Question 10.13.3.34

There are 1000 sealed envelopes in a box, 10 of them contain a cash prize of Rs 100 each, 100 of them contain a cash prize of Rs 50 each and 200 of them contain a cash prize of Rs 10 each and rest do not contain any cash prize. If they are well shuffled and an envelope is picked up out, what is the probability that it contains no cash prize?.

Solution: Let

$$X_n = \begin{cases} 1, & \text{if cash prize} \\ 0, & \text{if no cash prize} \end{cases} \tag{1}$$

Then

TABLE I
RANDOM VARIABLE

Variable	Description
X_1	cash prize of Rs 100
X_2	cash prize of Rs 50
X_3	cash prize of Rs 10
X_4	cash prize in total

$$pX_1(1) = \frac{10}{1000} \tag{2}$$
$$= \frac{1}{100} \tag{3}$$
$$= 0.01 \tag{4}$$
$$pX_2(1) = \frac{100}{1000} \tag{5}$$
$$= \frac{1}{10} \tag{6}$$
$$= 0.1 \tag{7}$$
$$pX_3(1) = \frac{200}{1000} \tag{8}$$
$$= \frac{2}{10} \tag{9}$$
$$= 0.2 \tag{10}$$

Probablity of no cash prize

$$pX_4(0) = 1 - (pX_1(1) + pX_2(1) + pX_3(1)) \tag{11}$$
$$= 1 - \frac{31}{100} \tag{12}$$
$$= 0.69 \tag{13}$$