PROBABILITY

INTRODUCTION OF PROBABILITY

EXERCISE

Q.1 A coin is tossed 500 times with the following frequencies of two outcomes :

Head : 240 times, tail : 260 times Find the probability of occurrence of each of these event.

Q.2 A die is thrown 1000 times with the following frequency for the outcomes 1, 2, 3, 4, 5 and 6 as given below :

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

Find the probability of happening of each outcome.

Q.3 The percentage of marks obtained by a student in the monthly unit tests are given below :

Unit test :	I	II	III	IV	V
Percentage of marks obtained	58	64	76	62	85

Find the probability that the student gets :

(i) a first class i.e. at least 60 % marks

(ii) marks between 70 % and 80 %

(iii) a distinction i.e. 75 % or above

(iv) less than 65 % marks.

Q.4 On one page of a telephone directory, there were 200 telephone numbers. The frequency distribution of their unit place digit (for example, in the number 25828573, the unit place digit is 3) is given in the table below :

Digit	0	1	2	3	4	5	6	7	8	9
Frequency:	22	26	22	22	20	10	14	28	16	20

A number is chosen at random, find the probability that the digit at its unit's place is :

(i) 6

(ii) a non-zero multiple of 3

(iii) a non-zero even number

(iv) an odd number.

Q.5 A tyre manufacturing company kept a record of the distance covered before a tyre to be replaced. Following table shows the resuts of 1000 cases.

Distance in km :	Less than 400	400 to 900	900 to 1400	More than 1400
Number of tyres :	210	325	385	80

If you buy a tyre of this company, what is the probability that :

(i) it will need to be replaced before it has covered 400 km ?

(ii) it will last more that 900 km ?

(iii) it will need to be replaced after it has covered somewhere between 400 km and 1400 km ?

(iv) it will not need to be replaced at all ?

(v) it will need to be replaced ?

Q.6 Fifty seeds were selected at random from each of 5 bags of seeds, and were kept under standardised conditions favourable to germination. After 20 days the number of seeds which had germinated in each collection were counted and recorded as follows :

Bag :	1	2	3	4	5
Number of seeds germinated :	40	48	42	39	41

What is the probability germinated of :

(i) more than 40 seeds is a bag ?

(ii) 49 seeds in a bag ?

(iii) more than 35 seeds in a bag ?

(iv) at least 40 seeds in a bag ?

(v) at most 40 seed in a bag ?

Q.7 The distance (in km) of 40 female engineers from their residence to their place of work were found as follows -

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	2

Find the probability that an engineer lives :

(i) less than 7 km from her place of work ?

(ii) at least 7 km from her place of work ?

(iii) within $\frac{1}{2}$ km from her place of work ?

(iv) at most 15 km from her place of work ?

Q.8 An insurance company selected 2000 drivers at random in a particular city to find a relationship between age and accidents. The data obtained are given in the following table:

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	Over 3
18-29	440	160	110	61	35
30-50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random form the life city:

(i) being 18-29 years of age and having exactly 3 accidents in one year.

(ii) being 30-50 years of age and having one or more accidents in a year.

(iii) having no accidents in one year.

Q.9 Find the probability that a number selected at random from the numbers 1 to 25 is not a prime number when each of the gievn number is equally likely to be selected.

Q.10 Eleven bags of wheat flour, each marked 5 kg. actually contained the following weights of flour (in kg.) :

4.97 5.05 5.08 5.03 5.00 5.06 5.08 4.98 5.04 5.07 5.00

Find the probability that any of these bags chosen at random contains more than 5 kg of flour.

ANSWER KEY

1. $P(A) = 0.48$ $P(B) = 0.52$

2. $P(E_i) = 0.179$ $P(E_2) = 0.15$

$P(E_3) = 0.157$, $P(E_4) = 0.175$

$P(E_6) = 0.19$

3. (i) 0.8

(ii) 0.2.

(iii) 0.4

(iv) 0.6.

4. (i) 0.07

(ii) 0.28

(iii) 0.36

(iv) 0.53

5. (i) 0.21

(ii) 0.465

(iii) 0.71

(iv) 0

(v) 1

6. (i) $\frac{3}{5}$.

(ii) 0

(iii) 1

(iv) $\frac{4}{5}$

(v) $\frac{2}{5}$

7. (i) 0.25

(ii) 0.75

(iii) 0.

(iv) 0.75

8. (i) 0.0305

(ii) 0.1125

(iii) 0.653

9. $\frac{16}{25}$

10. $\frac{7}{11}$