 red and 3 blue balls. If 3 balls are drawn at random without replacement, the probability of getting exactly one red ball is

1) $\frac{45}{196}$
2) $\frac{135}{392}$
3) $\frac{15}{56}$
4) $\frac{15}{29}$

Solution: Let X, Y and Z denote the random variables for first, second and third draw, respectively as follows:

For event E having exactly one red ball to be drawn, following coditions will be followed:

RV	Values	Description
X	{0,1}	1st Draw:- 0:red, 1: blue
Y	{0,1}	2nd Draw:- 0:red, 1: blue
Z	{0,1}	3rd Draw:- 0:red, 1: blue

TABLE 4
RANDOM VARIABLES

1) E_1: First ball drawn is red, rest are blue
2) E_2: Second ball drawm is red, rest are blue
3) E_3: Third ball drawn is red, rest are blue

Therefore,

$$\Pr(E_1) = \Pr(X = 0, Y = 1, Z = 1) \tag{1}$$

$$= \frac{5}{8} \cdot \frac{3}{7} \cdot \frac{2}{6} \tag{2}$$

$$= \frac{5}{56} \tag{3}$$

$$\Pr(E_2) = \Pr(X = 1, Y = 0, Z = 1) \tag{4}$$

$$= \frac{3}{8} \cdot \frac{5}{7} \cdot \frac{2}{6} \tag{5}$$

$$= \frac{5}{56} \tag{6}$$

$$\Pr(E_3) = \Pr(X = 1, Y = 1, Z = 0) \tag{7}$$

$$= \frac{3}{8} \cdot \frac{2}{7} \cdot \frac{5}{6} \tag{8}$$

$$= \frac{5}{56} \tag{9}$$

The probability of event that exactly one red ball is drawn is given by:

$$\Pr(E) = \Pr(E_1) + \Pr(E_2) + \Pr(E_3) \tag{10}$$

$$= \frac{5}{56} + \frac{5}{56} + \frac{5}{56} \tag{11}$$

$$= \frac{15}{56} \tag{12}$$