EXERCISE 3.1

1. A biased coin falls with heads showing with probability p. The coin is tossed three times. Find
the probability of obtaining:-
(i) three heads
(ii) two heads and one tail.

2. What is the probability of throwing a total score of 6 with two dice ?

3.100 cars are entered for a road-worthiness test which is in two parts, mechanical and electrical. A car passes only if it passes both parts. Half the cars fail the electrical test and 62 pass the mechanical. 15 pass the electrical but fail the mechanical test. Find the probability that a car chosen at random

(i) passes overall
(ii) fails on one test only
(iii) given that it has failed, failed the mechanical test only

4.What is the probability of drawing an ace or a spade from a well-shuffled pack of cards ?

5. Four suppliers provide 10%, 20%, 30% and 40% of the bolts sold by a hardware shop and the rate of defects in their products are 1%, 1.5%, 2% and 3% respectively. Calculate the probability of a given defective bolt coming from supplier 1.

6.The letters of the word CHEMISTRY are re-arranged at random. Find the number of arrangements which end with the letter T.

7.Three dice are thrown. Find the probability of obtaining

(i) at least two sixes

(ii) no sixes.

8. A mother takes her three young sons on a ride on the Severn Valley Railway. They get into an empty compartment with 3 forward-facing and 3 rearward-facing seats.

(i) In how many different ways can they be seated ?

(ii) In how many ways will two particular boys be seated directly opposite each other ?

9.There are 10 balls in a bag, 6 red and 4 green. If 3 are picked out at random, what is the probability of 1 red and 2 greens ?

10. Around 0.8% of men are blue-green colour-blind (the figure is slightly different for women) and roughly 1 in 5 men is left-handed. Assuming these characteristics are inherited independently,calculate the probability that a man chosen at random will:

(i) be both colour-blind and left-handed

(ii) be colour-blind and not left-handed

(iii) be colour-blind or left-handed

(iv) be neither colour-blind nor left-handed.

Answers

1. p^3; $3p^2(1-p)$

2.0.139

3.0.35; 0.42;0.23

4.0.308

5. 0.045

6. 40320

7. 0.074; 0.58

8. 360; 72

9.0.3

10. 0.0016; 0.0064; 0.2064; 0.7936.