

## EE22BTECH11029 - Komakula Sreeja

**Question 12.13.3.78**

A die is thrown and a card is selected at random from a deck of 52 playing cards. The probability of getting an even number on the die and a spade card.

**Solution:** We know that 52 playing cards contain 13 spades, 13 clubs, 13 diamonds and 13 hearts.

Let  $X_1$  and  $X_2$  be two random variables denoting the number on dice and card selected respectively:

TABLE 1: Description of random variables

Parameters	Values	Description
$X_1$	0	Even number
	1	Odd number
$X_2$	0	Spade
	1	Club
	2	Diamond
	3	Heart

Probability of the number on the dice:

$$p_{X_1}(k) = \frac{1}{2} \quad \{k = 0, 1\} \quad (1)$$

Probability of selecting a card:

$$p_{X_2}(k) = \frac{13}{52} = \frac{1}{4} \quad \{k = 0, 1\} \quad (2)$$

Therefore, the probability of getting an even number on the die and a spade card

$$= pr(X_1 = 0, X_2 = 0) \quad (3)$$

$$= p_{X_1}(0) \times p_{X_2}(0) \quad (4)$$

$$= \frac{1}{2} \times \frac{1}{4} \quad (5)$$

$$= \frac{1}{8} \quad (6)$$