Chapter - 15

ASSIGNMENT

1. If $P(A_1 \cup A_2) = 1 - P(A_1^c)P(A_2^c)$ where c stands for complement, then the events A_1 and A_2 are

(a) Mutually exclusive (b) Independent
(c) Equally likely (d) None of these

2. Two fair dice are tossed. Let A be the event that the first die shows an even number and B be the event that the second die shows an odd number. The two event A and B are

(a) Mutually exclusive
(b) Independent and mutually exclusive
(c) Dependent
(d) None of these

3. If $P(A) = 2/3$, $P(B) = 1/2$ and $P(A \cup B) = 5/6$ then events A and B are **[Kerala (Engg.) 2002]**

(a) Mutually exclusive
(b) Independent as well as mutually exhaustive
(c) Independent
(d) Dependent only on A

4. Two card are drawn successively with replacement from a pack of 52 cards. The probability of drawing two aces is

(a) $\frac{1}{169}$ (b) $\frac{1}{221}$
(c) $\frac{1}{2652}$ (d) $\frac{4}{663}$

5. In a single throw of two dice, the probability of getting more than 7 is **ET 1991]**

(a) $\frac{7}{36}$ (b) $\frac{7}{12}$
(c) $\frac{5}{12}$ (d) $\frac{5}{36}$

5. If two balanced dice are tossed once, the probability of the event, that the sum of the integers coming on the upper sides of the two dice is 9, is **[MP PET 1987]**

(a) $\frac{7}{18}$ (b) $\frac{5}{36}$
(c) $\frac{1}{9}$ (d) $\frac{1}{6}$

6. A single letter is selected at random from the word "PROBABILITY". The probability that the selected letter is a vowel is

(a) $\frac{2}{11}$ (b) $\frac{3}{11}$
(c) $\frac{4}{11}$ (d) 0

7. There are n letters and n addressed envelopes. The probability that all the letters are not kept in the right envelope, is

(a) $\frac{1}{n!}$ (b) $1 - \frac{1}{n!}$
(c) $1 - \frac{1}{n}$ (d) None of these

8. From a book containing 100 pages, one page is selected randomly. The probability that the sum of the digits of the page number of the selected page is 11, is

(a) $\frac{2}{25}$ (b) $\frac{9}{100}$

(c) $\frac{11}{100}$ (d) None of these

9. There are two childrens in a family. The probability that both of them are boys is

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$

(c) $\frac{1}{4}$ (d) None of these

10. Two cards are drawn one by one at random from a pack of 52 cards. The probability that both of them are king, is

(a) $\frac{2}{13}$ (b) $\frac{1}{169}$

(c) $\frac{1}{221}$ (d) $\frac{30}{221}$

11. Two dice are thrown simultaneously. The probability of getting the sum 2 or 8 or 12 is

(a) $\frac{5}{18}$ (b) $\frac{7}{36}$

(c) $\frac{7}{18}$ (d) $\frac{5}{36}$

12. A box contains 6 nails and 10 nuts. Half of the nails and half of the nuts are rusted. If one item is chosen at random, what is the probability that it is rusted or is a nail

(a) $\frac{3}{16}$ (b) $\frac{5}{16}$

(c) $\frac{11}{16}$ (d) $\frac{14}{16}$

13. Three letters are to be sent to different persons and addresses on the three envelopes are also written. Without looking at the addresses, the probability that the letters go into the right envelope is equal to

(a) $\frac{1}{27}$ (b) $\frac{1}{9}$

(c) $\frac{4}{27}$ (d) $\frac{1}{6}$

14. Two dice are thrown. The probability that the sum of numbers appearing is more than 10, is

(a) $\frac{1}{18}$ (b) $\frac{1}{12}$

(c) $\frac{1}{6}$ (d) None of these

15. From 10,000 lottery tickets numbered from 1 to 10,000, one ticket is drawn at random. What is the probability that the number marked on the drawn ticket is divisible by 20

(a) $\frac{1}{100}$ (b) $\frac{1}{50}$

(c) $\frac{1}{20}$ (d) $\frac{1}{10}$

16. A card is drawn from a well shuffled pack of cards. The probability of getting a queen of club or king of heart is

(a) $\frac{1}{52}$ (b) $\frac{1}{26}$

(c) $\frac{1}{18}$ (d) None of these

17. A bag contains 4 white, 5 black and 6 red balls. If a ball is drawn at random, then what is the probability that the drawn ball is either white or red

(a) $\frac{4}{15}$ (b) $\frac{1}{2}$

(c) $\frac{2}{5}$ (d) $\frac{2}{3}$

18. A card is drawn at random from a pack of cards. What is the probability that the drawn card is neither a heart nor a king

(a) $\frac{4}{13}$ (b) $\frac{9}{13}$

(c) $\frac{1}{4}$ (d) $\frac{13}{26}$

19. Three dice are thrown simultaneously. What is the probability of obtaining a total of 17 or 18

(a) $\frac{1}{9}$ (b) $\frac{1}{72}$

(c) $\frac{1}{54}$ (d) None of these

20. From the word `POSSESSIVE', a letter is chosen at random. The probability of it to be *S* is **[SCRA 1987]**

(a) $\frac{3}{10}$ (b) $\frac{4}{10}$

(c) $\frac{3}{6}$ (d) $\frac{4}{6}$

21. A box contains 10 good articles and 6 with defects. One article is chosen at random. What is the probability that it is either good or has a defect **[MP PET 1992, 2000]**

(a) $\frac{24}{64}$ (b) $\frac{40}{64}$

(c) $\frac{49}{64}$ (d) $\frac{64}{64}$

22. There are 4 envelopes with addresses and 4 concerning letters. The probability that letter does not go into concerning proper envelope, is

or

There are four letters and four addressed envelopes. The chance that all letters are not despatched in the right envelope is

(a) $\frac{19}{24}$ (b) $\frac{21}{23}$

(c) $\frac{23}{24}$ (d) $\frac{1}{24}$

23. If $P(A) = 0.65,\ P(B) = 0.15,$ then $P(\overline{A}) + P(\overline{B}) =$

(a) 1.5 (b) 1.2

(c) 0.8 (d) None of these

24. For any two independent events E_1 and E_2, $P\{(E_1 \cup E_2) \cap (\overline{E}_1 \cap \overline{E}_2)\}$ is

(a) $< \frac{1}{4}$ (b) $> \frac{1}{4}$

(c) $\geq \frac{1}{2}$ (d) None of these

25. For independent events $A_1, A_2, \ldots\ldots\ldots, A_n$, $P(A_i) = \frac{1}{i+1}$, $i = 1, 2, \ldots\ldots, n$. Then the probability that none of the event will occur, is

(a) $\frac{n}{n+1}$ (b) $\frac{n-1}{n+1}$

(c) $\frac{1}{n+1}$ (d) None of these

26. '*A*' draws two cards with replacement from a pack of 52 cards and '*B*' throws a pair of dice what is the chance that '*A*' gets both cards of same suit and '*B*' gets total of 6

(a) $\frac{1}{144}$ (b) $\frac{1}{4}$

(c) $\frac{5}{144}$ (d) $\frac{7}{144}$

27. A box contains 2 black, 4 white and 3 red balls. One ball is drawn at random from the box and kept aside. From the remaining balls in the box, another ball is drawn at random and kept aside the first. This process is repeated till all the balls are drawn from the box. The probability that the balls drawn are in the sequence of 2 black, 4 white and 3 red is

(a) $\frac{1}{1260}$ (b) $\frac{1}{7560}$

(c) $\frac{1}{126}$ (d) None of these

28. The probability that a teacher will give an unannounced test during any class meeting is 1/5. If a student is absent twice, then the probability that the student will miss at least one test is

(a) $\frac{4}{5}$ (b) $\frac{2}{5}$

(c) $\frac{7}{5}$ (d) $\frac{9}{25}$

29. The chance of India winning toss is 3/4. If it wins the toss, then its chance of victory is 4/5 otherwise it is only 1/2. Then chance of India's victory is **[Kurukshetra CEE 1998]**

(a) $\frac{1}{5}$ (b) $\frac{3}{5}$

(c) $\frac{3}{40}$ (d) $\frac{29}{40}$

30. The corners of regular tetrahedrons are numbered 1, 2, 3, 4. Three tetrahedrons are tossed. The probability that the sum of upward corners will be 5 is **[AMU 1999]**

(a) $\frac{5}{24}$ (b) $\frac{5}{64}$

(c) $\frac{3}{32}$ (d) $\frac{3}{16}$

31. A binary number is made up of 16 bits. The probability of an incorrect bit appearing is p and the errors in different bits are independent of one another. The probability of forming an incorrect number is **[AMU 1999]**

(a) $\frac{p}{16}$ (b) p^{16}

(c) ${}^{16}C_1 p^{16}$ (d) $1-(1-p)^{16}$

32. If any four numbers are selected and they are multiplied, then the probability that the last digit will be 1, 3, 5 or 7 is

(a) $\frac{4}{625}$ (b) $\frac{18}{625}$

(c) $\frac{16}{625}$ (d) None of these

33. Suppose that a die (with faces marked 1 to 6) is loaded in such a manner that for K = 1, 2, 3...., 6, the probability of the face marked K turning up when die is tossed is proportional to K. The probability of the event that the outcome of a toss of the die will be an even number is equal to **[AMU 2000]**

(a) $\frac{1}{2}$ (b) $\frac{4}{7}$

(c) $\frac{2}{5}$ (d) $\frac{1}{21}$

34. A problem in Mathematics is given to three students A, B, C and their respective probability of solving the problem is 1/2, 1/3 and 1/4. Probability that the problem is solved is

(a) $\frac{3}{4}$ (b) $\frac{1}{2}$

(c) $\frac{2}{3}$ (d) $\frac{1}{3}$

35. The probability that A speaks truth is $\frac{4}{5}$, while this probability for B is $\frac{3}{4}$. The probability that they contradict each other when asked to speak on a fact

(a) $\frac{4}{5}$ (b) $\frac{1}{5}$

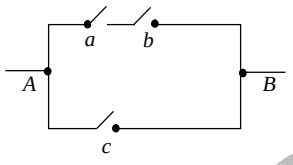
(c) $\frac{7}{20}$ (d) $\frac{3}{20}$

36. A and B are two independent events such that $P(A) = 1/2$ and $P(B) = 1/3$. Then P (neither A nor B) is equal to **[J & K 2005]**

(a) 2/3 (b) 1/6

(c) 5/6 (d) 1/3

37. Consider the circuit,



If the probability that each switch is closed is p, then find the probability of current flowing through AB **[DCE 2005]**

(a) $p^2 + p$ (b) $p^3 + p - 1$

(c) $p^3 + p$ (d)

38. From a class of 12 girls and 18 boys, two students are chosen randomly. What is the probability that both of them are girls

(a) $\frac{22}{145}$ (b) $\frac{13}{15}$

(c) $\frac{1}{18}$ (d) None of these

39. A word consists of 11 letters in which there are 7 consonants and 4 vowels. If 2 letters are chosen at random, then the probability that all of them are consonants, is

(a) $\frac{5}{11}$ (b) $\frac{21}{55}$

(c) $\frac{4}{11}$ (d) None of these

40. Twenty tickets are marked the numbers 1, 2, ... 20. If three tickets be drawn at random, then what is the probability that those marked 7 and 11 are among them

(a) $\frac{3}{190}$ (b) $\frac{1}{19}$

(c) $\frac{1}{190}$ (d) None of these

41. If Mohan has 3 tickets of a lottery containing 3 prizes and 9 blanks, then his chance of winning prize are

(a) $\frac{34}{55}$ (b) $\frac{21}{55}$

(c) $\frac{17}{55}$ (d) None of these

42. A committee of five is to be chosen from a group of 9 people. The probability that a certain married couple will either serve together or not at all, is

(a) $\frac{1}{2}$ (b) $\frac{5}{9}$

(c) $\frac{4}{9}$ (d) $\frac{2}{9}$

43. The letter of the word `ASSASSIN' are written down at random in a row. The probability that no two *S* occur together is

(a) $\frac{1}{35}$ (b) $\frac{1}{14}$

(c) $\frac{1}{15}$ (d) None of these

44. The probability of getting 4 heads in 8 throws of a coin, is

(a) $\frac{1}{2}$ (b) $\frac{1}{64}$

(c) $\frac{{}^8C_4}{8}$ (d) $\frac{{}^8C_4}{2^8}$

45. In a lottery 50 tickets are sold in which 14 are of prize. A man bought 2 tickets, then the probability that the man win the prize, is

(a) $\frac{17}{35}$ (b) $\frac{18}{35}$

(c) $\frac{72}{175}$ (d) $\frac{13}{175}$

46. Two persons each make a single throw with a die. The probability they get equal value is p_1. Four persons each make a single throw and probability of three being equal is p_2, then

(a) $p_1 = p_2$ (b) $p_1 < p_2$

(c) $p_1 > p_2$ (d) None of these

47. *n* cadets have to stand in a row. If all possible permutations are equally likely, then the probability that two particular cadets stand side by side, is

(a) $\frac{2}{n}$ (b) $\frac{1}{n}$

(c) $\frac{2}{(n-1)!}$ (d) None of these

48. There are 5 volumes of Mathematics among 25 books. They are arranged on a shelf in random order. The probability that the volumes of Mathematics stand in increasing order from left to right (the volumes are not necessarily kept side by side) is

(a) $\frac{1}{5!}$ (b) $\frac{50!}{55!}$

(c) $\frac{1}{50^5}$ (d) None of these

49. A cricket team has 15 members, of whom only 5 can bowl. If the names of the 15 members are put into a hat and 11 drawn at random, then the chance of obtaining an eleven containing at least 3 bowlers is

(a) $\frac{7}{13}$ (b) $\frac{11}{15}$

(c) $\frac{12}{13}$ (d) None of these

50. A bag has 13 red, 14 green and 15 black balls. The probability of getting exactly 2 blacks on pulling out 4 balls is P_1. Now the number of each colour ball is doubled and 8 balls are pulled out. The probability of getting exactly 4 blacks is P_2. Then

(a) $P_1 = P_2$ (b) $P_1 > P_2$

(c) $P_1 < P_2$ (d) None of these

51. If a committee of 3 is to be chosen from a group of 38 people of which you are a member. What is the probability that you will be on the committee **[AMU 2000]**

(a) $\binom{38}{3}$ (b) $\binom{37}{2}$

(c) $\binom{37}{2} \Big/ \binom{38}{3}$ (d) $\frac{666}{8436}$

52. Four boys and three girls stand in a queue for an interview, probability that they will in alternate position is

(a) $\frac{1}{34}$ (b) $\frac{1}{35}$

(c) $\frac{1}{17}$ (d) $\frac{1}{68}$

53. In a lottery there were 90 tickets numbered 1 to 90. Five tickets were drawn at random. The probability that two of the tickets drawn numbers 15 and 89 is

(a) $\frac{2}{801}$ (b) $\frac{2}{623}$

(c) $\frac{1}{267}$ (d) $\frac{1}{623}$

54. Two numbers are selected randomly from the set $S = \{1, 2, 3, 4, 5, 6\}$ without replacement one by one. The probability that minimum of the two numbers is less than 4 is **[IIT Screening 2003]**

(a) $\frac{1}{15}$ (b) $\frac{14}{15}$

(c) $\frac{1}{5}$ (d) $\frac{4}{5}$

55. A bag contains 6 white, 7 red and 5 black balls. If 3 balls are drawn from the bag at random, then the probability that all of them are white is

(a) $\frac{20}{204}$ (b) $\frac{5}{204}$

(c) $\frac{1}{3}$ (d) None of these

56. A bag contains 4 white, 5 red and 6 green balls. Three balls are picked up randomly. The probability that a white, a red and a green ball is drawn is

(a) $\frac{15}{91}$ (b) $\frac{30}{91}$

(c) $\frac{20}{91}$ (d) $\frac{24}{91}$

57. Let A and B be two finite sets having m and n elements respectively such that $m \le n$. A mapping is selected at random from the set of all mappings from A to B. The probability that the mapping selected is an injection is

(a) $\frac{n!}{(n-m)!m^n}$ (b) $\frac{n!}{(n-m)!n^m}$

(c) $\frac{m!}{(n-m)!n^m}$ (d) $\frac{m!}{(n-m)!m^n}$

58. Suppose $n \ge 3$ persons are sitting in a row. Two of them are selected at random. The probability that they are not together is

(a) $1-\frac{2}{n}$ (b) $\frac{2}{n-1}$

(c) $1-\frac{1}{n}$ (d) None of these

59. If A and B are two events such that $P(A)=0.4$, $P(A+B)=0.7$ and $P(AB)=0.2,$ then $P(B)=$

(a) 0.1 (b) 0.3

(c) 0.5 (d) None of these

60. Suppose that A, B, C are events such that $P(A)=P(B)=P(C)=\frac{1}{4}, P(AB)=P(CB)=0, P(AC)=\frac{1}{8},$ then $P(A+B)=$

(a) 0.125 (b) 0.25

(c) 0.375 (d) 0.5