CHAPTER-16

PROBABILITY

05 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	In a class of 60 students, 30 opted for NCC ,32 opted for NSS and 24 opted for both. If one student is selected at random, find the probability that i. The student opted for NCC or NSS ii. The student neither opted for NCC nor NSS iii. The student has opted for NSS but not NCC	**5**
2.	A fair coin is tossed four times, and a person win Rs. 1 for each head and lose Rs. 1.50 for each tail that turns up. From the sample space calculate how many different amount of money a person can have after four tosses and the probability of having each of these amounts.	**5**
3.	A team of medical students doing their internship have to assist during surgeries at a city hospital. The probabilities of surgeries rated as very complex, complex, routine, simple or very simple are respectively, 0.15, 0.20, 0.31, 0.26, .08. Find the probabilities that a particular surgery will be rated. (a) complex or very complex; (b) neither very complex nor very simple; (c) routine or complex (d) routine or simple	5
4.	On her vacations Neha visits four cities (A, B, C and D) in a random order. What is the probability that she visits? (i) A first and B last ? (ii) A before B and B before C ? (iii) A before B ? (iv) A just before B ? (v) A either first or second	5
5.	Rashmita is fond of travelling and want to explore whole India in minimum time. But she is a teacher. She never do academic loss of her students. In 2023, during summer vacations, Rashmita visits four cities Agra, Bombay, Chennai and Dehradun in a random order. What is the probability that she visits (i) Agra before Bombay (ii) Agra before Bombay and Bombay before Chennai. (iii) Agra first and Bombay last (iv) Agra either first or second (v) Agra just before Bombay.	5

		
6.	An urn contains twenty white slips of paper numbered from 1 to 20, ten red slips of paper numbered from 1 through 10, forty yellow slips of paper numbered from 1 through 40 and ten blue slips of paper numbered from 1 to 10. If these 80 slips of paper are thoroughly shuffled so that each slip has the same probability of being drawn. Find the probabilities of drawing a slip of paper that is (a) blue or white (b) numbered 1, 2, 3, 4, 5 (c) red or yellow numbered 1, 2, 3 or 4 (d) numbered 5, 15, 25 or 35 (e) white and numbered higher than 12 OR yellow and numbered higher than 26.	5
7.	Four persons are to be chosen at random from a group of 3 men ,2 women and four children. Find the probability of selecting. (i) 1 man,1woman and 2 children (ii) exactly2 children (iii) 2 woman	2+2+1
8.	A fair coin is tossed 4 times, and a person win Re 1 for each head and lose Rs,1.50 for each tail that turn up. From the sample space calculate how many different amounts of money you can have after four tosses and the probability of having each of these amounts	5
9.	If six boys and six girls sit in a row randomly. Find the probability that (i)All girls are together. (ii)All the girls are never together. (iii)All girls sit together but either side of the corner. (iv)boys and girls sit alternately. (v)A particular boy B_1 sits with a particular girl G_1 .	5
10.	Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is (i) an odd number (ii) a perfect square number (iii) divisible by 5 (iv) a prime number less than 20 v) a number divisible by 2 and 3	5

ANSWERS:

Q. NO	ANSWER	MARKS
1.	Let A represent students opted for NCC and B represents that a student opted for NSS $n(A) = 30, n(B) = 32, n(A \cap B) = 24 \;\; n(S) = 60$ i. $P(A \; or \; B) = P(A) + P(B) - P(A \cap B) = \frac{19}{30}$ ii. $P(\; neither \; NCC \; nor \; NSS) = 1 - P(A \; or \; B)$ $=1 - \frac{19}{30} = \frac{11}{30}$ iii. $P(only \; B) = P(B) - P(A \cap B) = \frac{32}{60} - \frac{24}{60} = \frac{8}{60}$	5
2.	4 heads won= 1+1+1+1=4 3heads & 1 tail won=1+1+1-1.5=1.5 2 heads & 2 tails lose=1+1-1.5-1.5=-1 1 head & 3 tails lose = 1-1.5-1.5-1.5=-3.5 4 tails lose= -6 $P(Rs.4 \; gain) = \frac{1}{16} \quad , P(gain \; Rs.1.5) = \frac{4}{16}$ $P(Rs.1 \; loss) = \frac{6}{16} \quad , P(Rs.3.5 \; loss) = \frac{4}{16}$ $P(Rs.6 \; loss) = \frac{1}{16}$	5
3.	(a) P(complex) + P(very complex) = 0.20 + 0.15 = 0.35 (b) 1 - (P(very complex) + P(very simple)) = 1 - (0.15 + 0.08) = 0.77. (c) P(routine) + P(complex) = 0.31 + 0.20 = 0.51. (d)P(routine) + P(simple) = 0.31 + 0.26 = 0.57.	5
4.	(i) The probability that Neha visits city A first and city B last =P(A first) * P (B last) = 1/4 * 1/4 = 1/16. (ii)P(A before B) * P(B before C). = 1/2 × ½ = ¼. (iii) The probability that Neha visits city A before city B can be calculated by considering the two possible orders: AB or BA. Each order is equally likely, so	5

	the probability is ½. (iv) The probability that Neha visits city A just before city B is the same as the probability that she visits city A before city B, which is ½. (v) The probability that Neha visits city A either first or second can be calculated by considering the possible orders: AB, AC, AD, BA, CA, DA. Out of these, 2 orders have city A either first or second (AB and AC). So, the probability is 2/6 = ⅓.	
5.	The number of arrangements (order) in which Rashmita can visit four cities A (Agra), B(Bombay), C (Chennai), D (Daulatpur) is 4! = 24 Since the number of elements in sample space of the experiment is 24 all of these outcomes are considered to be equally likely. A sample space for the experiment is S = {ABCD, ABDC, ACBD, ACDB, ADBC, ADCB, BACD, BADC, BDAC, BDCA, BCAD, BCDA, CABD, CADB, CBDA, CBAD, CDAB, CDBA, DABC, DACB, DBCA, DBAC, DCAB, DCBA} **(i)** Let the event 'she visits A (Agra) before B (Bombay)' be donated by E such that E = {ABCD, CABD, DABC, ABDC, CADB, DACB, ACBD, ACDB, ADBC, CDAB, DCAB, ADCB} P(E) = 12/24 = 1/2 **(ii)** Let the event 'She visits A (Agra) before B (Bombay) and B (Bombay) before C (Chennai)' be donated by F such that F = {ABCD, DABC, ABDC, ADBC} So, P(F) = 04/24 = 1/6 **(iii)** Let the event 'She visits A (Agra) first and B (Bombay) last' be denoted by G such that G = {ACDB, ADCB} P(G) = 2/24 = 1/12 **(iv)** Let the event 'She visits A (Agra) either first or second' be denoted by H such that H = { ABCD, ABDC, ACBD, ACDB, ADBC, ADCB, BACD, BADC, CABD, CADB, DABC, DACB} P(H) = 12/24 = 1/2 **(v)** Let the event 'She visits Agra just before Bombay' be denoted by K such that K ={ABCD, ABDC, CABD, DABC, CDAB, DCAB} P(K) = 06/24 = 1/4	5
6.	$(i)\frac{3}{8}$ $(ii)\frac{1}{4}$ $(iii)\frac{1}{10}$ $(iv)\frac{1}{10}$ $(v)\frac{11}{40}$	5
7.	There Are 9 persons viz, 3men 2 women and 4 children. Out of these 9 persons 4 persons can be selected in $^9C_4$= 126 ways Therefore, total number of elementary events = 126 (i) 1 man, 1 woman and 2 children can be selected in $^3C_1 \times ^2C_1 \times ^4C_2$=36 ways Therefore, favourable number of elementary events = 36 So required probability = 36/126= 2/7 (ii) Exactly two children mean: 2 children out of 4 children and 2 persons out of 5 persons consisting of 3 men and 2 women. This can be done in $^4C_2 \times ^5C_2$ ways Favourable number of elementary events = $^4C_2 \times ^5C_2$ =60 So required probability = 60/126= 10/21	

	(iii) We have to select 4 persons of which 2 are women and the remaining are chosen from 7 persons consisting of three men and 4 children. This can be done in ${}^{2}C_{2} \times {}^{7}C_{2} = 21$ ways So required probability = 21/126 = 1/6	
8.	Rs 4.00 gains, rs 1.50 gain, re 1 loss, rs 3.50 loss, rs 6 loss. P(winning rs 4.00)= 1/16 P(winning rs 1.50)=1/4 P(winning rs 1.00)=3/8 P(winning rs 3.50)=1/4 P(winning rs 6.00)=1/16	
9.	(i) Req. prob =1/132 (ii) Req. prob =131/132 (iii) Req. prob = 2 x6! x 6!/12! (iv) Req. prob = 2 x6! x 6!/12! (v) Req. prob = 1/6	5
10.	i) Odd numbers from 11 to 60=11, 13, 15... 59 No. of favourable outcomes=25 Total no. of possible outcomes =50 Probability= 25/50=1/2 ii) Perfect square numbers from 11 to 60=16,25,36,49 No. of favourable outcomes=4 Probability= 4/50=2/25 iii) Numbers divisible by 5 from 11 to 60=15,20,25,30,35,40,45,50,55,60 No. of favourable outcomes=10 Probability=10/50=1/5 iv) Prime numbers less than 20 from 11 to 60=11,13,17,19 No. of favorable outcomes=4 Total no. of possible outcomes =50 Probability=4/50=2/25 v)Numbers divisible by 2 and 3 are 6,12,18,24,30,36,42,48,54,60=10 Probability=10/50=1/5	5