CHAPTER-16

PROBABILITY

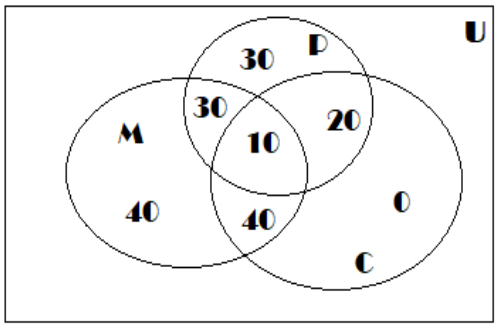
04 MARK TYPE QUESTIONS

Q. NO	**QUESTION**	**MARK**
1.	In a survey of 200 students it was found that 120 had got grade 'A' in Mathematics, 90 got grade 'A' in physics and 70 had got 'A' in Chemistry, 50 had got grade 'A' in mathematics and Chemistry, 40 had got 'A' in mathematics and Physics,30 had got grade 'A' in physics and chemistry and 10 got grade 'A' in all three subjects. One student is chosen randomly as a class representative. On the basis of above answer the following i. The probability that the chosen class representative had got grade 'A' in at least one of the subject. ii. The probability that the chosen class representative had got grade 'A' in at least two of the subject.	**4**
2.	In a bulb manufacturing company 10 defective bulbs are packed in a box with 90 non-defective bulbs by mistake. It is not possible to differentiate defective and non-defective bulbs by looking them. So manager draws a sample of three bulbs by decide box will be approved for selling or not. He will approve the box if all the three are not defective. On the basis of above data answer the following: i. Find the probability that the box will be approved for selling ii. Find the probability that the box will not approved for selling.	**4**
3.	In a large metropolitan area, the probabilities are .87, .36, .30 that a family (randomly chosen for a sample survey) owns a colour television set, a black and white television set, or both kinds of sets. What is the probability that a family owns either anyone or both kinds of sets?	4
4.	If A and B are mutually exclusive events, P (A) = 0.35 and P (B) = 0.45, find (a) P (A′) (b) P (B′) (c) P (A ∪ B) (d) P (A ∩ B) (e) P (A ∩ B′	4
5.	Rajesh asked his son 'Mrinal' to form a 4-digits number using 0, 1, 3, 5 and 7. At the same time, Mrinal's mother asked him to do same work but number should be greater than 5000. Mrinal's brother Srikant want to select a number which is divisible by 5. Based upon the information given as above, find the probability that (i) the digits are repeated in that number selected by Srikant. (ii) the digits are distinct in that number selected by Srikant.	4

		
6.	Four friends Liya, Maria, Kavya and Taniya shares every thing of their life among them. A true friendship lies among them. One interesting thing is there that all the four friends have their same birthday. Ignoring the existence of a leap year, what is the probability that (i) No two of them have their birthday on same day. (ii) All of them have same birthday. 	4
7.	In a survey of 200 students it was found that 120 had got grade 'A' in Mathematics,90 has got 'A' grade in Physics and 70 has got grade 'A' in chemistry,40 had got 'A' grade in Mathematics and Physics,30 had got 'A' grade in Physics and Chemistry and 10 had got A grade in all the three subjects, one student is chosen randomly as a class representative, on the basis of above answer the following. (i)The probability that the chosen class representative had got grade'A' in at least one of the subject is (a)1 (b) 7/20 (c) 17/20 (d) 3/5. (ii) The probability thatthe chosen class representative had got 'A' in at lest two of the subjects is (a) 1/2(b) 9/20 (c) 2/3 (d) 7/20 (i) The probability that the chosen representative had got 'A' grade in Mathematics and Chemistry is (a) 7/10 (b) 3/5 (c) 1/8 (d) 17/20 (ii) The probability of choosing a student who had got grade A only in Chemistry is (a) 1/20 (b) 0 (c) 7/20 d) 3/20	4
8.	Four friends Sheetal,Seema,Shalini and Preeti tossed three coins and reports their result as following A,B,C and D respectively Sheetal(A)=got exactly two head Seema (B)= got at least two head Shalini (C) =got at most two head Preeti (D) = got exactly three head. On the basis of above answer the following (i) Which of the following events are mutually exclusive and exhaustive?	4

	A and B (b) B and C (c) C and D (d) A and D (ii) Which of the following events are exhaustive? (a) A and B (b) B and C (c) C and D (d) A and D (iii) The probability of event A is (a) 2/3 (b) 3/8 (c) 1/3 (d) ½ (iv) The probability of event D is same as the probability of event (i)not C (ii) not A (iii) not B (iv) B	
9.	There was a quarrel among Bidu, Jadu and Madhu to get first chance in a game. Mr. bean came and says let us solve this problem easily by tossing two coins. If both heads appear, Bidu will take first chance. If both Tails appear 'Jadu' will get it & if one head & one tail, 'Madhu' will get the first chance.  (i) What is the probability of 'Bidu' getting the first chance? (ii) What is the probability of 'Jadu' getting the first chance? (iii) What is the probability of 'Madhu' getting the first chance? (iv)What is the probability of getting at least one head?	4
10.	A Bag contains twenty white slips of paper numbered from 1 through 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 through 10.The 80 slips of paper thoroughly shuffled so that each slip has the equal chance of being drawn. A slip is drawn at random from the bag. Now answer the followings: (i)The probability that slip drawn is blue or white a)1/4 b)3/8 c)1/2 d)5/8 (ii) The probability that slip drawn is numbered 1,2,3,4 or 5 a)1/4 b)3/8 c)1/2 d)5/8 (iii) The probability that slip drawn is red or yellow and numbered 1,2,3,or 4 is a)1/5 b)1/10 c)2/5 d)3/10 (iv) The probability that slip drawn is numbered 5,15,25 or 35 is a)3/10 b)1/5 c)1/10 d)2/5	4

ANSWERS:

Q. NO	ANSWER	MARKS
1.	 Total students=200 i. No. of students who got grade 'A' in at least one subject =40+30+10+40+20+30=170 Probability =$\frac{170}{200}$ ii. No. of students who got grade 'A' in at least two subject =40+30+10+20=100 Probability =$\frac{100}{200} = \frac{1}{2}$	4
2.	i. $\frac{c_3^{90}}{c_3^{100}} = \frac{178}{245}$ ii. $\frac{c_3^{10}}{c_3^{100}} = \frac{67}{245}$	4
3.	E1 = Event that a family owns colour television E2 = Event that the family owns black and white television Given that P (E1) = 0.87 P (E2) = 0.36 and P (E1 ∩ E2) = 0.30 Now, we have to find the probability that a family owns either anyone or both kinds of sets. By General Addition Rule, we have P (A ∪ B) = P(A) + P(B) – P (A ∩ B) ∴ P (E1∪ E2) = P (E1) + P (E2) – P (E1∩ E2) = 0.87 + 0.36 – 0.30 = 1.23 – 0.30 = 0.93 Hence, the required probability is 0.93	4

4.	(a) Probability of the complement of event A (A'), is P(A') = 1 - P(A) = 1 - 0.35 = 0.65. (b) To find the probability of the complement of event B (B'): P(B') = 1 - P(B) = 1 - 0.45 = 0.55. (c) The probability of the union of events A and B (A ∪ B) is the sum of their individual probabilities minus the probability of their intersection (since they are mutually exclusive): P(A ∪ B) = P(A) + P(B) - P(A ∩ B) = 0.35 + 0.45 - 0 = 0.80. (d)Since A and B are mutually exclusive, their intersection is empty: P(A ∩ B) = 0. (e) P(A ∩ B') = P(A) * P(B') = 0.35 * 0.55 = 0.1925	4
5.	**(i): When the digits are repeated** Using the digits 0, 1, 3, 5, 7 a four digit number greater than 5000, can be made by using 5 or 7 at leftmost place. The remaining 3 places can be filled by any of the digits 0, 1, 3, 5,7 as repetition of digits is allowed. So, total number of 4-digits number greater than 5000 $= (2 \times 5 \times 5 \times 5) - 1 = 250 - 1 = 249$ (1 is subtracted because 5000 can not be counted) A number is divisible by 5 if unit place is 0 or 5. So, 4-digits number greater than 5000, divisible by 5 are $= (2 \times 5 \times 5 \times 2) - 1 = 100 - 1 = 99$ So, probability of required event = 99/249 **(i): When the digits are not repeated** The thousand's place can be filled by 5 or 7. The remaining 3 places can be filled by any of the remaining 4 digits. Total number of 4-digits number greater than 5000 are = $2 \times 4 \times 3 \times 2 = 48$ When the thousand's place digit is 5 then unit place can be filled by 0 only. Remaining ten's and hundred's places can be filled by any two out of 3 remaining digits. Hence number of 4-digits numbers starting with 5 and divisible by 5 are $3 \times 2 = 6$ When the thousand's place digit is 7 then unit place can be filled by 0 or 5. Remaining ten's and hundred's places can be filled by any two out of 3 remaining digits. Hence number of 4-digits numbers starting with 7 and divisible by 5 are $1 \times 2 \times 3 \times 2 = 12$ So, probability of required event = (6+12)/48 = 18/48	4
6.	Let us number the days of the year from 1 to 365. The first person can have his birthday on any of 365 days. The second person can have his birthday on any of 365 days. And so on. Thus the total number of ways of choosing the birthday for the four persons is 365 x 365 x 365 x 365 = $(365)^4$ **(i)** Since, no two persons have their birthday on the same day, then for the first person we have 365 choices. For the second we have 364 choices, for the third we have 363 choices and for the fourth person we have 362 choices. Thus, the number of ways in which all the four persons have their birthdays on different days in 365 x 364 x 363 x 362. Thus P(distinct birthday) = $\frac{(365 \times 364 \times 363 \times 362)}{365 \times 365 \times 365 \times 365}$ **(ii)** If all the four persons have to have their birthday on the same day, then we have to choose just one day out of 365 and this can be done in 365 ways. Thus,	4

	P(all the birthdays on the same day) = $\frac{365}{365^4} = \frac{1}{365^3}$	
7.	(i) (C)17/20 (ii) (a) ½ (iii) (a) 7/10 (iv) (b)0	
8.	(i) (d)A and D (ii) (c) C and D (iii) (b) 3/8 (iv) (i)not C	
9.	No. of all possible outcome = $\frac{\text{No.of favourable outcome}}{\text{No of all possible outcome}}$ i)1/4 ii) ¼ iii)1/2 (iv) 3/4	4
10.	i) 3/8 ii)1/4 iii) 1/10 iv)1/10	4