20. Two dice are thrown simultaneously. What is the probability that the sum of the numbers appearing on the dice is (i) 7? (ii) a prime number? (iii) 1?

Solution: Two dice are thrown simultaneously. So, total number of possible outcomes = 36

(i) Sum of the numbers appearing on dice is 7 The favourable outcomes are (1,6), (2,5), (3,4), (4,3), and (5,2). Number of favourable outcomes = 6

$$\text{Required probability} = \frac{6}{36} = \frac{1}{6} \tag{1}$$

(ii) Sum of the numbers appearing on dice is a prime number. The favourable outcomes are (1,1), (1,2), (1,4), (1,6), (2,1), (2,3), (2,5), (3,2), (3,4), (4,1), (4,3), (5,2), (5,6), (6,1) and (6,5). Number of favourable outcomes = 15

$$\text{Required probability} = \frac{15}{36} = \frac{5}{12} \tag{2}$$

(iii) Sum of the numbers appearing on the dice is 1. It is not possible, so the probability is zero.