ABHINAV ACADEMY

UDUPI

CET25M13

Class 12 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 75**

1. If E_1 and E_2 are two independent events, then P $(E_1 \cap E_2)$ is equal to **[1]**

   a) $P(E_1) + P(E_2)$ b) $P(E_1) + P(E_2) + P(E_1 + \cup E_2)$

   c) $P(E_1)P(E_2)$ d) $P(E_1) - P(E_2)$

2. If A and B are such events that P(A) > 0 and P(B) $\neq$ 1, then P(A'/B') equals. **[1]**

   a) $\frac{1-P(A\cup B)}{P(B')}$ b) $P(A')/P(B')$

   c) $1 - P(A/B)$ d) $1 - P(A'/B)$

3. If A and B are independent events such that P(A) = $\frac{1}{5}$, P(A $\cup$ B) = $\frac{7}{10}$, then what is P$(\bar{B})$ equal to? **[1]**

   a) $\frac{3}{8}$ b) $\frac{7}{9}$

   c) $\frac{3}{7}$ d) $\frac{2}{7}$

4. If A and B are two independent events such that P(A) = 0.3, P(A $\cup$ B) = 0.5, then P(A / B) - P(B / A) = **[1]**

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

   c) $\frac{1}{70}$ d) $\frac{3}{35}$

5. If P(A) = $\frac{3}{5}$ and P(B) = $\frac{1}{5}$, find P (A $\cap$ B) if A and B are independent events. **[1]**

   a) $\frac{7}{25}$ b) $\frac{3}{25}$

   c) $\frac{4}{25}$ d) $\frac{8}{25}$

6. If A and B are events such that P(A|B) = P(B|A), then **[1]**

   a) A $\subset$ B but A $\neq$ B b) A = B

   c) A $\cap$ B = $\emptyset$ d) P(A) = P(B)

7. If E and F are independent, then _____ **[1]**

   a) P (E $\cap$ F) = P (E) P (E|F) b) P (E $\cap$ F) = P (E) P (F)

   c) P (E $\cap$ F) = P (E) P (F|E) d) P (E $\cap$ F) =P (E $\cup$ F)

8. A bag contains 5 red and 3 blue balls. If 3 balls are drawn at random without replacement the probability of getting exactly one red ball is **[1]**

   a) $\frac{45}{196}$ b) $\frac{15}{56}$

   c) $\frac{15}{29}$ d) $\frac{135}{392}$

9. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is **[1]**

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

c) $\frac{1}{9}$ d) $\frac{1}{3}$

10. Two independent events A and B have P(A) = $\frac{1}{3}$ and P(B) = $\frac{3}{4}$. What is the probability that exactly one of the two events A or B occurs? **[1]**

a) $\frac{5}{6}$ b) $\frac{7}{12}$

c) $\frac{1}{4}$ d) $\frac{5}{12}$

11. Two numbers are selected at random from integers 1 through 9. If the sum is even, what is the probability that both numbers are odd? **[1]**

a) $\frac{5}{8}$ b) $\frac{1}{6}$

c) $\frac{4}{9}$ d) $\frac{2}{3}$

12. If A and B are independent events such that P(A) = 0.4, P(B) = x and P(A $\cup$ B) = 0.5, then x = ? **[1]**

a) 0.1 b) $\frac{1}{6}$

c) $\frac{1}{8}$ d) $\frac{4}{5}$

13. If the probability for A to fail in an examination is 0.2 and that for B is 0.3, then the probability that either A fails or B fails is **[1]**

a) 0.08 b) 0.44

c) 0.5 d) 0.06

14. Let A and B be independent events with P (A) = 0.3 and P(B) = 0.4. Find P(B|A). **[1]**

a) 0.5 b) 0.4

c) 0.2 d) 0.3

15. Let A and B be two events such that P(A) = $\frac{3}{8}$, P(B) = $\frac{5}{8}$ and $\mathrm{P}(\mathrm{A} \cup \mathrm{B}) = \frac{3}{4}$. Then $P(A|B) \cdot P(A'/B)$is equal to **[1]**

a) $\frac{2}{5}$ b) $\frac{6}{25}$

c) $\frac{3}{10}$ d) $\frac{3}{8}$

16. Let A and B be two events. If P (A) = 0.2, P (B) = 0.4, P (A$\cup$B) = 0.6, then P (A|B) is equal to **[1]**

a) 0.5 b) 0.8

c) 0.3 d) 0

17. From each of the four married couples, one of the partners is selected at random. The probability that those selected are of the same sex is **[1]**

a) $\frac{1}{8}$ b) $\frac{1}{16}$

c) $\frac{1}{2}$ d) $\frac{1}{4}$

18. In a certain town, 40% persons have brown hair, 25% have brown eyes, and 15% have both. If a person selected at random has brown hair, the chance that a person selected at random with brown hair is with brown eyes **[1]**

a) $\frac{1}{3}$ b) $\frac{3}{20}$

c) $\frac{3}{8}$ d) $\frac{2}{3}$

19. If A and B are two independent events with P(A) = $\frac{1}{3}$ and P(B) = $\frac{1}{4}$, then P(B'|A) is equal to: **[1]**

a) $\frac{1}{3}$

b) $\frac{3}{4}$

c) $\frac{1}{4}$

d) 1

20. If $P(A) = \frac{1}{4}, P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{5}$, then $P(\bar{B}/\bar{A})$ = ? **[1]**

a) $\frac{37}{45}$

b) $\frac{11}{45}$

c) $\frac{11}{15}$

d) $\frac{37}{60}$

21. If two events are independent, then **[1]**

a) None of these

b) they must be mutually exclusive

c) they must be mutually exclusive and the sum of their probabilities must be equal to 1 both are correct

d) the sum of their probabilities must be equal to 1

22. If A and B are any two events such that P(A) + P(B) - P(A and B) = P(A), then **[1]**

a) P(B|A) = 1

b) P(A|B) = 1

c) P(B|A) = 0

d) P(A|B) = 0

23. If P(B) = $\frac{3}{5}$,$P(\frac{A}{B}) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$, then P(A ∪ B)′ + P(A′ ∪ B) = **[1]**

a) $\frac{1}{5}$

b) $\frac{4}{5}$

c) $\frac{1}{2}$

d) 1

24. Two events A and B will be independent, if **[1]**

a) A and B are mutually exclusive

b) P(A) + P(B) = 1

c) P(A′B′) = [1 – P(A)] [1 – P(B)]

d) P(A) = P(B)

25. An unbiased die is tossed twice. What is the probability of getting a 4, 5 or 6 on the first toss and a 1, 2, 3 or 4 on the second toss? **[1]**

a) $\frac{2}{3}$

b) $\frac{3}{4}$

c) $\frac{1}{3}$

d) $\frac{5}{6}$

26. Two cards are drawn from a well shuffled deck of 52 playing cards with replacement. The probability, that both cards are queens, is **[1]**

a) $\frac{1}{13} \times \frac{1}{13}$

b) $\frac{1}{13} \times \frac{4}{51}$

c) $\frac{1}{13} + \frac{1}{13}$

d) $\frac{1}{13} \times \frac{1}{17}$

27. A problem in Statistics is given to three students A, B and C whose chances of solving it independently are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$, respectively. The probability that the problem will be solved, is **[1]**

a) $\frac{3}{4}$

b) $\frac{1}{2}$

c) $\frac{11}{12}$

d) $\frac{1}{12}$

28. Let A and B be independent events with P(A) = 0.3 and P(B) = 0.4. Find P(A ∪ B). **[1]**

a) 0.62

b) 0.58

c) 0.51

d) 0.55

29. If E_1, E_2,.....,E_n are mutually exclusive and exhaustive events associated with a samplespace, and A is any event of non zero probability, then **[1]**

a) $P\left(E_i|A\right)=\frac{P(E_i)P(A|E_i)}{\sum_{i=1}^{n}P(E_i)P(A|E_i)}$

b) $P\left(E_i|A\right)=\frac{P(E_i)P(A|E_i)}{\sum_{i=1}^{n}P(E_{i-1})P(A|E_i)}$

c) $P\left(E_i|A\right)=\frac{P(E_i)P(E_i|A)}{\sum_{i=1}^{n}P(E_i)P(A|E_i)}$

d) $P\left(E_i|A\right)=\frac{P(E_i)P(A|E_i)}{\sum_{i=1}^{n}P(E_i)P(A|E_{i-2})}$

30. In answering a question on a multiple-choice test, a student either knows the answer or guesses. Let $\frac{3}{4}$ be the probability that he knows the answer and $\frac{1}{4}$ be the probability that he guesses. Assuming that a student who guesses at the answer will be correct with probability $\frac{1}{4}$. What is the probability that the student knows the answer given that he answered it correctly? **[1]**

a) $\frac{11}{13}$

b) $\frac{7}{13}$

c) $\frac{12}{13}$

d) $\frac{9}{13}$

31. A speaks truth in 75% cases and B speaks truth in 80% cases. Probability that they contradict each other in a statement, is **[1]**

a) $\frac{2}{5}$

b) $\frac{13}{20}$

c) $\frac{7}{20}$

d) $\frac{3}{5}$

32. A and B are two students. Their chances of solving a problem correctly are $\frac{1}{3}$ and $\frac{1}{4}$, respectively. If the probability of their making a common error is, $\frac{1}{20}$ and they obtain the same answer, then the probability of their answer to be correct is **[1]**

a) $\frac{1}{12}$

b) $\frac{1}{40}$

c) $\frac{10}{13}$

d) $\frac{13}{120}$

33. If A and B are two events such that $P(A)=\frac{4}{5}$, and $P(A\cap B)=\frac{7}{10}$, then P (B / A) = **[1]**

a) $\frac{1}{10}$

b) $\frac{17}{20}$

c) $\frac{7}{8}$

d) $\frac{1}{8}$

34. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probabilities of an accident involving a scooter driver, car driver, and truck driver are 0.01, 0.03, and 0.15, respectively. One of the insured persons meets with an accident. The probability that the person is a scooter driver, is **[1]**

a) $\frac{1}{52}$

b) $\frac{19}{52}$

c) $\frac{15}{52}$

d) $\frac{3}{52}$

35. The probabilities of A, B and C of solving a problem are $\frac{1}{6}$, $\frac{1}{5}$ and $\frac{1}{3}$ respectively. What is the probability that the problem is solved? **[1]**

a) $\frac{5}{9}$

b) $\frac{4}{9}$

c) $\frac{1}{3}$

d) $\frac{1}{7}$

36. If P(A) = 0.4, P(B) = 0.8 and P(B | A) = 0.6, then P(A ∪ B) is equal to **[1]**

a) 0.48

b) 0.96

c) 0.3

d) 0.24

37. A bag X contains 2 white and 3 black balls and another bag Y contains 4 white and 2 black balls. One bag is selected at random and a ball is drawn from it. Then, the probability of the chosen ball to be white is **[1]**

a) $\frac{2}{15}$

b) $\frac{7}{15}$

c) $\frac{8}{15}$

d) $\frac{14}{15}$

38. In a class, 60% of the students read mathematics, 25% biology and 15% both mathematics and biology. One student is selected at random. What is the probability that he reads mathematics, if it is known that he reads biology? **[1]**

a) $\frac{3}{8}$ b) $\frac{2}{5}$

c) $\frac{3}{5}$ d) $\frac{5}{8}$

39. If A and B are independent events, then $P(\bar{A}/\bar{B})$ = ? **[1]**

a) 1 - P(A / $\bar{B}$) b) 1 - P(A)

c) 1 - P(B) d) -P($\bar{A}$ / B)

40. If A and B are two events such that P(A) $\neq$ 0 and P(B|A) = 1, then **[1]**

a) B $\subset$ A b) B = ϕ

c) A = ϕ d) A $\subset$ B

41. A machine operates only when all of its three components function. The probabilities of the failures of the first, second and third component are 0.2, 0.3 and 0.5 respectively. What is the probability that the machine will fail? **[1]**

a) 0.007 b) 0.07

c) 0.72 d) 0.70

42. If P(A) =$\frac{6}{11}$, P(B) =$\frac{5}{11}$ and P(A $\cup$ B) =$\frac{7}{11}$.find P(A$\cap$B) **[1]**

a) $\frac{4}{13}$ b) $\frac{5}{17}$

c) $\frac{5}{11}$ d) $\frac{4}{11}$

43. If P(A) = $\frac{4}{5}$, and P(A $\cap$ B) =$\frac{7}{10}$ then P(B|A) is equal to **[1]**

a) $\frac{7}{8}$ b) $\frac{17}{20}$

c) $\frac{1}{10}$ d) $\frac{1}{8}$

44. For two mutually exclusive events A and B, P(A) = 0.2 and P$(\bar{A} \cap B)$ = 0.3. What is P(A|(A $\cup$ B)) equal to? **[1]**

a) $\frac{2}{7}$ b) $\frac{2}{5}$

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

45. Let A and B be independent events with P(A) = 0.3 and P(B) = 0.4. Find P(A $\cap$ B) **[1]**

a) 0.15 b) 0.10

c) 0.14 d) 0.12

46. If P(A) = $\frac{1}{2}$, P(B) = 0, then P(A|B) is **[1]**

a) 0 b) not defined

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

47. There are 2 boxes. One box contains 3 white balls and 2 black balls. The other box contains 7 yellow balls and 3 black balls. If a box is selected at random and from it, a ball is drawn, the probability that the ball drawn is black is **[1]**

a) $\frac{1}{3}$ b) $\frac{1}{20}$

c) $\frac{7}{20}$ d) $\frac{1}{5}$

48. A die is thrown and a card is selected at random from a deck of 52 playing cards. The probability of getting an even number on the die and a spade card is **[1]**

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

c) $\frac{3}{4}$ d) $\frac{1}{8}$

49. If A and B are events such that $P(A) = \frac{1}{2}, P(B) = \frac{7}{12}$ and $P(A' \cup B') = \frac{1}{4}$, then A and B are **[1]**

a) Independent and mutually exclusive b) Independent

c) None of these d) Mutually exclusive

50. If $P(A \cap B) = \frac{7}{10}$ and P(B) = $\frac{17}{20}$, then $P(\frac{A}{B})$ equals **[1]**

a) $\frac{7}{8}$ b) $\frac{17}{20}$

c) $\frac{14}{17}$ d) $\frac{1}{8}$

51. If for any two events A and B, P(A) = $\frac{4}{5}$ and P(A ∩ B) = $\frac{7}{10}$, then $P\left(\frac{B}{A}\right)$ is equal to **[1]**

a) $\frac{1}{10}$ b) $\frac{1}{8}$

c) $\frac{7}{8}$ d) $\frac{17}{20}$

52. If A ⊆ B, then which one of the following is not correct? **[1]**

a) P(B/A) = $\frac{P(B)}{P(A)}$ b) P(A/B) = $\frac{P(A)}{P(B)}$

c) P(A ∩$\bar{B}$) = 0 d) P(A/(A ∪ B)) = $\frac{P(A)}{P(B)}$

53. The probability that an event E occurs in one trial is 0.4. Three independent trials of the experiment are performed. What is the probability that E occurs at least once? **[1]**

a) 0.936 b) 0.784

c) 0.924 d) 0.964

54. If A and B are two independent events with $P(A) = \frac{3}{5}$ and $P(B) = \frac{4}{9}$, then $P(A' \cap B')$ equals **[1]**

a) $\frac{2}{9}$ b) $\frac{8}{45}$

c) $\frac{4}{15}$ d) $\frac{1}{3}$

55. If P(A) = $\frac{2}{5}$, P(B) = $\frac{3}{10}$ and $P(A \cap B) = \frac{1}{5}$, then $P\left(\frac{A'}{B'}\right) \cdot P\left(\frac{B'}{A'}\right)$ is equal to **[1]**

a) $\frac{25}{42}$ b) $\frac{5}{6}$

c) $\frac{5}{7}$ d) 1

56. Two men hit at a target with probabilities $\frac{1}{2}$ and $\frac{1}{3}$, respectively. What is the probability that exactly one of them hits the target? **[1]**

a) $\frac{1}{6}$ b) $\frac{1}{2}$

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

57. The probability that a man will live for 10 more years is $\frac{1}{4}$ and that his wife will live 10 more years is $\frac{1}{3}$. The probability that neither will be alive in 10 years is **[1]**

a) $\frac{11}{12}$ b) $\frac{1}{2}$

c) $\frac{5}{12}$ d) $\frac{7}{12}$

58. If A and B are events such that P(A) = 0.4, P(B) = 0.8 and P(B/A) = 0.6, then P(A/B) = ? **[1]**

a) 0.3 b) 0.5

c) 0.2 d) 0.4

59. The probability that A speaks the truth is $\frac{4}{5}$ and that of B speaking the truth is $\frac{3}{4}$. The probability that they contradict each other in stating the same fact is: **[1]**

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

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

60. A can hit a target 4 times in 5 shots, B can hit 3 times in 4 shots, and C can hit 2 times in 3 shots. The probability that B and C hit and A does not hit is **[1]**

a) $\frac{5}{12}$ b) $\frac{7}{12}$

c) $\frac{1}{10}$ d) $\frac{2}{5}$

61. If A and B are two events such that $\mathrm{P}\left(\frac{\mathrm{A}}{\mathrm{B}}\right) = 2 \times \mathrm{P}\left(\frac{\mathrm{B}}{\mathrm{A}}\right)$ and P(A) + P(B) = $\frac{2}{3}$, then P(B) is equal to **[1]**

a) $\frac{5}{9}$ b) $\frac{4}{9}$

c) $\frac{2}{9}$ d) $\frac{7}{9}$

62. If A and B are two events such that P(A) = $\frac{1}{2}$, P(B) = $\frac{1}{3}$, $P(\frac{A}{B}) = \frac{1}{4}$ then $\mathrm{P}\left(\mathrm{A}' \cap \mathrm{B}'\right)$ equals **[1]**

a) $\frac{1}{12}$ b) $\frac{3}{16}$

c) $\frac{1}{4}$ d) $\frac{3}{4}$

63. A couple has 2 children. What is the probability that both are boys, if it is known that one of them is a boy? **[1]**

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

c) $\frac{2}{3}$ d) $\frac{3}{4}$

64. If it is given that A and B are two events such that P(B) = $\frac{3}{5}$, $P(\frac{A}{B}) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$, $P\left(B|A'\right)$ is equal to **[1]**

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

c) $\frac{1}{2}$ d) $\frac{3}{10}$

65. Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel). Previous year results report that 30% of all students who reside in hostel attain A grade and 20% of day scholars attain A grade in their annual examination. At the end of the year, one student is chosen at random from the college and he has an A grade, what is the probability that the student is a hostlier? **[1]**

a) $\frac{2}{13}$ b) $\frac{5}{13}$

c) $\frac{9}{13}$ d) $\frac{3}{13}$

66. A biased coin with probability p, 0 < p < 1, of heads is tossed until a head appears for the first time. If the probability that the number of tosses required is even is 2/5, then p equals **[1]**

a) $\frac{2}{3}$ b) $\frac{2}{5}$

c) $\frac{1}{3}$ d) $\frac{3}{5}$

67. A bag contains 4 red and 4 black balls, another bag contains 2 red and 6 black balls. One of the two bags is selected at random and a ball is drawn from the bag which is found to be red. Find the probability that the ball is drawn from the first bag. **[1]**

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

c) $\frac{2}{3}$ d) $\frac{1}{4}$

68. If A and B are two independent events such that P(A) = $\frac{1}{3}$ and P(B) = $\frac{1}{4}$, then $P\left(\frac{B'}{A}\right)$ is **[1]**

a) $\frac{1}{8}$ b) 1

c) $\frac{3}{4}$ d) $\frac{1}{4}$

69. Number X is randomly selected from the set of odd numbers and Y is randomly selected from the set of even numbers of the set {1, 2, 3, 4, 5, 6, 7}. Let Z = (X + Y). **[1]**

What is P (Z = 10) equal to?

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

c) $\frac{1}{5}$ d) 0

70. You are given that A and B are two events such that P(B) = $\frac{3}{5}$, P(A | B) = $\frac{1}{2}$ and P(A ∪ B) = $\frac{4}{5}$, then P(A) equals **[1]**

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

c) $\frac{3}{5}$ d) $\frac{3}{10}$

71. For any two events A and B, if $P(\bar{A})$ = $\frac{1}{2}$, $P(\bar{B})$ = $\frac{2}{3}$ and P(A ∩ B) = $\frac{1}{4}$, then $P\left(\frac{\bar{A}}{\bar{B}}\right)$ equals: **[1]**

a) $\frac{1}{4}$ b) $\frac{3}{8}$

c) $\frac{8}{9}$ d) $\frac{1}{8}$

72. If for two events A and B, P(A - B) = $\frac{1}{5}$ and P(A) = $\frac{3}{5}$, then $P\left(\frac{B}{A}\right)$ is equal to **[1]**

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

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

73. A bag contains 3 white, 4 black and 2 red balls. If 2 balls are drawn at random (without replacement), then the probability that both the balls are white is: **[1]**

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

c) $\frac{1}{24}$ d) $\frac{1}{36}$

74. A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, the box is approved for sale, otherwise, it is rejected. Find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale. **[1]**

a) $\frac{44}{91}$ b) $\frac{49}{91}$

c) $\frac{47}{91}$ d) $\frac{41}{91}$

75. A box contains 3 orange balls, 3 green balls and 2 blue balls. Three balls are drawn at random from the box without replacement. The probability of drawing 2 green balls and one blue ball is **[1]**

a) $\frac{1}{28}$ b) $\frac{3}{28}$

c) $\frac{167}{168}$ d) $\frac{2}{21}$