EXERCISE 6B

BASIC PROBABILITY

1. A die is thrown. Find the probability that the result is
   (i) an even number
   (ii) a number less than 5
   (iii) a number which is even and less than 5
   (iv) a number which is even or less than 5

2. A box contains 5 red, 3 green and 6 white marbles. One marble is selected at random from the box. Find the probability that it is
   (i) white (ii) red or white (iii) not red.

3. A letter is selected from the letters of the word KATOOMBA. Find the probability that the letter is a vowel.

4. Three cards are marked 1,2,3 respectively. One is selected and without returning this card a second one is selected. Write out the sample space and find the probability that an odd digit was drawn
   (i) the first time (ii) the second time (iii) both times.

5. Two normal dice are tossed and the sum of the numbers appearing on the uppermost faces is recorded as a score X. Write out the sample space in table form and hence find the probability that
   (i) $X = 10$ (ii) $X < 9$ (iii) $X \geq 11$

6. One hundred cards are marked 00,01,02,03,......,09,10,11,.........,99
   One of the cards is selected at random. What is the probability that
   (i) the digit 9 appears
   (ii) the digit 9 does not appear
   (iii) the card bears a double digit
   (iv) the number on the card is a multiple of 9 (not 00)
   (v) the number on the card is a double digit or a multiple of 9

7. In a family with 3 children what is the probability that they are 2 boys and 1 girl?

8. From a bag containing 5 white and 3 black marbles a marble is drawn out and found to be white. If a second marble is now drawn out what is the probability that it is also white?

9. The numbers 1,2,3,.........,30 are written on 30 cards. One card is selected at random. Show that the probability that the number on this card is a prime number or a multiple of 5 is 0·5.

10. A coin is tossed 4 times. How many outcomes are possible? What is the probability of at least one head occurring?

11. Two digit numbers are made from the digits 1,2,3,4,5 without repetition of digits. Find the probability that the two digit number is (i) even (ii) divisible by 5

12. A group of 80 people includes 35 who play tennis and 40 who play golf as well as 20 who play neither of these sports. Find the probability that a person selected at random from this group plays both tennis and golf.

13. Four cards are marked a,b,c,d. They are shuffled and dealt out one by one being placed in a line from left to right so that a typical result is $bdac$. How many results are possible? Write out all the possible results. If in the arrangement $abcd$ each letter is said to be in its "proper place" calculate the probability that
   (i)   the letter a is dealt first
   (ii)   some letter appears out of its proper place
   (iii)   every letter appears out of its proper place

Answers

1. $\dfrac{1}{2}, \dfrac{2}{3}, \dfrac{1}{3}, \dfrac{5}{6}$ 2. $\dfrac{3}{7}, \dfrac{11}{14}, \dfrac{9}{14}$ 3. $\dfrac{1}{2}$ 4. $\dfrac{2}{3}, \dfrac{2}{3}, \dfrac{1}{3}$ 5. $\dfrac{1}{12}, \dfrac{13}{18}, \dfrac{1}{12}$

6. $0.19, 0.81, 0.1, 0.11, 0.2$ 7. $\dfrac{3}{8}$ 8. $\dfrac{4}{7}$ 10. $\dfrac{15}{16}$

11. $\dfrac{2}{5}, \dfrac{1}{5}$ 12. $\dfrac{3}{16}$

13. 24, $abcd$ $abdc$ $acbd$ $acdb$ $adbc$ $adcb$
       $bacd$ $badc$ $bcad$ $bcda$ $bdac$ $bdca$
       $cabd$ $cadb$ $cbad$ $cbda$ $cdab$ $cdba$
       $dabc$ $dacb$ $dbac$ $dbca$ $dcab$ $dcba$

   (i) $\dfrac{1}{4}$ (ii) $\dfrac{23}{24}$ (iii) $\dfrac{3}{8}$