

PROBABILITY

BRIKS ACADEMY

PADMANABHANAGARA

CONT: 9900084667

MCQ'S / FILL IN THE BLANKS

- If $P(A) = \frac{1}{2}$, $P(B) = 0$, then $P(A/B)$ is :
(a) 0 (b) $\frac{1}{2}$ (c) not defined (d) 1
- If A and B are two events such that $A \subset B$ and $P(B) \neq 0$, then which of the following is correct?
(a) $P(A/B) = \frac{P(A)}{P(B)}$ (b) $P(A/B) < P(A)$
(c) $P(A/B) \geq P(A)$ (d) None
- If A and B are two events and $A \neq \Phi, B \neq \Phi$, then
(a) $P(A/B) = P(A).P(B)$ (b) $P(A/B) = \frac{P(A \cap B)}{P(B)}$
(c) $P(A/B).P(B/A) = 1$ (d) $P(A/B) = P(A)/P(B)$
- If $P(A/B) > P(A)$, then which of the following is correct :
(a) $P(B/A) < P(B)$ (b) $P(A \cap B) < P(A).P(B)$
(c) $P(B/A) > P(B)$ (d) $P(B/A) = P(B)$
- If A and B are events such that $P(A/B) = P(B/A)$, and $P(A \cap B) = \emptyset$ then
(a) $A \subset B$ but $A \neq B$ (b) $A = B$ (c) $A \cap B = \Phi$ (d) $P(A) = P(B)$
- If A and B are any two events such that $P(A) + P(B) - P(A \text{ and } B) = P(A)$, then
(a) $P(B/A) = 1$ (b) $P(A/B) = 1$ (c) $P(B/A) = 0$ (d) $P(A/B) = 0$
- If A and B are events such that $P(A) > 0$ and $P(B) \neq 1$, then $P(A'/B')$ equals.
(a) $1 - P(A/B)$ (b) $1 - P(A'/B)$ (c) $\frac{1 - P(A \cup B)}{P(B')}$ (d) $P(A')/P(B')$
- Let A and B be two events such that $P(A) = 0.6, P(B) = 0.2$ and $P(A/B) = 0.5$. Then $P(A'/B')$ equals
(a) $\frac{1}{10}$ (b) $\frac{3}{10}$ (c) $\frac{3}{8}$ (d) $\frac{6}{7}$
- If $P(A) = 0.4, P(B) = 0.8$ and $P(B/A) = 0.6$, then $P(A \cup B)$ is equals to
(a) 0.24 (b) 0.3 (c) 0.48 (d) 0.96

10. If $P(A) = \frac{3}{10}$, $P(B) = \frac{2}{5}$ and $P(A \cup B) = \frac{3}{5}$, then $P(B/A) + P(A/B)$ equals
- (a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{5}{12}$ (d) $\frac{7}{12}$
11. If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A/B) = \frac{1}{4}$, then $P(A' \cap B')$ equals
- (a) $\frac{1}{12}$ (b) $\frac{3}{4}$ (c) $\frac{1}{4}$ (d) $\frac{3}{16}$
12. A and B are events such that $P(A) = 0.4$, $P(B) = 0.3$ and $P(A \cup B) = 0.5$, then $P(B' \cap A) =$
- (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{3}{10}$ (d) $\frac{1}{5}$
13. You are given that A and B are two events such that $P(B) = \frac{3}{5}$, $P(A/B) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$, then $P(B/A')$ is equal to
- (a) $\frac{1}{5}$ (b) $\frac{3}{10}$ (c) $\frac{1}{2}$ (d) $\frac{3}{5}$
14. If $P(B) = \frac{3}{5}$, $P(A/B) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$, then $P(A \cup B)' + P(A' \cup B) =$
- (a) $\frac{1}{5}$ (b) $\frac{4}{5}$ (c) $\frac{1}{2}$ (d) 1
15. Let A and B are two events such that $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$ and $P(A \cup B) = \frac{3}{4}$. Then $P(A/B) \cdot P(A'/B)$ is equal to
- (a) $\frac{2}{5}$ (b) $\frac{3}{8}$ (c) $\frac{3}{20}$ (d) $\frac{6}{25}$
16. A box containing 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
- (a) $\frac{3}{28}$ (b) $\frac{2}{21}$ (c) $\frac{1}{28}$ (d) $\frac{167}{168}$
17. If $P(A \cap B) = \frac{7}{10}$ and $P(B) = \frac{17}{20}$, where P stands for probability, then $P(A/B)$ is equal to
- (a) $\frac{14}{17}$ (b) $\frac{17}{20}$ (c) $\frac{7}{8}$ (d) $\frac{1}{8}$
18. In a college, 30 students fail in physics, 25 fail in mathematics and 10 fail in both. One student is chosen at random. The probability that she fails in physics is she has failed in mathematics is
- (a) $\frac{1}{10}$ (b) $\frac{2}{5}$ (c) $\frac{9}{20}$ (d) $\frac{1}{3}$

19. 10% of the bulbs produced in a factory are of red colour and 2% are red and defective. If one bulb is picked up at random, then the probability of its being defective if it is red is
- (a) $\frac{1}{2}$ (b) $\frac{1}{10}$ (c) $\frac{1}{5}$ (d) $\frac{1}{12}$
20. If A and B are two events of a sample space S such that $P(A)=0.2$, $P(B)=0.6$ and $P(A/B)=0.5$, then $P(A'/B)=$
- (a) $\frac{1}{2}$ (b) $\frac{3}{10}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$
21. Two events A and B will be independent, if
- (a) A and B are mutually exclusive (b) $P(A'B')=[1-P(A)][1-P(B)]$
- (c) $P(A)=P(B)$ (d) $P(A)+P(B)=1$
22. If A and B are independent events such that $0 < P(A) < 1$ and $0 < P(B) < 1$, then which of the following is not correct?
- (a) A and B are mutually exclusive (b) A and B' are independent
- (c) A' and B are independent (d) A' and B' are independent
23. Two events E and F are independent. $P(E)=0.3$, $P(E \cup F)=0.5$, then $P(E/F)-P(F/E)$ equals
- (a) $\frac{2}{7}$ (b) $\frac{3}{35}$ (c) $\frac{1}{70}$ (d) $\frac{1}{7}$
24. Probability that A speaks truth is $\frac{4}{5}$. A coin is tossed. A reports that a head appears. The probability that actually there was head is
- (a) $\frac{4}{5}$ (b) $\frac{1}{2}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$
25. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. The probability that it is actually a six is :
- (a) $\frac{3}{8}$ (b) $\frac{1}{5}$ (c) $\frac{3}{4}$ (d) $\frac{1}{2}$
26. A man speaks truth 2 out of 3 times. He picks one of the natural number in the set $S = \{1, 2, 3, 4, 5, 6, 7\}$ and reports that it is even. The probability that it is actually even is
- (a) $\frac{1}{10}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) $\frac{1}{5}$
27. If A and B are two events such that $P(A) \neq 0$ and $P(A/B)=1$, then
- (a) $A \subset B$ (b) $B \subset A$ (c) $B = \Phi$ (d) $A = \Phi$
28. If $P(A)=\frac{4}{5}$, and $P(A \cap B)=\frac{7}{10}$, then $P(B/A)$ is equals to

- (a) $\frac{1}{10}$ (b) $\frac{1}{8}$ (c) $\frac{7}{8}$ (d) $\frac{17}{20}$

29. Let $P(A) = \frac{7}{13}$, $P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$. Then $P(A' / B)$ is equal to

- (a) $\frac{6}{13}$ (b) $\frac{4}{13}$ (c) $\frac{4}{9}$ (d) $\frac{5}{9}$

30. It is given that that the events A and B are such that $P(A) = \frac{1}{4}$, $P(A/B) = \frac{1}{2}$ and $P(B/A) = \frac{2}{3}$.

Then $P(B)$ is :

- (a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{1}{2}$

31. You are given that A and B are two events such that $P(B) = \frac{3}{5}$, $P(A/B) = \frac{1}{2}$ and

$P(A \cup B) = \frac{4}{5}$, then $P(A)$ equals

- (a) $\frac{3}{10}$ (b) $\frac{1}{5}$ (c) $\frac{1}{2}$ (d) $\frac{3}{5}$

32. If A and B are two events such that $P(A/B) = p$, $P(A) = p$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{5}{9}$, then p is equal to

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{2}{5}$

33. A and B are two events such that $P(A) \neq 0$, $P(B/A)$ if (i) A is sub set of B (ii) $A \cap B = \phi$ are respectively

- (a) 0 and 1 (b) 1, 0 (c) 1, 1 (d) 0, 0

34. If A and B' are independent events, then $P(A' \cup B)$ is equal to

- (a) $1 - P(A)P(B)$ (b) $1 - P(A')P(B)$ (c) $1 - P(A)P(B')$ (d) $1 - P(A')P(B')$

35. If the events A and B are independent, then $P(A \cap B)$ is equals to

- (a) $P(A) + P(B)$ (b) $P(A) - P(B)$ (c) $P(A) \cdot P(B)$ (d) $P(A) / P(B)$

36. A die is thrown two times. Let A and B be the events, 'same number each time' and 'a total score is 10 or more' respectively, then A and B are :

- (a) Mutually exclusive (b) exhaustive
(c) Independent (d) Not Independent

37. If $P(A \cup B) = \frac{2}{3}$, $P(A \cap B) = \frac{1}{6}$ and $P(A) = \frac{1}{3}$, then

- (a) A and B are independent events (b) A and B are disjoint events
(c) A and B are dependent events (d) None of these

38. The probability of obtaining an even prime number on each die, when a pair of dice is rolled is
39. If $P(A) = \frac{4}{5}$ and $P\left(\frac{B}{A}\right) = \frac{2}{5}$, then $P(A \cap B) = \dots\dots\dots$
40. If $P(A) = 0.6$, $P(B) = 0.3$ and $P(A \cap B) = 0.2$, then $P\left(\frac{A}{B}\right) \dots\dots\dots$
41. If $P(A) = \frac{3}{5}$, $P(B) = \frac{1}{5}$, then $P(A \cap B)$ if A and B are independent events is
42. If $P(A) = 0.8$, $P(B) = 0.5$ and $P\left(\frac{B}{A}\right) = 0.4$ then $P(A \cap B) = \dots\dots\dots$
43. If A and B are independent events with $P(A) = 0.3$ and $P(B) = 0.4$, then $P(A \cap B) = \dots\dots\dots$
44. If $P(E) = 0.6$ and $P(E \cap F) = 0.2$ then $P\left(\frac{F}{E}\right) = \dots\dots\dots$
45. A fair die is rolled. Consider the events $E = \{1, 3, 5\}$ and $F = \{2, 3\}$, then $P\left(\frac{E}{F}\right) = \dots\dots\dots$
46. If $P(A) = \frac{1}{2}$, $P(B) = 0$, then $P\left(\frac{A}{B}\right) = \dots\dots\dots$
47. Given two independent events A and B such that $P(A) = 0.3$, $P(B) = 0.6$, then $P(A \text{ and not } B) = \dots\dots\dots$
48. A and B are two events such that $P(A) \neq 0$. then the value of $P\left(\frac{B}{A}\right)$, if A is a subset of B is
49. A and B are two events such that $P(A) \neq 0$. then $P\left(\frac{B}{A}\right)$, if $A \cap B = \phi$ is
50. Given that the events A and B are such that $P(A) = \frac{1}{2}$, $P(A \cap B) = \frac{3}{5}$ and $P(B) = k$, then the value of 'k' if A and B are independent is

TWO MARKES:

1. A die is thrown. If E is the event 'the number appearing is a multiple of 3' and F be the event 'the number appearing is even', then prove that E and F are independent events.

2. Two coins are tossed once, find $P\left(\frac{E}{F}\right)$ where E : no tail appears, F : no head appears.
3. Assume that each born child is equally likely to be a boy or girl. If a family has two children. What is the conditional probability of both are girls given that atleast one is girl?
4. A fair die is rolled. Consider the events $E = \{1, 3, 5\}$, $F = \{2, 3\}$ and $G = \{2, 3, 4, 5\}$. Find (i) $P\left(\frac{E}{F}\right)$ (ii) $P\left(\frac{E}{G}\right)$.
5. Given two independent events A and B such that $P(A) = 0.3$, $P(B) = 0.6$.
Find
(i) $P(A \text{ and not } B)$
(ii) $P(\text{neither } A \text{ or } B)$.
6. Mother, father and son line up at random for a family picture, if E "son on one end" and F "father in middle", find $P\left(\frac{E}{F}\right)$.
7. A family has two children. What is the probability that both the children are boys given that at least one of them is a boy?
8. If $P(E_1) = \frac{1}{2}$, $P(E_2) = \frac{1}{2}$ and $P\left(\frac{A}{E_1}\right) = \frac{1}{2}$, $P\left(\frac{A}{E_2}\right) = \frac{1}{4}$. Find $P\left(\frac{E_1}{A}\right)$.
9. A coin is tossed three times, where E : atmost two tails, F : at least one tail. Determine $P\left(\frac{E}{F}\right)$.
10. An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both drawn balls are black?
11. A die marked 1, 2, 3 in red and 4, 5, 6 in green is tossed. Let A be the event, 'the number is even', and B be the event, 'the number is red'. Are A and B independent?
12. Probability of solving specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively.
If both try to solve the problem independently, find the probability that the problem is solved.

3 MARKES:

1. Bag-I contains 3 red and 4 black balls while another Bag-II contains 5 red and 6 black balls. One ball is drawn at random from one of the bag and it is found to be red. Find the probability that it was drawn from Bag-II.
2. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of accidents is 0.01, 0.03 and 0.15 respectively. One of the insured person meets with an accident. What is the probability that he is a scooter driver?
3. Two groups are competing for the position on the board of directors of a corporation. The probability of I and II groups will win are 0.6 and 0.4 respectively. Further, if I group wins, the probability of introducing a new product is 0.7 and corresponding probability is 0.3 if the II group wins. Find the probability that new product introduced was by the II group.

4. Given three identical boxes I, II and III each containing two coins. In box I, both coins are gold coins, in box II, both are silver coins and in the box III, there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is gold, what is the probability that the other coin in the box is also gold?
5. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six.
6. There are three coins, one is a two headed coin, another is a biased coin that comes up head 75% of the time and third is an unbiased coin. One of the three coins is choose at random and tossed it shows head. What is the probability that it was the two headed coin.