CBSE Class 11 Mathematics

Important Questions

Chapter 16

Probability

1 Marks Questions

1. Three coins are tossed simultaneously list the sample space for the event.

Ans. S = [HHH, HHT, HTH, THH, HTT, TTH, THT, TTT]

2. Two dice are thrown simultaneously. Find the prob. of getting doublet.

Ans. $n=(s)=36$ [S be the sample space]

let E be the event of getting doublet

$$P(E)=\frac{6}{36}\left[\because E=\left((1,1),(2,2),(3,3),(4,4),(5,5),(6,6)\right)\right]$$

$$=\frac{1}{6}$$

3. 20 cards are numbered from 1 to 20. One card is then drawn at random. What is the prob. of a prime no.

Ans. Let S be the sample space and E be the event of prime no.

$$n(s)=\{1,2,3,.....20\}$$
$$n(E)=\{2,3,5,7,11,13,17,19\}$$
$$P(E)=\frac{n(E)}{n(S)}=\frac{8}{20}=\frac{2}{5}$$

4. If $\frac{3}{10}$ is the prob. that an event will happen, what is the prob. that it will not happen?

Ans. Let E be the event

$$P(E)=\frac{3}{10}$$
$$P(E)=1-P(E)$$
$$=1-\frac{3}{10}$$
$$=\frac{7}{10}$$

5. If A and B are two mutually exclusive events such that

P (A) $=\frac{1}{2}$ **and**

P (B) $=\frac{1}{3}$ **find P (A or B)**

Ans. $P(A\ or\ B)=P(A)+P(B)-p(A\cap B)$

$$=\frac{1}{2}+\frac{1}{3}-\phi\ \left[P(A\cap B)=\phi\right]$$

$$=\frac{5}{6}$$

6. If E and F are events such that P(E) $=\frac{1}{4}$, **P(F)** $=\frac{1}{2}$ **and P(E and F)** $=\frac{1}{8}$ **find P(not E and not F)**

Ans.

$$P(E'\cap F')=P(E\cup F)'$$

$$=1-P(E\cup F)\left[\because P(E\cup F)=\frac{1}{4}+\frac{1}{2}-\frac{1}{8}=\frac{5}{8}\right]$$

$$=1-\frac{5}{8}$$

$$=\frac{3}{8}$$

7. A letter is chosen at random from the word 'ASSASSINATION'. Find the prob. that letter is a consonant.

Ans. P (consonant) $=\frac{7}{13}$

8. There are four men and six women on the city council. If one council member is selected for a committee at random, how likely is it that at it is a woman?

Ans. P (a woman member is selected) $=\frac{6}{10}=\frac{3}{5}$

9. 4 cards are drawn from a well snuffled deck of 52 cards what is the prob. of obtaining 3 diamonds and one spade.

Ans.

$$\frac{{}^{13}C_3\times{}^{13}C_1}{{}^{52}C_4}=\frac{286}{20825}\left[\begin{array}{l}\because\ 3\text{ Spades out of }13\\ \text{and one ace out of }13\end{array}\right]$$

10. Describe the sample space. A coin is tossed and a die is thrown.

Ans. {H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6}

11. We wish to choose one child of 2 boys and 3 girls. A coin is tossed. If it comes up heads, a boy is chosen, otherwise a girl is chosen. Describe the sample space.

Ans. $\{HB_1, HB_2, TG_1, TG_2, TG_3\}$

12. What is the chance that a leap year, selected at random, will contain 53 Sundays?

Ans. A leap year consists of 366 days and therefore 52 complete weeks and two days over. These two days may be (Sunday, Monday), (Monday, Tuesday),(Tuesday, Wednesday), (Wednesday, Thursday), (Thursday, Friday), (Friday, Saturday), or (Saturday, Sunday)

P (a leap year has 53 Sunday) = $\frac{2}{7}$

13. If P (A) = 0.6, P(B) =0.4 and P (A $\cap$ B) = 0, then the events are?

Ans. Exclusive and exhaustive

14. In general the prob. of an event lie between?

Ans. 0 and 1.

15. A and B are two mutually exclusive events of an experiment. If P (not A) = 0.65, P (A $\cup$ B) = 0.65 and P (B) = K, find K

Ans. $P(A \cup B) = P(A) + P(B)$

$$P(A \cup B) = 1 - P(notA) + P(B)$$
$$0.65 = 1 - 0.65 + K$$
$$K = 0.30$$

16. A box contains 1 white and 3 identical black balls. Two balls are drawn at random in succession without replacement. Write the sample space for this experiment.

Ans. S = {WB, BW, BB}

17. Three coins are tossed once. Find the probability at most two heads.

Ans. S = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}

E = HHT, THH, HTH, HTT, THT, TTH, TTT

P (E) $= \frac{7}{8}$

18. One card is drawn from a pack of 52 cards, find the probability that drawn card is either red or king.

Ans.

$$p = \frac{26+2}{52}$$

$$= \frac{28}{52}$$

$$= \frac{7}{13}$$

19. Five cards are drawn from a well shuffled pack of 52 cards. Find the probability that all the five cards are hearts.

Ans. $\frac{{}^{13}C_5}{{}^{52}C_5} = \frac{33}{66640}$

20. From a deck of 52 cards four cards are accidently dropped. Find the chance that the missing cards should be one from each type.

Ans.

$$\frac{{}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_4} = \frac{2197}{20825}$$

21. In a random sampling three items are selected from a lot. Each item is tested and

classified as defective (D) or non – defective (H). Write the sample space.

Ans. S ={DDD, DDN, DND, NDD, DNN, NDN, NND, NNN}

22. Let $S = \{W_1, W_2, W_3, W_4, W_5, W_6\}$ be sample space. Is the probability to outcome valid.

W_1	W_2	W_3	W_4	W_5	W_6
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

Ans. Yes, $\left[\because \frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=1\right]$

23. The odds in favour of an event are 3:5, find the probability of occurrence of this event.

Ans. $P = \frac{3}{8}$

24. What is the probability that an ordinary year has 53 Sundays?

Ans. $\frac{1}{7}$

25. If odds against an event be 7:9, find the probability of non-occurrence of this event.

Ans. $1-\frac{9}{16}=\frac{16-9}{16}=\frac{7}{16}$

CBSE Class 12 Mathematics

Important Questions

Chapter 16

Probability

4 Marks Questions

1. A coin is tossed three times consider the following event A : No head appears, B : Exactly one head appears and C : At least two heads appears do they form a set of mutually exclusive and exhaustive events.

Ans. S = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}

A = {TTT}, B = {HTT, THT, TTH}, C = {HHT, HTH, THH, HHH}

$$A \cup B \cup C = S$$

Therefore A, B and C are exhaustive events.

Also $A \cap B = \phi, A \cap C = \phi, C \cap C = \phi,$ disjoint i.e. they are mutually exclusive.

2. A and B are events such that P (A) = 0.42, P (B) = 0.48, and P (A and B) = 0.16 determine (i) P (not A) (ii) P (not B) (iii) P (A or B)

Ans. $P(notA) = 1 - p(A) = 1 - 0.42 = 0.58$

$$P(notB) = 1 - p(B) = 1 - 0.48 = 0.52$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$$

$$= 0.42 + 0.48 - 0.16$$
$$= 0.74$$

3. Find the prob. that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (i) all king (ii) 3 kings (iii) at least 3 kings

Ans. P (all king) $= \dfrac{{}^{4}C_{4} \times {}^{48}C_{3}}{{}^{52}C_{7}} = \dfrac{1}{7735}$

P (3 king) $= \dfrac{{}^{4}C_{3} \times {}^{48}C_{4}}{{}^{52}C_{7}} = \dfrac{9}{1547}$

P (atleast 3 king) = p (3 king) + p (4 king)

$$= \frac{9}{1547} + \frac{1}{7735} = \frac{46}{7735}$$

4. From a group of 2 boys and 3 girls, two children are selected at random. Describes the sample space associated with

(i) E_1 **: both the selected children are boys**

(ii) E_2 **: at least one selected child is a boy**

(iii) E_3 **: one boy and one girl is selected**

(iv) E_4 **: both the selected children are girls**

Ans. $S = \{B_1B_2,\ B_1G_1,\ B_1G_2,\ B_1G_3,\ B_2G_1,\ B_2G_2,\ B_2G_3,\ G_1G_2,\ G_1G_3,\ G_2G_3\}$

$E_1 = \{B_1B_2\}$

$E_2 = \{B_1B_2,\ B_1G_1,\ B_1G_2,\ B_1G_3,\ B_2G_1,\ B_2G_2,\ B_2G_3\}$

$E_3 = \{B_1G_1,\ B_1G_2,\ B_1G_3,\ B_2G_1,\ B_2G_2,\ B_2G_3\}$

$E_4 = \{G_1G_2,\ G_1G_3,\ G_2G_3\}$

5. A book contains 100 pages. A page is chosen at random. What is the chance that the sum of the digit on the page is equal to9

Ans. $E=\{9,\ 18,\ 27,\ 36,\ 45,\ 54,\ 63,\ 72,\ 81,\ 90\}$

$S=100$

$P(E)=\frac{10}{100}$

$=\frac{1}{10}$

6. A pack of 50 tickets numbered 1 to 50 is shuffled and the two tickets are drawn find the prob.

(i) Both the ticket drawn bear prime no.

(ii) Neither of the tickets drawn bear prime no.

Ans. Prime no. from 1 to 50 are

$2,\ 3,\ 5,\ 7,\ 11,\ 13,\ 17,\ 19,\ 23,\ 29,\ 31,\ 37,\ 41,\ 43,\ 47$

(i) Two ticket out of fifty can be drawn in $C(50,2)$

$$\mathrm{P(both\ ticket\ bearing\ prime\ no.)}=\frac{{}^{15}C_2}{{}^{50}C_2}=\frac{3}{35}$$

(ii) P (neither of the tickets bear prime no.)

$$=\frac{{}^{35}C_2}{{}^{50}C_2}=\frac{17}{35}$$

7. In a class XI of a school 40% of the students study mathematics and 30% study biology. 10% of the class study both mathematics and Biology. If a student is selected at random from the class, find the prob. that he will be studying mathematics or biology.

Ans.

$$P(M)=\frac{40}{100}, P(B)=\frac{30}{100}$$

$$P(M \cap B)=\frac{10}{100}$$

$$P(M \cup B)=P(M)+P(B)-P(M \cap B)$$

$$=\frac{40}{100}+\frac{30}{100}-\frac{10}{100}=0.6$$

8. A hockey match is played from 3 pm to 5 pm. A man arrives late for the match what is the prob. that he misses the only goal of the match which is scored at the 20th minute of the match?

Ans. The man can arrive any time between 3 to 5 pm so that time = 2hr =120 minutes

He see goal of he arrives within first 20 minutes

P (he see the goal) $=\frac{20}{120}=\frac{1}{6}$

P (not see the goal) $=1-\frac{1}{6}=\frac{5}{6}$

9. In a single throw of two dice, find the prob. that neither a doublet nor a total of 10 will appear.

Ans. Let S be the sample space and E_1, E_2 are event of doublet, and event of getting a total of 10 respectively

$$E_1=\{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$$

$$E_2=\{(4,6)(5,5)(6,4)\}$$

$$n(S)=36$$

$$P(E_1)=\frac{6}{36}=\frac{1}{6}$$

$$P(E_2)=\frac{3}{36}=\frac{1}{12}$$

$$P(E_1\cap E_2)=1$$

$$P(E_1\cup E_2)=\frac{2}{9}$$

$$P\left(E_1'\cap E_2'\right)=P(E_1\cup E_2)'$$

$$=1-(E_1\cup E_2)$$

$$=1-\frac{2}{9}=\frac{7}{9}$$

10. The prob. that a person will get an electrification contract is $\frac{2}{5}$ and the prob. that he will not get a plumbing contract is $\frac{4}{7}$. If the prob. of getting at least one contract is $\frac{2}{3}$, what is the prob. that he will get both?

Ans. Let A = Event of getting an electrification contract

B = Event of getting a plumbing contract

$$P(A)=\frac{2}{5},\quad P(notB)=\frac{4}{7}$$

$$P(B)=1-\frac{4}{7}=\frac{3}{7}$$

$$P(A\cup B)=\frac{2}{3}$$

Req. prop $=P(A\cup B)$

$$= P(A) + P(B) - P(A \cap B)$$

$$= P(A) + P(B) - P(A \cap B)$$

$$= \frac{2}{5} + \frac{3}{7} - \frac{2}{3} = \frac{42 + 45 - 70}{105}$$

$$= \frac{17}{105}$$

11. In a town of 6000 people 1200, are over 50 yr. old and 2000 are females. It is known that 30% of the females are over 50 yr. what is the prob. that a randomly chosen individual from the town is either female or over 50 yr.

Ans. A_1 : Event of person being a female

A_2 : Event of person being 50 yr. old

$$n(A_1) = 2000, \quad n(A_2) = 1200$$

$$n(A_1 \cap A_2) = 30\% \text{ of } 2000 = \frac{30}{100} \times 2000$$

$$= 600$$

$$n(A_1 \cup A_2) = n(A_1) + n(A_2) - n(A_1 \cap A_2)$$

$$2000 + 1200 - 600$$

$$= 2600$$

$$P(A_1 \cup A_2) = \frac{2600}{6000} = \frac{13}{30}$$

12. In a class of 60 students 30 opted for NCC, 32 opted for NSS, 24 opted for both NCC and NSS. If one of these students is selected at random find the probability that

(i). The student opted for NCC or NSS

(ii). The student has opted neither NCC nor NSS.

(iii). The student has opted NSS but not NCC.

Ans. A student opted for NCC

B student opted for NSS

$$P(A)=\frac{30}{60}=\frac{1}{2},\ P(B)=\frac{32}{60}=\frac{8}{15}$$

$$P(A\cap B)=\frac{24}{60}=\frac{2}{5}$$

(i) $P(A\cup B)=P(A)+P(B)-P(A\cap B)$

$$=\frac{1}{2}+\frac{8}{15}-\frac{2}{5}$$

$$=\frac{19}{30}$$

(ii) $P(A'\cap B')=P(A\cup B)'$

$$=1-P(A\cup B)$$

$$=1-\frac{19}{30}$$

$$=\frac{11}{30}$$

(iii) $P(B-A)=P(B)-P(A\cap B)$

$$=\frac{8}{15}-\frac{2}{5}=\frac{2}{15}$$

13. Two students Anil and Ashima appeared in an examination. The probability That Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. the probability that both will qualify the examination is 0.02 find the probability that

(a). Both Anil and Ashima will qualify the examination

(b). At least one of them will not qualify the examination and

(c). Only one of them will qualify the examination.

Ans. Let E and F denote the event that Anil and Ashima will qualify the examination respectively P (E) = 0.05, P (F) = 0.10, P (E $\cap$ F) = 0.02

(a) $P(E' \cap F') = P(E \cup F)'$

$= 1 - P(E \cup F)$

$= 1 - [P(E) + P(F) - P(E \cap F)]$

$= 1 - 0.13 = 0.87$

(b) (at least one of them will not quality) = 1-P(both of them will quality)

=1-0.02

= 0.98

(c) P (only one of them will quality) = $P(E \cap F') + P(E' \cap F)$

$= P(E) - P(E \cap F) + P(F) - P(E \cap F)$

$= 0.05 - 0.02 + 0.10 - 0.02$

$= 0.11$

14. Out of 100 students, two sections of 40 and 60 are formed. If you and your friend are among the 100 students what is the probability that

(a) You both enter the same section?

(b) You both enter the different section?

Ans. Two sections of 40 and 60 can be formed out of 100 in ${}^{100}C_{60}$ or ${}^{100}C_{40}$ ways

(a) P (both enter the same section)

$$= \frac{{}^{40}C_2}{{}^{100}C_2} + \frac{{}^{60}C_2}{{}^{100}C_2} = \frac{17}{33}$$

(b) req. probability

$$= \frac{{}^{40}C_1 \times {}^{60}C_1}{{}^{100}C_2} = \frac{16}{33}$$

15. There are three mutually exclusive and exhaustive events $E_1, E_2,$ and E_3 . The odds are 8 : 3 against E_1 and 2 : 5 in favors of E_2 find the odd against E_3 .

Ans. Odds against E_1 are 8:3

So odds in favors of E_1 are 3:8

$$\therefore P(E_1) = \frac{3}{3+8} = \frac{3}{11}, \quad P(E_2) = \frac{2}{2+5} = \frac{2}{7}$$

$$P(E_1) + P(E_2) + P(E_3) = 1 \left[\begin{matrix} E_1, E_2, \text{ and } E_3 \text{ are mutually} \\ \text{exclusive and exnaustive} \end{matrix} \right]$$

$$= 1 - \frac{3}{11} - \frac{2}{7}$$

$$= \frac{34}{77}$$

Odds against E_3 are

$$= \frac{1 - P(E_3)}{P(E_3)}$$

$$= \frac{1 - \frac{34}{77}}{77} = \frac{43}{34}$$

16. If an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing both?

Ans. A : student passes first examination

B : student passes Second examination

P (A) = 0.8, P (B) = 0.7

P (A $\cup$ B) = 0.95

P (A $\cap$ B) =?

P (A $\cup$ B) = P (A) + P (B) - P (A $\cap$ B)

0.95 = 0.8 + 0.7 - P (A $\cap$ B)

0.55 = P (A $\cap$ B).

17. One card is drawn from a well shuffled deck of 52 cards. If each out come is equally likely calculate the probability that the card will be.

(i) a diamond (ii) Not an ace (iii) A black card (iv) Not a diamond.

Ans. (i) req. probability

$$= \frac{13}{52} = \frac{1}{4}$$

(ii)req. probability

$$=1-\frac{4}{52}=1-\frac{1}{13}=\frac{12}{13}$$

(iii) req. probability

$$=\frac{26}{52}=\frac{1}{2}$$

(iv)req. probability

$$=1-\frac{1}{4}=\frac{3}{4}$$

18. In a lottery, a person chooses six different natural no. at random from 1 to 20 and if these six no. match with six no. already fixed by the lottery committee, he wins the prize. What is the probability of winning the prize in the game?

Ans. Out of 20, a person can choose 6 natural no. In ${}^{20}C_6$ ways out of these there is only one choice which will match the six no. already by the committee

P (The person wins the prize)

$$= \frac{1}{{}^{20}C_6}=\frac{1}{38760}$$

19. From the employees of a company, 5 persons are elected to represent them in the managing committee of the company.

S.No.	Person	Age
1	Male	30
2	Male	33
3	Female	46
4	Female	28
5	Male	41

A person is selected at random from this group as a spoke person what is the probability the a spoke person will be either male or over 35 yr.

Ans. A: spoke person is a male

B: spoke person is over 35 yr.

$$P(A)=\frac{3}{5}$$

$$P(B)=\frac{2}{5}$$

$$P(A\cap B)=\frac{1}{5}$$

$$P(A\cup B)=P(A)+P(B)-P(A\cap B)$$

$$=\frac{3}{5}+\frac{2}{5}-\frac{1}{5}=\frac{4}{5}$$

20.A die has two faces each with no. 1 three faces each with no. 2 and one face with no. 3 if the die is rolled once, determine

(i) P (2) (ii) P (1 or 3) (iii) P(not 3)

Ans. A: getting a face with no. 1

B: getting a face with no. 2

C: getting a face with no. 3

$$P(A)=\frac{2}{6}=\frac{1}{3}$$

$$P(B)=\frac{3}{6}=\frac{1}{2}$$

$$P(C)=\frac{1}{6}$$

(i) $P(2)=\frac{1}{3}$

(ii) $P(1\ or\ 3)=P(1)+P(3)$

$$=\frac{1}{3}+\frac{1}{6}=\frac{1}{2}$$

(iii) $P(not3)=1-\frac{1}{6}=\frac{5}{6}$

21. Find the probability that in a random arrangement of the letters of the word UNIVERSITY the two I's come together.

Ans. Total no. of words which can be formed by the letters of the word UNIVERSITY is $\frac{10!}{2!}$

regarding 2I'S as one letter no. of ways of arrangement in which both I'S are together = 9!

Req. probability

$$=\frac{9!}{\frac{10!}{2!}}=\frac{1}{5}$$

22. A bag contains 50 tickets no. 1,2,3,……,50 of which five are drawn at random and arranges in ascending order of magnitude $(x_1<x_2<x_3<x_4<x_5)$ **find the probability that** x_3 **= 30**

Ans. Five tickets out of 50 can be drawn in ${}^{50}C_5$ ways

Since $x_1<x_2<x_3<x_4<x_5$

And x_3 = 30

$x_1 < x_2 < 30$

i.e x_1 and x_2 should come from tickets no to 1 to 29 and this may happen in ${}^{29}C_2$ ways.

Remaining two i.e. $x_4, x_5 > 30$ should Come from 20 tickets no. from 31 to 50 in ${}^{20}C_2$ ways

Favorable case = ${}^{29}C_2 \times {}^{20}C_2$

Req. probability $= \frac{{}^{29}C_2 \times {}^{20}C_2}{{}^{50}C_5}$

$= \frac{551}{15134}$

CBSE Class 12 Mathematics

Important Questions

Chapter 16

Probability

6 Marks Questions

1.Three letters are dictated to three persons and an envelope is addressed to each of them, those letters are inserted into the envelopes at random so that each envelope contains exactly one letter. Find the prob. that at least one letter is in its proper envelope.

Ans. Let the tree letters be denoted by A_1 A_2 and A_3 and three envelopes by E_1 E_1 and E_3 .

Total No. of ways to putting the letter into three envelopes is $3P_3$ = 6

No. of ways in which none of the letters is put into proper envelope = 2

Req. prob.

P (at least one letters is put into proper envelope) =1- P (none letters is put into proper envelopes)

$$=1-\frac{2}{6}$$

$$=\frac{2}{3}$$

2.If 4 digit no. greater than 5,000 are randomly formed the digits 0,1,3,5 and 7 what is the prob. of forming a no. divisible by 5 when

(i). The digits are repeated (ii) The repetition of digits is not allowed.

Ans. (i)

Thousand	**H**	**T**	**U**

5,7			

For a digit greatest then 5000 Thousand Place filled in 2 ways and remaining three place be filled in 5 ways

No. 40. can be formed = $2\times5\times5\times5=250$

ATQ

Thousand	**H**	**T**	**U**
5,7			0,5

If no. is divisible by 5

Unit place filled in 2 ways and thousand place also by 2 ways (5, 7)

No. formed $=2\times5\times5\times2=100$

Req. prob. $=\frac{100}{250}=\frac{2}{5}$

(ii) Digit not repeated

Thousand	**H**	**T**	**U**
5,7			

Thousand place filled in 2 ways

4 digit no. greater than 5 thousand $=2\times4\times3\times2=48$

Thousand	**H**	**T**	**U**
5			0
7			5,0

Favorable case $=1\times3\times2\times2 \quad + \quad 1\times3\times2\times1$

7 at thousand place 5 at thousand places

$=12+6$

$=18$

Req. prob. $= \frac{18}{48} = \frac{3}{8}$

3.20 cards are numbered from 1 to 20. One card is drawn at random what is the prob. that the no. on the card drawn is

(i) A prime no. (ii) An odd no. (iii) A multiple of 5 (iv) Not divisible by 3.

Ans. Let S be the sample space

S={1,2,3,4,5,.....20}

Let E_1, E_2 and E_3, E_4 are the event of getting prime no., an odd no, multiple of 5 and not divisible by 3 respectively

$$P(E_1) = \frac{8}{20} = \frac{2}{5},\ E_1 = \{2,3,5,7,11,13,17,19\}$$

$$P(E_2) = \frac{10}{20} = \frac{1}{2},\ E_2 = \{1,3,5,7,9,11,13,15,17,19\}$$

$$P(E_3) = \frac{4}{20} = \frac{1}{5},\ E_3 = \{5,10,15,20\}$$

$$P(E_4) = \frac{14}{20} = \frac{7}{10},\ E_4 = \{1,2,4,5,7,8,10,11,13,14,16,17,19,20\}$$

4.In a single throw of three dice, find the prob. of getting

(i) A total of 5 (ii) A total of at most 5.

Ans. Let S be the sample space E_1 be the event of total of 5.

(i) $E_1 = \{(1,1,3),(1,3,1),(3,1,1),(1,2,2),(2,1,2),(2,2,1)\}$

$S = 6 \times 6 \times 6 = 216$

$$P(E_1) = \frac{n(E_1)}{n(S)} = \frac{6}{216} = \frac{1}{26}$$

(ii)

$$E_2 = \{(1,1,1),(1,1,2),(1,2,1),(2,1,1),(1,1,3),(1,3,1),(3,1,1),(1,2,2),(2,1,2),(2,2,1)\}$$

$$P(E_2) = \frac{10}{216} = \frac{5}{108}$$