MATHS

JEE (MAIN AND ADVANCED MATHEMATICS) FOR BOARD AND COMPETITIVE EXAMS

PROBABILITY

Examples

1. Find the sample space when two dice are thrown simultaneously .

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2. A coin is tossed. If it shows head, we draw a ball from a bag consisting of 3 red and 4 black balls; if it shows tail, we throw a die. What is the sample associated to this experiment?

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3. In a single throw of die, describe the following events.

(i) A = getting a number less than 7

(ii) B = getting a number greater than 7

(iii) C = getting a multiple of 3

(iv) D = getting a number less than 4

Also, find 'A or B', 'A and B', 'B and C' and 'not D'

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4. A pair of dice is rolled once and the sum of the number which appear on the uppermost faces of the two dice is noted. Consider the following events

(i) E_1 : Sum is odd

(ii) E_2 : Sum is 5 or 6

(iii) E_3 : Sum is greater than 11

(iv) E_4 : Sum is less than 4

Find which of the given events are mutually exclusive.

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5. Which of the following can be the valid assignment of probability for outcomes of sample space, $S = \{W_1, W_2, W_3\}, \{$ where W_1, W_2 and W_3 are mutually exclusive events

Assignment

	w_1	w_2	w_3
(a)	0.4	0.2	0.8
(b)	0	0	1
(c)	$-\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
(d)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$

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6. A card is drawn from a well shuffled deck of 52 cards. Find the probability that the card drawn is

(i) An ace of hearts

(ii) A black card

(iii) Not a black card

(iv) A king

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7. The probability of a horse A winning a race is $\frac{1}{4}$ and that of a horse B winning the same race is $\frac{1}{3}$. Considering that winning is matually exclusive, find the probability that

(i) Either of them win

(ii) None of them win

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8. If a leap is selected at random, then what is the probability that it will have 53 Fridays?

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9. A bag contains 7 white, 5 black and 4 red balls. If two balls are drawn at random, find the probability that: (i) both the balls are white (ii) one ball is black and the other red (iii) both the balls are of the same colour.

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10. A 2 digit number is formed using the digits 2, 3, 5, 8 and 9 without repetition. What is the probability that the digits used are 3 and 9?

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11. The letters of SOCIETY are placed at random in a row. What is the probability that three vowels come together?

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12. There are 10 persons who are to seated around a circular table . Find the probability that two particular will always sit together .

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13. There are 6 letters and 6 addressed envelopes. Find the probability that at least one letter goes into the wrong envelope.

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14. What is the probability of getting the sum as 4 or 7 or 12 when two dice are thrown simultaneously?

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15. If $P(A) = \frac{5}{13}, P(B) = \frac{7}{13}$ and $P(A \cap B) = \frac{2}{13}$, evaluate $P(A \mid B)$ and

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16. A die is rolled. If the outcome is an odd number, what is the probability that it is prime?

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17. Three fair coins are tossed. Find the probability that the outcomes are all tails, if atleast one of the coins shows a tail.

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18. A die is rolled twice and the sum of the numbers appearing is observed to be 8. What is the conditional probability that the no. 3 has appeared at least once?

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19. In a class, 30% students study English, 15% study Hindi and 10% study both English and Hindi. One student is selected at random. Find the probability that

(i) He studies English if it known that he Hindi

(ii) He studies Hindi if it is known that he studies English

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20. Two numbers are selected at random from integers 1 through 9. If the sum is even, find the probability that both the numbers are odd.

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21. A box contains 20 red and 15 black balls. Two balls are drawn from the box one after the other without replacement. What is the probability that both drawn balls are red ?

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22. Three cards are drawn successively without replacement from a pack of 52 well-shuffled cards . What is the probability that first two cards are queens and the third card drawn is a king ?

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23. Prove that if E and F are independent events, then so are the events E and F.

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24. If A and B are two independent events, then the probability of occurrence of at least one of A and B is given by $1 - P(A')\,P(B')$

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25. An unbiased die thrown twice. Let the event A be 'even number on the first throw' and B the event 'even no. on the second throw'. Check the

independence of the events A and B.

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26. A factory has three machines A, B, and C. Producing 100, 200 and 300 bolts per day respectively. The machine A produces 1% defective bolts, B produces 2& defective bolts and C produces 2% defective bolts. At the end of the day, a bolt is drawn at random and it is found to be defective. What is the probability that this defective bolt has been produced by machine C?

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27. A company has two plants to manufacture bicycles. The first plant manufactures 60% of bicycles and the second 40%. Also 80% of the bicycles are rated of standard qaulity at the first plant and 90% of the standard qaulity at the second plant. A bicycle is picked up at random and found to be of standard quality. Find the probability that it is produced from first plant.

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28. A person goes to his office by using different means of transport on different days. It is know that the probabilities that he will come by train, bus, scooter or by car are respectively $\frac{1}{10}, \frac{3}{10}, \frac{2}{10}$ and $\frac{4}{10}$. The probabilities that he will be late are $\frac{1}{4}, \frac{1}{5}, \frac{1}{6}$, and $\frac{1}{3}$ if he comes by train, bus, scooter and car respectively, on one day when he reaches office, he is late. What is the probability he has come by train?

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29. A man is known to speak the truth 4 out of 5 times. He throws a die and reports that it is a four. Find the probability that it is actually a four.

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30. A person plays a game of tossing a coin thrice. For each tail, he is given Rs.3 by the organiser of the game and for each head, he has to give Rs.2 to the organiser. Let X denote the amount gained or lost by the person. Show that X is a random variable and exhibit it as a function on the sample space of the experiment.

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31. A die is thrown twice. If X is the number of turns 6 appearned, then describe the range of X.

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32. A pair of dice is rolled twice. Find the probability distribution of no. of doublets.

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33. Let X denote the no. of hours you study during a randomly selected school day. The probability that X can take the values x, has the following form, where λ is some unknown constant.

$$P(X=x)=\begin{cases}0.2 & , \text{ if } x=0\\ \lambda x & , \text{ if } x=1 \text{ or } 2\\ \lambda(6-x) & , \text{ if } x=3 \text{ or } 4\\ 0 & , \text{ otherwise}\end{cases}$$

(a) Find the value of λ

(b) What is the probability that you study at least two hours ? Exactly two hours? At most two hours?

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34. Let a pair of dice he rolled thrice and the random variable X be the number of doublets. Find the mean of the random variable.

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35. A coin is tossed thrice. X denotes the no. of heads appeared. Find the mean and variance of X.

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36. An urn contains 4 white and 3 red balls. Let X be the number of red balls in a random draw of 3 balls. Find the mean and variance of X.

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37. If a fair coin is tossed 9 times, find the probability of (a) exactly six heads, (b) at least six heads, (c) at most six heads.

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38. A machine manufactures some items in a day of which 5% are defective. 10 items are checked one by one with replacement. Find the

probability that there is atleast on defective item.

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39. India plays 4 matches with Australia. The probability of india winning a match is $\frac{3}{4}$ and loosing match is $\frac{1}{4}$. Find the probability of india winning 3^{rd} time in 4^{th} match.

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40. For a post,three persons A, B and C appearin the interview. The probability of A being selected is twice that of B and the probability of b being selected is thrice that of C. What of the individual probability of A, B and C being selected?

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41. If $\frac{(1-3p)}{2}, \frac{(1+4p)}{3}, \frac{(1+p)}{6}$ are the probabilities of three mutually excusing and exhaustive events, then the set of all values of p is

a. (0,1) b. (-1/4,1/3) c. (0,1/3) d.

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42. A five-digit number is formed by the digit 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4.

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43. If four whole numbers taken at random are multiplied together, then find the probability that the least digit in the product is 1, 3, 7 or 9.

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44. Out of (2n+1) tickets consecutively numbered, three are drawn at random. Find the chance that the numbers on them are in AP.

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45. Two distinct number x & y are chosen at random from the set { 1 , 2 , 3 ...., 30} . The probability that $x^2 - y^2$ is divisible by 3 is :

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46. A is a set having n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of A. A subset Q of A is again chosen at random. Find the probability that P and Q have no common elements.

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47. In a multiple choice question, there are four alternative answers of which one or more than one is correct A candidate will get marks on the question only if he ticks the correct answer. The candidate decides to tick answers at a random. If he is allowed up to three chances to answer the question, then find the probability that he will get marks on it.

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48. A coin is tossed 10 times. Find the probability of getting

(i) 2 Heads

(ii) Even numbers of heads

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49. On a chess board if two squares are chosen at random, what is the probability that they haven't a side in common?

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50. If three six-faced fair dice are thrown together, find the probability that the sum of the numbers appearing on the dice is 12.

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51. A point is selected at random from inside a circle. The probability that the point is closer to the circumference of the circle than to its centre, is

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52. A friendly hockey match among Aakashians played from 3pm to 5pm. Shekhar arrives to see the match (not before the match starts). Find the probability that the will miss the only goal of the match which takes place at the 15th minute of the match.

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53. Suppose there are three bags such that

Bag A has 10 bulbs out of which 4 are defective.

Bag B has 6 bulbs out of which 1 is defective

Bag C has 8 bulbs out of which 3 are defective.

A bag is chosen at random and then a bulb is randomly chosen from the chosen bag.

(i) Find the probability that the bulbs is non-defective

(ii) If the bulb is non-defective, find the probability that it came from bag C?

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54. A bag contains a fair coin X and a two headed coin Y. A coin is selected at random and tossed twice.

(i) If heads appears both times find the probability that the coin is two headed.

(ii) If tails appears both times, find the probability that the coin is two headed.

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55. Amit and sumit throw with one die for a prize of Rs. 121, which will be won by a player who throws 5 first. If Amit starts, then find the mathematical expectation for sumit.

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56. Six persons are standing in random order in a aqeue to buy tickets individually. Three of them have a ten rupee note each while the other three have a five rupee note each. The booking clerk has an empty cash box. Find the probability that all the 6 persons will get a ticket each without having to wait. Each ticket costs rupees 5.

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57. A is a set having n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of A. A subset Q of A is

again chosen at random. Find the probability that P and Q have no common elements.

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58. If E and F are independent events then which of the following are also independent

(i) $\overline{E}$ and $\overline{F}$

(ii) E and $\overline{F}$

(iii) $\overline{F}$ and F

(iv) None of these

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Try Yourself

1. Two coins are tossed simultaneously. Write the sample space S and the number of sample points n(S).

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2. If three coins are tossed, represent the sample space and the event of getting atleast two heads, then find the number of elements in them.

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3. An experiment consists of rolling a die and then tossing a coin once if the number on the die is even. If the number on the die is odd, the coin is tossed twice. Write the sample space for this experiment.

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4. A box contains 1 white and 3 identical black balls. Two balls are drawn at random in succession without replacement. Write the sample space for this experiment.

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5. Consider the experiment of rolling a die. Let A be the event "getting a prime number". B be the event "getting an odd number". Write the sets representing the events (i) A or B (ii) A and B (iii) A but not B (iv) "not A".

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6. Consider the experiment of rolling a die. Let A be the event "getting a prime number". B be the event "getting an odd number". Write the sets representing the events (i) A or B (ii) A and B (iii) A but not B (iv) "not A".

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7. A coin is tossed three times, consider the following events. A : No head appears, B: Exactly one head appears and C: Atleast two appear. Do they form a set of mutually exclusive and exhaustive events?

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8. Two dice are thrown and the sum fo the numbers which come up on the dice is noted. Let us consider the following events: $A =$ The sum is even, $B =$ The sum is multiple of 3, $C =$ The sum is less than 4, $D =$ The sum is greater than 11. Which pairs of these events are mutually exclusive?

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9. Consider a sample space $S = \{W_1, W_2, W_3, \ldots\ldots W_6\}$. Where $W_i \cap W_j = \phi,\ \forall \mathrm{i} \neq j.$ Which of the following assignments of probabilities to each outcome are valid? {Where $W_i \cap W_j = \phi,\ \forall \mathrm{I} \neq j$} outcomes

Outcomes	w_1	w_2	w_3	w_4	w_5	w_6
(1)	$\frac{2}{6}$	$\frac{1}{6}$	$\frac{2}{6}$	0	$\frac{1}{6}$	0
(2)	$\frac{1}{2}$	$\frac{-1}{2}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{7}{9}$	$\frac{1}{6}$
(3)	$\frac{2}{4}$	$\frac{2}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{11}$
(4)	1	0	0	0	0	0

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10. Suppose a sample space S consists of 4 elements, i.e., $S = \{\alpha_1, \alpha_2, \alpha_3, \alpha_4\}$ where $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are pair wise mutually exclusive. Which function defines a probability function on S?

(1) $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{3}, P(\alpha_3) = \frac{1}{4}, P(\alpha_4) = \frac{1}{4}$

(2) $P(\alpha_1) = \frac{1}{4}, P(\alpha_2) = -\frac{1}{2}, P(\alpha_3) = \frac{7}{9}, P(\alpha_4) = \frac{1}{3}$

(3) $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{4}, P(\alpha_3) = \frac{1}{8}, P(\alpha_4) = \frac{1}{8}$

(4) $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{4}, P(\alpha_3) = \frac{1}{8}, P(\alpha_4) = 0$

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11. A bag contains 9 discs of which 4 are red. 3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it will be (i) red. (ii) yellow, (iii) blue, (iv) not blue, (v)

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12. In a simultaneous thrown of a pair of dice, find the probability of getting: (i)8 as the sum (ii)a doublet of prime number (iii)a doublet of odd number

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13. Two students Anil and Ashima appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the

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14. If $P(A) = \frac{2}{3}, P(B) = \frac{4}{9}$ and $P(A \cap B) = \frac{4}{5}$, then find the value of $P(A \cup B)$ and $P(A' \cap B')$.

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15. The probability that a leap year selected at random will contain either 53 Thursday or 53 Friday is

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16. Find the probability that the leap year selected at random will contain of exactly 52 Wednesdays.

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17. In a lottery of 50 tickets numbered 1 to 50 , two tickets are drawn simultaneously . Find the probability that

both the tickets drawn have prime numbers ,

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18. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (a) no man?

(b) one man? (c) two men?

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19. A 2 digit number is formed using the digits 2, 3, 5, 8 and 9 without repetition. What is the probability that the digits used are 3 and 9?

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20. A five-digit number is formed by the digit 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4.

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21. The letters of the word FORTUNATES are arranged at random in a row. What is the chance that the two T come together.

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22. Find the probability that in a random arrangement of the letters of the word UNIVERSITY the two Is come together.

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23. 5 boys and 5 girls sit in a row randomly. Find the probability that all the boys sit together.

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24. There are 10 persons who are to seated around a circular table . Find the probability that two particular will always sit together .

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25. In a relay race there are five teams A. B, C. D and E. (a) What is the probability that A. B and C finish first, second and third, respectively. (b)

What is the probability that A. B and C are first three to finish (in any order) (Assume t

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26. In a lottery, a person chooses six different numbers at random from 1 to 20 and if these six numbers match with six numbers already fixed by the lottery committee, he wins the prize. What is the probability of winning the prize in the game?

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27. A, B, C are three mutually exclusive and exhaustive events associated with a random experiment. Find $P(A)$, it being given that $P(B) = \frac{3}{2}P(A)$ *and* $P(C) = \frac{1}{2}P(B)$.

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28. Two dice are rolled. What is the probability of getting the sum as 2, 3 or 4?

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29. If two events A and B such that $P(A') = 0.3$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, then $P(B/A \cup B')$ is

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30. In an entrance examination, 60% students are boys. In the result of the test it was observed that 40% of boys secured grade 1 and 45% of girls secured grade 1. Find the probability that the student secured grade 1, if it is known the student is a girl.

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31. The probability that an event A occurs in a single trial of an experiment is 0.6. Three independent trials of the experiment are performed. Find the probability that the event at least once occurs.

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32. 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 is ____

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33. Each of the n urns contains 4 white and 6 black balls. The (n + 1)th urn contains 5 white and 5 black balls. One of the n + 1 urns is chosen at random and two balls turn out to be black. If the probability that the (n + 1)th urn was chosen to draw the balls is 1/16, then find the value of n.

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34. Two aeroplanes I and II bomb a target in succession. The probabilities of I and II scoring a hit correctly are 0.3 and 0.2, respectively. The second plane will bomb only if the first misses the target. The probability that the target is hit by the second plane is (A) 0.06

(B) 0.14 (C) $\frac{7}{22}$ (D) 0.7

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35. Consider the random experiment of tossing three coins. If X denote, the number of tails in the sample space, exhibit X.

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36. Let there be a bag containing 5 white, 4 red and 3 green balls. Three balls are drawn. If X denotes the number of green balls. Exhibit X and write its probability distribution.

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37. Two cards are drawn without replacement from a well-shuffled deck of 52 cards. Determine the probability distribution of the number of face cards (i.e. Jack, Queen, King and Ace).

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38. A fair dice is thrown two times. Find the probability distribution of the number of sixes. Also determine the mean of the number of sixes

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39. Find the probability distribution of the number of success in two tosses f a die, where a success is defined as getting a number greater than 4. Also, find the mean and variance of the distribution.

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40. Two cards are drawn successively with replacement from a well shuffled deck of 52 cards. Find the mean and standard deviation of the number of aces.

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41. One hundred identical coins, each with probability 'p' of showing heads are tossed once. If $0 < p < 1$ and the probability of heads showing on 50 coins is equal to that of heads showing on 51 coins, then the value of p is

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42. If A and B each toss three coins. The probability that both get the same number of heads is :

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Assignment Section A Competition Level Questions

1. If a coin is tossed three times, then the sample space for this experiment is

A. {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}

B. {HH, HT, TH, TT}

C. {HHH, HTH, TTT}

D. {HHT, HTH, HHT, HHH, HTT, THT, TTH}

Answer: A

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2. A coin tossed and a die is thrown. Describe the sample space for this experiment.

A. {(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6)}

B. {H, T, 1, 2, 3, 4, 5, 6}

C. {(1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)}

D. {(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, 1), (T, 2), (T, 3), (T, 4), (T, 5), (T, 6)}

Answer: D

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3. A coin is tossed repeatedly until a tail comes up for the first time. Write the sample space for this experiment.

A. {T}

B. {T, HT, HHT, HHHHT, ...}

C. {H, TH, TTH, TTTH, ...}

D. {T, H}

Answer: B

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4. Descibe the sample space :

A coin is tossed twice . If the second thrown If the second throw results in a tail , a die is thrown.

A. {TT, HT, (TH, 1), (TH, 2), (TH, 3), (TH, 4), (TH, 5), (TH, 6), (HH, 1), (HH, 2), (HH, 3), (HH, 4), (HH, 5), (HH, 6)}

B. {1, 2, 3, 4, 5, 6, H, T}

C. {(TH, 1), (TH, 2), (TH, 3), (TH, 4), (TH, 5), (TH, 6), (HH, 1), (HH, 2), (HH, 3), (HH, 4), (HH, 5), (HH, 6)}

D. {HH, HT, TH, TT, 1, 2, 3, 4, 5, 6}

Answer: A

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5. A bag contains one white and one red ball. A ball is drawn from the bag. If the ball drawn is white it is replaced in bag and again a ball is drawn. otherwise, a die is tossed. Write the sample space for this experiment.

A. {W, (R, 1), (R, 2), (R, 3), (R, 4), (R, 5), (R, 6)}

B. {W, R, 1, 2, 3, 4, 5, 6}

C. {(W, W), (W, R), (R, 1), (R, 2), (R, 3), (R, 4), (R, 5), (R, 6)}

D. {(W, R), R, (R, 1), (R, 2), (R, 3), (R, 4), (R, 5), (R, 6)}

Answer: C

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6. From a group of 2 boy and 3 girls, two children are selected at random. Describe the events. A = both selected children are girls. B= the selected group consists of one boy and one girl. C= at least one boy is selected. Which pairs (s) of events is (are) mutually exclusive?

A. A, B and A, C

B. A, B only

C. B, C and A, C

D. A, C only

Answer: A

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7. Three coins are tossed once. Describe the following events associated with this random experiment: $A =$ Getting three heads, $B =$ Getting two heads and one tail, $C =$ Getting three tails $D =$ Getting a head on the first coin. Which pairs of events are mutually exclusive?

A. B only

B. A and C

C. B and D

D. D only

Answer: C

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8. Two dice are thrown simultaneously. The events A, B, C, D are described as follows:

A = Getting an even number on the first die

B = Getting an odd number on the first die

C = Getting atmost 5 as sum of the numbers on the two dice

D = Getting the sum of the numbers on the dice greater than 5 but less than 10

Which of the following statements is true?

A. A and D are mutually exclusive

B. A and B are mutually exclusive and exhaustive events

C. A and C are mutually exclusive events

D. C and D are mutually exclusive and exhaustive events

Answer: B

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9. A die is thrown twice. Each time then number appearing on it is recorded. Describe the following events: A= both numbers are odd. B= both numbers are even. C= sum of the numbers is less that 6. Also, find $A \cup B, A \cap B, A \cup C, A \cap C$. Which pairs of events are mutually exclusive?

A. A, B and B, C

B. A, B only

C. A, C and B, C

D. B, C only

Answer: B

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10. Two dice are thrown simultaneously and the sum of the numbers which come up on the dice is noted. Consider the following events

A = The sum is even

B = The sum is a multiple of 3

C = The sum is less than 4

D = The sum is greater than 11

Which of the following is/are elementary event(s)?

A. A and B

B. A and C

C. Only C

D. Only D

Answer: D

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11. One coin and one fair die are tossed. The probability of getting head on the coin and six on the die is

A. $\frac{1}{2}+\frac{1}{6}$

B. $\frac{1}{2}-\frac{1}{6}$

C. $\frac{1}{2}\times\frac{1}{6}$

D. $\frac{1}{2}\div\frac{1}{6}$

Answer: C

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12. A bag contains tickets numbered from 1 to 20. Two tickets are drawn. find the probability that i. both the tickets have prime numbers on them ii. on one there is a prime number and on the other there is a multiple of 4.

A. $\frac{17}{95}$

B. $\frac{16}{95}$

C. $\frac{2}{15}$

D. $\frac{14}{95}$

Answer: D

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13. A bag contains 3 red, 4 white and 5 blue balls. All balls are different two balls are drawn at random. the probability that they are of different colour is a. 47/66 b. 10/33 c. 1/3 d. 1

A. $\frac{47}{66}$

B. $\frac{10}{33}$

C. $\frac{1}{3}$

D. 1

Answer: A

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14. One ticket is selected at random from 100 tickets numbered 00, 01, 02, 03,.....99. Suppose x is the sum of the digits and y is the product of the digits, then the probability that x = 9 and y = 0 is

A. $\frac{1}{99}$

B. $\frac{1}{50}$

C. $\frac{3}{50}$

D. $\frac{1}{25}$

Answer: B

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15. A number x is chosen at random from the numbers $-3, -2, -1, 0, 1, 2, 3$ the probability that $|x| < 2$ is $\frac{5}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{1}{7}$

A. $\frac{2}{7}$

B. $\frac{4}{7}$

C. $\frac{3}{7}$

D. $\frac{6}{7}$

Answer: C

Watch Video Solution

16. Two dice are thrown together. The probability that neither they show equal digits nor the sum of their digits is 9 will be a. 13/1 b. 13/18 c. 1/9 d. 8/9

A. $\frac{13}{15}$

B. $\frac{13}{18}$

C. $\frac{1}{9}$

D. $\frac{8}{9}$

Answer: B

Watch Video Solution

17. Four persons are selected at random out of 3 men, 2 women and 4 children. The probability that there are exactly 2 children in the selection is a. 11/21 b. 9/21 c. 10/21 d. none of these

A. $\frac{11}{21}$

B. $\frac{9}{21}$

C. $\frac{10}{21}$

D. $\frac{19}{21}$

Answer: C

Watch Video Solution

18. Find the probability that a leap year, selected at random, will contain 53 Sundays.

A. $\frac{1}{7}$

B. $\frac{2}{7}$

C. $\frac{6}{7}$

D. $\frac{5}{7}$

Answer: B

Watch Video Solution

19. If P(A) = $\frac{3}{8}$, P(B) = $\frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$ then $P\left(\overline{A} \cap \overline{B}\right)$ equals

A. $\frac{5}{12}$

B. $\frac{7}{12}$

C. $\frac{13}{24}$

D. $\frac{17}{24}$

Answer: C

Watch Video Solution

20. A sample space consists of 4 elements $S = (\alpha_1, \alpha_2, \alpha_3, \alpha_4)$ Which defines a probability function on S $(where \quad \alpha_i \cap \alpha_j \neq \phi \quad \forall \quad i \neq j \text{ and } \cup \alpha_i = S)$

A. $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{3}, P(\alpha_3) = \frac{1}{4}, P(\alpha_4) = \frac{1}{5}$

B. $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{4}, P(\alpha_3) = -\frac{1}{4}, P(\alpha_4) = \frac{1}{2}$

C. $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{4}, P(\alpha_3) = \frac{1}{8}, P(\alpha_4) = \frac{1}{8}$

D. $P(\alpha_1) = \frac{1}{2}, P(\alpha_2) = \frac{1}{4}, P(\alpha_3) = \frac{1}{8}, P(\alpha_4) = 0$

Answer: C

Watch Video Solution

21. If A, B and C are three exhaustive and mutually exclusive events such that $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{2}P(B)$, then $P(A \cup C)$ is

A. $\frac{3}{13}$

B. $\frac{6}{13}$

C. $\frac{7}{13}$

D. $\frac{10}{13}$

Answer: C

Watch Video Solution

22. Five boys and four girls sit in a row randomly. The probability that no two girls sit together

A. $\frac{1}{122}$

B. $\frac{1}{112}$

C. $\frac{1}{102}$

D. $\frac{1}{132}$

Answer: D

Watch Video Solution

23. Three electric bulbs are chosen at random from 15 bulbs of which 5 are defective. The probability that atleast one is defective is

A. $\frac{67}{91}$

B. $\frac{24}{91}$

C. $\frac{57}{91}$

D. $\frac{34}{91}$

Answer: A

Watch Video Solution

24. Six married couples are locked in a room, If two people are chosen at random, then the probability that one is male and the other is a female is

A. $\frac{1}{11}$

B. $\frac{6}{11}$

C. $\frac{10}{11}$

D. $\frac{5}{11}$

Answer: B

Watch Video Solution

25. A word consists of 7 letters : 4 consonants and 3 vowels. If three letters are chosen at random, then the probability that more than one vowel will be selected, is

A. $\frac{13}{35}$

B. $\frac{17}{42}$

C. $\frac{7}{35}$

D. $\frac{13}{42}$

Answer: A

Watch Video Solution

26. If a bag contains 50 tickets, numbered 1, 2, 3,..., 50 of which five are drawn at random and arranged in ascending order of magnitude $(x_1 < x_2 < x_3 < x_4 < x_5)$. The probability that $x_3 = 30$, is

A. $\frac{30}{51}$

B. $\frac{551}{15134}$

C. $\frac{190}{15134}$

D. $\frac{406}{15134}$

Answer: B

Watch Video Solution

27. A point is selected at random from inside a circle. The probability that the point is closer to the circumference of the circle than to its centre, is

A. $\frac{2}{3}$

B. $\frac{1}{3}$

C. $\frac{3}{4}$

D. $\frac{1}{4}$

Answer: C

Watch Video Solution

28. The letters of the word EAMCET are permuted at random. The probability that the two E's will never be together, is

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

Answer: C

Watch Video Solution

29. Find the probability that in a random arrangement of the letters of the word UNIVERSITY the two Is come together.

A. $\frac{10!}{2!}$

B. $\frac{9!}{10!}$

C. $\frac{1}{5}$

D. $\frac{2}{7}$

Answer: C

Watch Video Solution

30. If three dice are throw simultaneously, then the probability of getting a score of 5 is a. 5/216 b. 1/6 c. 1/36 d. none of these

A. $\frac{5}{216}$

B. $\frac{1}{6}$

C. $\frac{1}{36}$

D. $\frac{1}{216}$

Answer: C

Watch Video Solution

31. The probability that a leap year will have 53 Fridays or 3 Saturday is a. 2/7 b. 3/7 c. 4/7 d. 1/7

A. $\frac{2}{7}$

B. $\frac{1}{7}$

C. $\frac{3}{7}$

D. $\frac{4}{7}$

Answer: C

Watch Video Solution

32. Ravi writes 5 letters and addresses 5 envelopes. If the letters are placed in the envelopes at random, then the probability that a least one letter goes into the wrong envelope is

A. $\frac{1}{120}$

B. $\frac{119}{120}$

C. $\frac{1}{60}$

D. $\frac{115}{120}$

Answer: B

Watch Video Solution

33. A and B are two events such that $P(A) = 0.25 \, and \, P(B) = 0.50$. The probability of both happening together is 0.14. the probability of both A and B not happening is 0.39 b. 0.25 c. 0.11 d. none of these

A. 0.39

B. 0.25

C. 0.11

D. 0.22

Answer: A

Watch Video Solution

34. There are 10 cards numbered 1 to 10 in a bag. Two cards are drawn one after other without replacement. The probability that their sum is odd, is

A. $\frac{2}{9}$

B. $\frac{3}{9}$

C. $\frac{7}{9}$

D. $\frac{5}{9}$

Answer: D

Watch Video Solution

35. Out of 10 girls in a class, 3 have blue eyes. If two girls are chosen at random, then the probability that neither has blue eyes, is

A. $\frac{1}{15}$

B. $\frac{7}{15}$

C. $\frac{8}{15}$

D. $\frac{14}{15}$

Answer: B

Watch Video Solution

36. Four cards are drawn at a time from a pack of 5 playing cards. Find the probability of getting all the four cards of the same suit.

A. $\frac{11}{4165}$

B. $\frac{1}{4165}$

C. $\frac{44}{4165}$

D. $\frac{22}{4165}$

Answer: C

Watch Video Solution

37. If from each of the three boxes containing 3 whiter and 1 black, 2 white and 2 black, 1 white and 3 black ball, one bal is drawn at random, then the probability that 2 white and 1 black ball will be drawn is $1/3$ b. $1/6$ c. $1/2$ d. 1/4

A. $\frac{13}{32}$

B. $\frac{1}{4}$

C. $\frac{1}{32}$

D. $\frac{3}{16}$

Answer: A

Watch Video Solution

38. The probability of A to fail in an examination is $\frac{1}{5}$ and that of B is $\frac{3}{10}$. If the probability that both of them fails is $\frac{3}{50}$, then the probability that only one of A and B fails, is

A. $\frac{1}{2}$

B. $\frac{11}{25}$

C. $\frac{19}{50}$

D. $\frac{12}{25}$

Answer: C

Watch Video Solution

39. Five persons entered the lift cabin on the ground floor of an 8 floor house. Suppose that each of them independently and with equal probability can leave the cabin at any floor beginning with the first, then the probability of al 5 persons leaving at different floor is a. $\frac{{}^7P_5}{7^5}$ b. $\frac{7^5}{{}^7P_5}$ c. $\frac{6}{{}^6P_5}$ d. $\frac{{}^5P_5}{5^5}$

A. $\frac{.^7P_5}{7^5}$

B. $\frac{P^5}{.^7P_5}$

C. $\frac{6}{.^6P_5}$

D. $\frac{.^5P_5}{5^5}$

Answer: A

Watch Video Solution

40. If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$, then $P(\overline{A}) + P(\overline{B})$ is equal to

A. 0.3

B. 0.9

C. 0.7

D. 0.5

Answer: B

Watch Video Solution

41. The first twelve letters of the alphabet are written down at random . What is the probability that there are four letters between the A and the B?

A. $\frac{5}{66}$

B. $\frac{7}{53}$

C. $\frac{3}{22}$

D. $\frac{7}{66}$

Answer: D

Watch Video Solution

42. A bag contains 7 red and 3 white balls. Three balls are drawn at random. Probability, that the two balls are red and one is white, is

A. $\frac{21}{40}$

B. $\frac{21}{80}$

C. $\frac{7}{40}$

D. $\frac{7}{80}$

Answer: A

Watch Video Solution

43. A five-digit number is formed by the digit 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4.

A. $\frac{1}{5}$

B. $\frac{4}{5}$

C. $\frac{2}{5}$

D. $\frac{3}{5}$

Answer: A

Watch Video Solution

44. If three distinct number are chosen randomly from the first 100 natural numbers, then the probability that all three of them are divisible by both 2 and 3 is $4/25$ b. $4/35$ c. $4/33$ d. $4/1155$

A. $\frac{4}{25}$

B. $\frac{4}{35}$

C. $\frac{4}{33}$

D. $\frac{4}{1155}$

Answer: D

Watch Video Solution

45. The letters of the word NAVANAVALAVANYAM are arranged in a row at random. The probability that repeated letters of the same kind are together, is

A. $\frac{6(7!)(3!)^2}{16!}$

B. $\frac{(6!)^2(3!)^2}{16!}$

C. $\frac{(7!)^2(3!)^2}{16!}$

D. $\frac{6!7!(3!)^2}{16!}$

Answer: D

Watch Video Solution

46. Six '+' signs and five '-' signs are to be arranged in a row. If the arrangement is at random, then the probability that no 2 '-' sings are together, is

A. $\frac{1}{32}$

B. $\frac{3}{32}$

C. $\frac{21}{22}$

D. $\frac{1}{22}$

Answer: D

Watch Video Solution

47. If four whole numbers taken at random are multiplied together, then find the probability that the least digit in the product is 1, 3, 7 or 9.

A. $\frac{33}{625}$

B. $\frac{16}{625}$

C. $\frac{42}{625}$

D. $\frac{52}{625}$

Answer: B

Watch Video Solution

48. 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, then find the probability that it is rusted or is a nail.

A. $\frac{3}{16}$

B. $\frac{5}{16}$

C. $\frac{11}{16}$

D. $\frac{4}{16}$

Answer: C

Watch Video Solution

49. A locker can be opened by dialing a fixed three digit code from 000 to 999. A stranger who does not know the code, tries to open the locker by dialing three digits at random. Probability, that he opens the locker in first trail, is

A. $\frac{1}{1000}$

B. $\frac{9}{1000}$

C. $\frac{99}{100}$

D. $\frac{99}{1000}$

Answer: A

Watch Video Solution

50. 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 $1/15$ b. $14/15$ c. $1/5$ d. $4/5$

A. $\frac{4}{5}$

B. $\frac{1}{5}$

C. $\frac{1}{15}$

D. $\frac{14}{15}$

Answer: A

Watch Video Solution

51. If A and B are two events such that $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{5}, then \quad P(\overline{B} \mid \overline{A}) =$

A. $\frac{37}{40}$

B. $\frac{37}{45}$

C. $\frac{23}{40}$

D. $\frac{23}{45}$

Answer: A

Watch Video Solution

52. If E and F are independent events such that $0 < P(E) < 1$and $0 < P(F) < 1$, then

A. E and F^C (the complement of the event F) are independent

B. E^C and F^C are independent___

C. $P\left(\frac{E}{F}\right) + P\left(\frac{E^C}{F^C}\right) = 1$

D. All of these

Answer: D

Watch Video Solution

53. If A and B are two independent events such that P (A) = $1/2, P(B) = 1/5,$ then

A. $P(A \mid B) = \frac{1}{2}$

B. $P(A \mid (A \cup B)) = \frac{5}{6}$

C. $P((A \cap B) \mid (A' \cup B')) = 0$

D. All of these

Answer: D

Watch Video Solution

54. Let

$0 < P(A) < 1, 0 < P(B) < 1$ and $P(A \cup B) = P(A) + P(B) - P(A)P$

then,

A. P(B|A) = P(B) - P(A)

B. $P\left(A^C \cup B^C\right) = P\left(A^C\right) + P\left(B^C\right)$

C. $P(A \cup B)^C = P\left(A^C\right).P\left(B^C\right)$

D. P(A|B) = P(A)|P(B)

Answer: C

Watch Video Solution

55. A coin is tossed three times in succession. If E is the event that there are at least two heads and F is the event in which first throw is head, then find $P(E/F)$.

A. $\frac{3}{4}$

B. $\frac{3}{8}$

C. $\frac{1}{2}$

D. $\frac{1}{8}$

Answer: A

Watch Video Solution

56. A dice is thrown three times and the sum of the thrown numbers in 15. Find the probability for which number 4 appears in first throw.

A. $\frac{1}{5}$

B. $\frac{1}{36}$

C. $\frac{1}{9}$

D. $\frac{1}{3}$

Answer: A

Watch Video Solution

57. The dice are thrown. What is the probability that the sum of the numbers appering on the two dices is 11, if 5 appears on the first

A. $\frac{1}{36}$

B. $\frac{1}{6}$

C. $\frac{5}{6}$

D. $\frac{5}{36}$

Answer: B

Watch Video Solution

58. If 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) .P(A/B) is equal to

A. $\frac{2}{5}$

B. $\frac{2}{3}$

C. $\frac{3}{5}$

D. $\frac{3}{4}$

Answer: A

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59. If 4P(A) = 6P(B) = $10P(A \cap B) = 1$, then $P\left(\frac{B}{A}\right)$

A. $\frac{2}{5}$

B. $\frac{3}{5}$

C. $\frac{7}{10}$

D. $\frac{19}{60}$

Answer: A

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60. Indian and four American men and their wives are to be seated randomly around a circular table. Then, the conditional probability that the Indian man is seated adjacent to this wife given that each American man is seated adjacent to his wife is $1/2$ b. $1/3$ c. $2/5$ d. $1/5$

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{2}{5}$

D. $\frac{1}{5}$

Answer: C

Watch Video Solution

61. For a biased die the probabilities for different faces to turn up are given below

The die is tossed and you are told that either face 1 or 2 has turned up. Then the probability that it is face 1, is

A. $\frac{5}{21}$

B. $\frac{5}{22}$

C. $\frac{4}{21}$

D. $\frac{2}{11}$

Answer: A

Watch Video Solution

62. A and B are two events such that P(A)= 0.8, P(B) = 0.6 and P $(A \cap B) = 0.5,$ then the value of P(A/B) is

A. $\frac{5}{6}$

B. $\frac{5}{8}$

C. $\frac{9}{10}$

D. $\frac{5}{7}$

Answer: A

Watch Video Solution

63. One ticket is selected at ransom form 50 tickets numbered $00, 01, 02, \ldots, 49.$ Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, is

A. $\frac{1}{14}$

B. $\frac{1}{7}$

C. $\frac{5}{14}$

D. $\frac{1}{50}$

Answer: A

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

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{1}{2}$

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

65. If the events A and B are mutually exclusive, then P(A/B) =

A. 0

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{3}$

Answer: A

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66. Two aeroplanes I and II bomb a target in succession. The probabilities of I and II scoring a hit correctly are 0.3 and 0.2, respectively. The second plane will bomb only if the first misses the target. The probability that the target is hit by the second plane is (A) 0.06

(B) 0.14 (C) $\frac{7}{22}$ (D) 0.7

A. 0.06

B. 0.14

C. 0.2

D. 0.7

Answer: C

Watch Video Solution

67. If two events A and B are such that $P(A') = 0.3, P(B) = 0.4$ and $P(A \cap B') = 0.5,$ then find the value of $P[B/A \cap B')].$

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

Answer: C

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68. Ina certain town, 40% of the people have brown hair, 25% have brown eyes, and 15% have both brown hair and brown eyes. If a person selected at random from the town has brown hair, the probability that he also has brown eyes is $1/5$ b. $3/8$ c. $1/3$ d. $2/3$

A. $\frac{1}{5}$

B. $\frac{3}{8}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$

Answer: B

Watch Video Solution

69. If E and $F$are the complementary events of events E and F, respectively, and if P(F) $\in$ [0,1]

A. P(E|F) + $P\left(\overline{E} \mid F\right) = 1$

B. P(E|F) + $P\left(E \mid \overline{F}\right) = 1$

C. $P\left(\overline{E} \mid F\right) + P\left(E \mid \overline{F}\right) = 1$

D. $P\left(E \mid \overline{F}\right) + P\left(\overline{E} \mid \overline{F}\right) = 1$

Answer: A

Watch Video Solution

70. As 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.

A. $\frac{3}{8}$

B. $\frac{1}{5}$

C. $\frac{3}{4}$

D. $\frac{3}{5}$

Answer: A

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71. If A and B are two events such that $P(A) > 0 and P(B) \neq 1, then P\left(\frac{\overline{A}}{\overline{B}}\right)$ is equal to (Here $\overline{A} and \overline{B}$ are complements of $A and B$, respectively .) a. $1 - p\left(\frac{A}{B}\right)$ b. $1 - p\left(\frac{\overline{A}}{B}\right)$ c. $\frac{1 - p(A \cup B)}{P(\overline{B})}$ d. $\frac{P(\overline{A})}{P(B)}$

A. $1 - P\left(\frac{A}{B}\right)$

B. $1 - P\left(\frac{\overline{A}}{B}\right)$

C. $\frac{1 - P(A \cup B)}{P(\overline{B})}$

D. $\frac{P(\overline{A})}{P(\overline{B})}$

Answer: C

Watch Video Solution

72. If A and B are two events such that $A \subseteq B$, then P(B|A) is equal to

A. 0

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{3}$

Answer: B

Watch Video Solution

73. A family has two children. If one of them is boy, then the probability that other is also a boy, is

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{3}$

D. $\frac{1}{5}$

Answer: C

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74. A letter is known to have come either from LONDON or CLIFTON. On the envelope just two consecutive letters ON are visible. What is the probability that the letter has come from (i) LONDON (ii) CLIFTON?

A. $\frac{5}{17}$

B. $\frac{12}{17}$

C. $\frac{17}{30}$

D. $\frac{3}{5}$

Answer: B

Watch Video Solution

75. For two events A and B, if $P(A)P\left(\frac{A}{B}\right) = \frac{1}{4}$ and $P\left(\frac{B}{A}\right) = \frac{1}{2}$, then which of the following is not true ?

A. A and B are independent

B. A and B are not independent

C. $P(B'|A') = \frac{1}{2}$

D. $P(B'|A') = \frac{1}{4}$

Answer: A:C

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76. A bag A contains 2 white and 3 red balls another bag B contains 4 white and 5 red balls. A bag is chosen at random and a ball is drawn from it. If the ball drawn is red, what is the probability that the bag B is chosen? [CBSE '04C)

A. $\frac{5}{14}$

B. $\frac{5}{16}$

C. $\frac{5}{18}$

D. $\frac{25}{52}$

Answer: D

Watch Video Solution

77. In a single throw of two dice what is the probability of obtaining a number greater 7, if 4 appears on the first dice ?

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{12}$

D. $\frac{1}{6}$

Answer: B

Watch Video Solution

78. Three coins are tossed. If one of them shows tail, then find the probability that all three coins show tail.

A. $\frac{1}{7}$

B. $\frac{1}{8}$

C. $\frac{2}{7}$

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

79. For $k = 1, 2, 3$ the box B_k contains k red balls and $(k+1)$ white balls. Let $P(B_1) = \frac{1}{2}, P(B_2) = \frac{1}{3}$ and $P(B_3) = \frac{1}{6}$.A box is selected at random and a ball is drawn from it. If a red ball is drawn, then the probability that it has come from box B_2, is

A. $\frac{35}{78}$

B. $\frac{14}{39}$

C. $\frac{10}{13}$

D. $\frac{12}{13}$

Answer: B

Watch Video Solution

80. Two cards are drawn one by one from a pack of cards. The probability of getting first card an ace and second honoured one is (before drawing second card first card is not placed again in the pack)

A. $\frac{1}{26}$

B. $\frac{5}{52}$

C. $\frac{5}{221}$

D. $\frac{4}{13}$

Answer: C

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81. 8 coins are tossed simultaneously. The probability of getting at least 6 heads is

A. $\frac{57}{64}$

B. $\frac{229}{256}$

C. $\frac{7}{64}$

D. $\frac{37}{256}$

Answer: D

Watch Video Solution

82. If three dice are thrown together, then the probability of getting 5 on at least one of them is

A. $\frac{125}{216}$

B. $\frac{215}{216}$

C. $\frac{1}{216}$

D. $\frac{91}{216}$

Answer: D

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83. In binomial probability distribution, mean is 3 and standard deviation is $\frac{3}{2}$. Then the value of p is

A. $\frac{1}{4}$

B. $\frac{3}{4}$

C. $\frac{1}{2}$

D. $\frac{1}{3}$

Answer: A

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84. The probability of a bomb hitting a bridge is $\frac{1}{2}$ and two direct hits are needed to destroy it. The least number of bombs required so that the probability of the bridge being destroyed is greater than 0.9, is :

A. 8

B. 7

C. 6

D. 9

Answer: B

Watch Video Solution

85. In simultaneous toss of 4 coins , what is the probability of getting exactly 3 heads ?

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{6}$

Answer: C

Watch Video Solution

86. A die is tossed twice. Getting a number greater than 4 is considered a success. Then the variance of the probability distribution of the number of success is

A. $\frac{2}{9}$

B. $\frac{4}{9}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$

Answer: B

Watch Video Solution

87. A biased coin with probability $p(0 < p < 1)$ of falling tails is tossed until a tail appears for the first time. If the probability that tail comes in odd number of trials is $\frac{2}{3}$, then p equals

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

Answer: B

Watch Video Solution

88. If two coins are tossed five times, thenthe probability of getting 5 heads and 5 tails is

A. $\frac{63}{256}$

B. $\frac{1}{1024}$

C. $\frac{2}{205}$

D. $\frac{9}{64}$

Answer: A

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89. A dice is thrown 100 times . If getting an even number is considered a success , then the variance of the number of successes is

A. 10

B. 25

C. 18

D. 15

Answer: B

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90. A contest consist of predicting the result win, draw or defeat of 7 football matches. A sent his entry predicting at random. The probability that his entry will contain exactly 4 correct predictions is

A. $\frac{8}{3^7}$

B. $\frac{16}{3^7}$

C. $\frac{280}{3^7}$

D. $\frac{560}{3^7}$

Answer: C

Watch Video Solution

91. In a bag there are three tickets numbered 1,2,3. A ticket is drawn at random and put back, and this is done four times. The probability that the sum of the numbers is even, is

A. $\frac{41}{81}$

B. $\frac{39}{81}$

C. $\frac{40}{81}$

D. $\frac{42}{81}$

Answer: A

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92. Assuming that for a husband-wife couple the chance of their child being a boy or a girl are the same, the probability of their two children being a boy and a girl is

A. $\frac{1}{4}$

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{8}$

Answer: C

Watch Video Solution

93. A bag contains 2 white and 4 black balls . A ball is drawn 5 times with replacement .The probability that atleast 4 of the balls drawn are white is

A. $\frac{8}{141}$

B. $\frac{10}{243}$

C. $\frac{11}{243}$

D. $\frac{8}{41}$

Answer: C

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94. In a binomial distribution , the probability of getting asuccess is $\frac{1}{4}$ and the standard deviation is 3 . Then its mean is

A. 6

B. 8

C. 12

D. 10

Answer: C

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95. If X follows a binomial distribution with parameters $n = 100$ and $p = \frac{1}{3}$, then P(X=r) is maximum, when r equals

A. 16

B. 32

C. 33

D. 50

Answer: C

Watch Video Solution

96. If X has binomial distribution with mean np and variance npq, then $\frac{P(X=r)}{P(X=r-1)}$ is equal to

A. $\frac{n-r}{r-1}\frac{p}{q}$

B. $\frac{n-r+1}{r}\frac{p}{q}$

C. $\frac{n+1}{r}\frac{p}{q}$

D. $\frac{n-1}{r+1}\frac{p}{q}$

Answer: B

Watch Video Solution

97. In a box containing 100 eggs 10 eggs are roten the probability that out of a sample of 5 eggs, none is rotten (if the sampling is with replacement)

A. $\left(\frac{1}{10}\right)^5$

B. $\left(\frac{1}{5}\right)^5$

C. $\left(\frac{9}{5}\right)^5$

D. $\left(\frac{9}{10}\right)^5$

Answer: D

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98. If a die is thrown 7 times, then the probability of obtaining 5 exactly 4 times is

A. $.^7C_4\left(\frac{1}{6}\right)^4\left(\frac{5}{6}\right)^3$

B. $.^7C_4\left(\frac{1}{6}\right)^3\left(\frac{5}{6}\right)^4$

C. $\left(\frac{1}{6}\right)^4\left(\frac{5}{6}\right)^3$

D. $\left(\frac{1}{6}\right)^3\left(\frac{5}{6}\right)^4$

Answer: A

Watch Video Solution

99. A die is thrown 10 times. If getting an even number is considered as a success, then the probability of four successes is

A. $.^{10}C_4\left(\frac{1}{2}\right)^4$

B. $.^{10}C_4\left(\frac{1}{2}\right)^6$

C. $.^{10}C_4\left(\frac{1}{2}\right)^8$

D. $.^{10}C_6\left(\frac{1}{2}\right)^{10}$

Answer: D

Watch Video Solution

100. In a binomial distribution, the mean is 4 and variance is 3. Then its mode is

A. 6

B. 5

C. 4

D. 7

Answer: C

Watch Video Solution

101. A coin is tossed successively three times. The probability of getting exactly one head or 2 heads, is

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{3}{4}$

D. $\frac{1}{3}$

Answer: C

Watch Video Solution

102. If there are n independent trials, p and q are the probability of success and failure respectively, then probability of exactly r success

A. $.^{n}C_{r+1}p^{r}q^{n-r}$

B. $.^{n}C_{r}p^{r-1}q^{r+1}$

C. $.^{n}C_{r}q^{n-r}p^{r}$

D. $.^{n}C_{r}p^{r+1}q^{r-1}$

Answer: C

Watch Video Solution

103. If in a trial the probability of a success is twice the probability of failure , the probability of atleast four sucesses in six trials is

A. $\frac{496}{729}$

B. $\frac{400}{729}$

C. $\frac{500}{729}$

D. $\frac{600}{729}$

Answer: A

Watch Video Solution

104. The probability that a student is not a swimmer is 1/5. Then find the probability that out of 5 students exactly 4 are swimmer.

A. $.^5C_4\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$

B. $\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$

C. $.^5C_1\left(\frac{1}{5}\right)\left(\frac{4}{5}\right)^4 \times .^5C_4$

D. $.^5C_1\left(\frac{4}{5}\right)\left(\frac{1}{5}\right)^4$

Answer: A

Watch Video Solution

105. A coin is tossed $2n$ times. The chance that the number of times one gets head is not equal to the number of times one gets tails is $\frac{(2n!)}{(n!)^2}\left(\frac{1}{2}\right)^{2n}$ b. $1-\frac{(2n!)}{(n!)^2}$ c. $1-\frac{(2n!)}{(n!)^2}\frac{1}{(4^n)}$ d. none of these

A. $\frac{2n!}{(n!)^2}.\left(\frac{1}{2}\right)^{2n}$

B. 1-((2n)!)/((n!)^(2))`

C. 1-((2n)!)/((n!)^(2)).1/4^(n)`

D. $\frac{(2n)!}{(n!)^2}$

Answer: C

Watch Video Solution

106. A coin is tossed 10 times . The probability of getting exactly six head is

A. $\frac{512}{513}$

B. $\frac{105}{512}$

C. $\frac{100}{153}$

D. $\frac{100}{512}$

Answer: B

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107. One coin is thrown 100 times. The probability of coming tails in odd number

A. $\frac{1}{2}$

B. $\frac{1}{8}$

C. $\frac{3}{8}$

D. $\frac{3}{4}$

Answer: A

Watch Video Solution

108. Two cards are drawn successively with replacement from a well shuffled deck of 52 cards. Find the mean and standard deviation of the number of aces.

A. $\frac{1}{13}$

B. $\frac{3}{13}$

C. $\frac{2}{13}$

D. $\frac{4}{13}$

Answer: C

Watch Video Solution

109. If x denotes the number of sixes in four consecutive throws of a dice, then P(x=4) is

A. $\frac{1}{1296}$

B. $\frac{4}{6}$

C. 1

D. $\frac{1295}{1296}$

Answer: A

Watch Video Solution

110. A pair of four dice is thrown independently three times. The probability of getting a score of exactly 9 twice is

A. $\frac{1}{729}$

B. $\frac{8}{9}$

C. $\frac{8}{729}$

D. $\frac{8}{243}$

Answer: D

Watch Video Solution

111. A die is thrown thrice. If getting a four is considered a success, then the mean and variance of the distribution of the number of successes are

A. $\frac{1}{2}, \frac{5}{12}$

B. $\frac{1}{6}, \frac{5}{12}$

C. $\frac{5}{6}, \frac{1}{2}$

D. $\frac{1}{6}, \frac{1}{2}$

Answer: D

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112. The items produced by a firm are supposed to contain 5% defective items. The probability that a smaple of 8 items will contain will less than 2 defective items, is

A. $\frac{27}{20}\left(\frac{19}{20}\right)^7$

B. $\frac{533}{400}\left(\frac{19}{20}\right)^6$

C. $\frac{153}{20}\left(\frac{1}{20}\right)^7$

D. $\frac{35}{16}\left(\frac{1}{20}\right)^6$

Answer: A

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113. A die is tossed thrice. A success is getting 5 or 6 on a toss. The mean and the variance of number of successes

A. $\mu = 1, \sigma^2 = \frac{2}{3}$

B. $\mu = \frac{2}{3}, \sigma^2 = 1$

C. $\mu = 2, \sigma^2 = \frac{2}{3}$

D. $\mu = 1, \sigma^2 = 1$

Answer: A

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114. The probability that a bulb produced by a factory will fuse after 150 days if used is 0.50. what is the probability that our of 5 such bulbs none will fuse after 150 days of use? $1-(19/20)^5$ b. $(19/20)^5$ c. $(3/4)^5$ d. $90(1/4)^5$

A. $1-\left(\frac{19}{20}\right)^5$

B. $\left(\frac{19}{20}\right)^5$

C. $\left(\frac{3}{4}\right)^5$

D. $90\left(\frac{1}{4}\right)^5$

Answer: B

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Assignment Section B Objective Type Questions One Option Is Correct

1. Two dice are thrown simultaneously and three events A, B and C are defined as

A : The sum of the numbers is 10

B : The sum of the numbers is 9

C : The sum of the numbers is 8

If P(E) is the probability of event E, then which of the followings is true ?

A. $P(A) = \frac{1}{11}$

B. $P(B) = \frac{1}{8}$

C. $P(C) = \frac{5}{36}$

D. $P(C) = \frac{1}{9}$

Answer: C

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2. If a coin is tossed four times then the probability of getting tails at least once is

A. $\frac{1}{16}$

B. $\frac{15}{16}$

C. $\frac{13}{16}$

D. $\frac{11}{16}$

Answer: B

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3. A dice is thrown the probability of the event that either en even number appears or odd number appears is

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{6}$

Answer: A

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4. Two dice are thrown simultaneously and the sum of the numbers is noted. If the sum of the numbers is 7 , then the probability is

A. $\frac{1}{5}$

B. $\frac{1}{4}$

C. $\frac{1}{6}$

D. $\frac{1}{2}$

Answer: C

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5. A die is thrown four times and the sum of the numbers is noted. If the sum of the numbers is 23 then the probability is

A. (a) $\frac{1}{324}$

B. (b) $\frac{1}{342}$

C. (c) $\frac{1}{243}$

D. (d) $\frac{1}{322}$

Answer: A

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6. One card is drawn from 52 playing card. The probability that this will be red card or a King is

A. $\frac{7}{13}$

B. $\frac{29}{52}$

C. $\frac{25}{52}$

D. $\frac{23}{52}$

Answer: A

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7. Four cards are drawn at random from a pack of 52 playing cards, one of them is King other is Queen, third is Jack and fourth is Ace. If the probability is $\frac{K}{.^{52}C_4}$, then K is

A. 64

B. 4

C. 16

D. 256

Answer: D

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8. A number k is selected from the set {1, 2, 3, 4, ...10}. If $k^2 - 4k + 3 < 0$ then the probability is

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{3}{10}$

D. $\frac{1}{10}$

Answer: D

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9. Numbers of three digits with repetition using digits {1, 2, 3, ...9} are formed. The probability that a selected number is divisible by 5 is

A. $\frac{2}{9}$

B. $\frac{3}{9}$

C. $\frac{1}{9}$

D. $\frac{1}{8}$

Answer: C

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10. Four digit numbers are formed by using the digits 1, 2, 3, 6 without repetition. The probability that a selected number is divisible by 3 is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. 1

Answer: D

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11. In a game of six digits, two digits are already fixed for prize. If any one will find these two fixed digits then he will win the prize. Mr. A selects two numbers. The probability that Mr. A will win the prize is

A. $\frac{1}{15}$

B. $\frac{1}{6}$

C. $\frac{1}{5}$

D. $\frac{1}{1}$

Answer: A

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12. Three dice are thrown simultaneously. If the probability that numbers on them show are same face is P, then the value of 36P is

A. 3

B. 2

C. 1

D. 4

Answer: C

Watch Video Solution

13. A bag contains 3 red and 5 black balls. Two balls are drawn at random. The probability that one ball is red and other is black is P then the value of 28P - 15 is

A. 1

B. 0

C. $\frac{1}{2}$

D. 2

Answer: B

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14. If n is a positive integer then the probability that 3^n has 3 at unit place is

A. $\frac{1}{4}$

B. $\frac{1}{5}$

C. $\frac{3}{10}$

D. $\frac{1}{8}$

Answer: A

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15. If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(C) = \frac{1}{2}$ and $P(A \cap B) = P(B \cap C) = P(C \cap A) = \frac{1}{4}$ and $P(A \cap B \cap C) = \frac{1}{8}$, then the probability that at least one of them appears is

A. $\frac{17}{24}$

B. $\frac{19}{24}$

C. $\frac{13}{24}$

D. $\frac{11}{24}$

Answer: c

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16. If $P(A) = \frac{1}{2}$ and $P(A \cap B) = \frac{1}{3}$, then the probability that A happens but B does not happen is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{5}{6}$

D. $\frac{1}{6}$

Answer: D

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17. If three distinct number are chosen randomly from the first 100 natural numbers, then the probability that all three of them are divisible by both 2 and 3 is $4/25$ b. $4/35$ c. $4/33$ d. $4/1155$

A. $\frac{1}{231}$

B. $\frac{4}{1155}$

C. $\frac{1}{55}$

D. $\frac{1}{5}$

Answer: B

Watch Video Solution

18. A number is selected from first 100 natural numbers. The probability that number is perfect square or a perfect cube is

A. $\frac{7}{50}$

B. $\frac{3}{25}$

C. $\frac{2}{25}$

D. $\frac{1}{25}$

Answer: B

Watch Video Solution

19. Five horses are in a race. Mr. A selects two of the horses at random and bets on them. The probability that Mr. A selected the winning horse is $3/5$ b. $1/5$ c. $2/5$ d. $4/5$

A. $\frac{3}{5}$

B. $\frac{2}{5}$

C. $\frac{1}{5}$

D. $\frac{4}{5}$

Answer: B

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20. 5 cards are drawn from a pack of 52 cards. The probability that these 5 will contain just one king is

A. $\frac{.^{48}C_4}{.^{52}C_4}$

B. $\frac{.^{48}C_4}{.^{51}C_4}$

C. $\frac{.^{48}C_4}{.^{52}C_5} \times 4$

D. $\frac{.^{48}C_{44}}{.^{51}C_4} \times 4$

Answer: C

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21. Let $n = 2^3 4^5 6^8 5^4$. A positive factor is taken atrandom from the possible positive factors of n.Then the probability that the selected factor is aperfect square and divisible by 100 is

A. $\frac{5}{99}$

B. $\frac{10}{99}$

C. $\frac{1}{6}$

D. $\frac{71}{99}$

Answer: B

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22. If $pandq$ are chosen randomly from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ with replacement, determine the probability that the roots of the equation $x^2 + px + q = 0$ are real.

A. 0.62

B. 0.32

C. 0.44

D. 0.55

Answer: A

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23. 12 members of a committee are to sit down at random round a table. Probability that there are 3 members between the two particular members A and B, is

A. $\frac{2}{11}$

B. $\frac{7}{11}$

C. $\frac{4}{11}$

D. $\frac{5}{11}$

Answer: A

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24. Two integers x and y are chosen with replacement out of the set {0, 1, 2, . . . 10}. The probability that |x - y| doesn't exceed 5 is

A. $\frac{5}{11}$

B. $\frac{81}{121}$

C. $\frac{3}{11}$

D. $\frac{91}{121}$

Answer: D

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25. Dialling a telephone number an old man forgets the last two digits remembering only that these are different dialled at random. The probability that the number is dialled correctly is $1/45$ b. $1/90$ c. $1/100$ d. none of these

A. $\frac{1}{90}$

B. $\frac{1}{45}$

C. $\frac{2}{45}$

D. $\frac{89}{90}$

Answer: D

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26. There are four balls of different colours and four boxes of colours same as those of the balls. Find the number of ways in which the balls,

one in each box, could be placed such that a ball is not placed in the box of its own colour.

A. $\frac{5}{8}$

B. $\frac{3}{8}$

C. $\frac{1}{8}$

D. $\frac{7}{8}$

Answer: B

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27. Four digit number is formed from all possible ways. The probability that a number xyzt chosen from the number satisfy $x < y = z > t$ is (A) $\frac{2}{75}$ (B) $\frac{3}{75}$ (C) $\frac{2}{25}$ (D) $\frac{3}{25}$

A. $\frac{2}{75}$

B. $\frac{3}{75}$

C. $\frac{2}{25}$

D. $\frac{3}{25}$

Answer: A

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28. If $P(B) = 3/4, P(A \cap B \cap C) = 1/3$ and $P(A \cap B \cap C) = 1/3, then P(B \cap C)$ is $1/12$ b. $1/6$ c. $1/16$ d. $1/9$

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{1}{15}$

D. $\frac{1}{9}$

Answer: A

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29. Given two events A and B. If odds against A are as 2 : 1 and those in favor of A $\cup$ B are as 3 : 1, then find the range of P(B).

A. $\frac{1}{2} \leq P(B) \leq \frac{3}{9}$

B. $\frac{5}{12} \leq P(B) \leq \frac{3}{4}$

C. $\frac{1}{2} \leq P(B) \leq \frac{3}{5}$

D. $\frac{1}{3} \leq P(B) \leq \frac{3}{4}$

Answer: B

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30. A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that these are of the same colour is $\frac{5}{108}$ b. $\frac{18}{108}$ c. $\frac{31}{108}$ d. $\frac{48}{108}$

A. $\frac{5}{108}$

B. $\frac{18}{108}$

C. $\frac{30}{108}$

D. $\frac{48}{108}$

Answer: D

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31. 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 $1/15$ b. $14/15$ c. $1/5$ d. $4/5$

A. $\frac{1}{15}$

B. $\frac{14}{15}$

C. $\frac{1}{5}$

D. $\frac{4}{5}$

Answer: D

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32. Out of 20 consecutive numbers, two are chosen at random, the probability that their sum is odd is

A. $\frac{9}{10}$

B. $\frac{11}{20}$

C. $\frac{10}{19}$

D. $\frac{10}{21}$

Answer: C

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33. Out of n persons sitting at a round table, three, A, B, C are chosen at random. The chance that no two of these are sitting next to one another is

A. $\frac{(n-4)(n-5)}{2 \times (n-1)}$

B. $\frac{(n-4)(n-5)}{2\times(n-1)(n-2)(n-3)}$

C. $\frac{(n-4)(n-5)}{(n-1)(n-2)}$

D. $\frac{n(n-4)}{(n-1)(n-2)}$

Answer: C

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34. In a singing competition a group of 10 pepole, participate, each person has exactly one friend and rest are strangers, the probability that both the singers of the duet are complete strangers is

A. $\frac{1}{15}$

B. $\frac{1}{45}$

C. $\frac{8}{9}$

D. $\frac{22}{45}$

Answer: C

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35. If A and B are two independent events such that $P(A) = \frac{7}{10}$, $P(B') = \alpha, P(A \cup B) = \frac{8}{10}$, then α =

A. $\frac{2}{7}$

B. $\frac{5}{7}$

C. $\frac{2}{3}$

D. $\frac{3}{7}$

Answer: A

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36. $P(A \cup B) = P(A \cap B)$ if and only if the relation between P(A) and P(B) is .....

A. P(A)+P(B) = 2P(A)P$\left(\frac{B}{A}\right)$

B. P(A)+P(B) = 2P(A)P$\left(\frac{A}{B}\right)$

C. P(A) +P(B) = 2P(A)P(B)

D. P(A) + P(B) = P(A)P(B)

Answer: A

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37. The probability that a man aged 50 years will die in a year is p. The probability that out of n men $A_1, A_2, A_3, \ldots\ldots, A_n$ each aged 50 year, A_1 will die and first to die is

A. $\frac{1-(1-p)^n}{n}$

B. $\frac{1-(1-p)^n}{n^2}$

C. $1-(1-p)^n$

D. $\frac{\left[1-(1-p)^n\right]^2}{n^2}$

Answer: A

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38. about to only mathematics

A. p + m + c = $\frac{27}{20}$, pmc = $\frac{1}{10}$

B. p + m + c = $\frac{19}{20}$, pmc = $\frac{3}{10}$

C. p + m + c = $\frac{17}{20}$, pmc = $\frac{7}{10}$

D. p + m + c = $\frac{13}{20}$, pmc = $\frac{1}{4}$

Answer: A

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39. If A,B and C are three events, such that P(A)=0.3, P(B)=0.4, P(C)=0.8, P(AB)=0.08, P(AC)=0.28, P(ABC)=0.09. If $P(A \cup B \cup C) \geq 0.75$, then show that P(BC) kies in the interval $0.23 \leq x \leq 0.48$

A. [0.12, 0.67]

B. [0.12, 0.48]

C. [0.21, 0.46]

D. [0.23, 0.67]

Answer: C

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40. A box contains N coins, m of wiich are fair and the rest are biased. The probability of getting a head when a fair coin is tossed is 1/2, while it is 2/3 when a biased coin is tossed. A coin is drawn from the box at random and is tossed twice. The first time it shows head and the second time it shows tail. What is the probability that the coin drawn is fair ?

A. $\frac{9m}{8N+m}$

B. $\frac{9m}{N+8m}$

C. $\frac{4m}{8N+m}$

D. $\frac{4m}{N+8m}$

Answer: A

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41. Bag A contains 2 white and 3 red marbles and bag B contains 4 white and 5 red marbles. One marble is drawn at random from one of the bags and is found to be red. The probability that it was drawn from the bag B is

A. $\frac{4}{13}$

B. $\frac{25}{52}$

C. $\frac{36}{65}$

D. $\frac{41}{78}$

Answer: B

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42. A and B are two independent witnesses in a case. The probability that A will speak the truth is x and the probability that B will speak the truth is y. A and B agree on a certain statement. The probability that the statement is true is

A. $\frac{2xy}{1-x-y+xy}$

B. $\frac{xy}{1-x-y+2xy}$

C. $\frac{xy}{1+x+y-xy}$

D. $\frac{2xy}{1+x+y-xy}$

Answer: B

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43. Let A and B be two independent events with P(A) = p and P(B) = q. If p and q are the roots of the equation $ax^2 + bx + c = 0$, then the probability of the occurrence of at least one of the two events is

A. $\frac{b+c}{a}$

B. $\frac{b-c}{a}$

C. $\frac{-(b+c)}{a}$

D. $\frac{-b+c}{a}$

Answer: C

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44. A circle of maximum area is inscribed in an ellipse. If p is the probability that a point within the ellipse chosen at random lies outside the circle, then the eccentricity of the ellipse is

A. $\sqrt{1-p}$

B. $\sqrt{1-(1-p)^2}$

C. $\sqrt{1-p^2}$

D. $\sqrt{(1+p)^2-1}$

Answer: B

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45. The probability of a candidate passing an examination at any one attempt is $\frac{3}{5}$.He carries on entering until he passes and each entry costs him Rs. 1. The expected cost of his passing the exam is (in Rs)

A. $\frac{25}{9}$

B. $\frac{5}{3}$

C. $\frac{125}{27}$

D. $\frac{625}{81}$

Answer: B

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46. Hari and Krishna throw with one die for prize of Rs. 121, which will bw won by a player who throws 4 first. If Hari starts, then the mathematical expectation for Krishna is

A. Rs. 57

B. Rs. 104

C. Rs. 55

D. Rs. 98

Answer: C

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47. Three player A, B and C, toss a coin cyclically in that order (that is $A, B, C, A, B, C, A, B, \ldots$) till a headshows. Let p be the probability that the coin shows a head. Let α, β and γ be, respectively, the probabilities that A, B and C gets the first head. Then determine α, β and γ (in terms of p).

A. $\alpha = \frac{p}{1-q^3}$, where q = 1 - p

B. $\beta = \frac{p(1-p)}{1-q^3}$

C. $\gamma = \frac{p-2p^2+P^3}{1-q^3}$

D. All of these

Answer: D

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48. Let S = {1, 2, ... 100}. The probability of choosing an integer k, $1 \leq k \leq 100$ is proportional to log k. The conditional probability of choosing the integer 2, given that an even integer is chosen is

A. $\frac{\log 2}{50 \log 2 + \log(50)!}$

B. $\frac{\log 2}{100 \log 2 + \log(50)!}$

C. $\frac{\log 2}{50 \log 2 + \log(100)!}$

D. $\frac{\log 2}{100 \log 2 + (100)!}$

Answer: A

Watch Video Solution

49. If m things are distributed among a men and b women. Then the probability that number of things received by men is odd is

A. $\frac{1}{2}\left[\frac{(b+a)^m+(b-a)^m}{(b+a)^m}\right]$

B. $\frac{1}{2}\left[\frac{(a+b)^m}{(a-b)^m}\right]$

C. $\frac{1}{2}\left[\frac{(b+a)^m-(b-a)^m}{(b+a)^m}\right]$

D. Data inadequate

Answer: C

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50. Digits 1, 2, 3, ... 9 are written in a random order to form a 9 digit number. If the number happens to be divisible by 4. Then probability that

it will be divisible by 36 is given by

A. $\frac{2}{9}$

B. $\frac{3}{4}$

C. $\frac{7}{9}$

D. 1

Answer: D

Watch Video Solution

51. If n biscuits are distributed among N beggars, find the chance that a particular beggar will get `r(

A. $\frac{.^{n}C_{r}(N-1)^{n-r}}{N^{n}}$

B. $.^{n}C_{r}.\frac{(N-1)^{n-r+1}}{N^{n}}$

C. $\frac{.^{n}C_{r}.(N-2)^{n-r}}{N^{n+1}}$

D. $\frac{.^{n}C_{r}.(N-1)^{n-r}}{N^{n+1}}$

Answer: A

Watch Video Solution

52. There are 5 duplicate and 10 of original items in an automobile shop and 3 items are bought at random by a customer. The probability that none of the items is duplicate, is :

A. $\frac{20}{91}$

B. $\frac{22}{91}$

C. $\frac{24}{91}$

D. $\frac{89}{91}$

Answer: C

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53. A consignment of 15 record players contain 4 defectives. The record players are selected at random, one by one and examined. The one examined is not put back. Then : Find the Probability that 9^{th} one examined is the last defective is $\frac{8}{195}$.

A. $\frac{7}{195}$

B. $\frac{11}{195}$

C. $\frac{8}{195}$

D. $\frac{13}{195}$

Answer: C

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54. A coin is tossed 15 times, then find the probability that exactly 9 consecutive heads appears, is

A. $\frac{7}{2^{11}}$

B. $\frac{9}{2^{11}}$

C. $\frac{11}{2^{11}}$

D. $\frac{13}{2^{11}}$

Answer: B

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55. A team of 8 couples, (husband and wife) attend a lucky draw in which 4 persons picked up for a prize. Then, inprobability that there is at least one couple is

A. $\frac{11}{39}$

B. $\frac{12}{39}$

C. $\frac{14}{39}$

D. $\frac{15}{39}$

Answer: D

Watch Video Solution

56. Three persons A, B and C speak at a function along with 5 other persons. If the persons speak at random, find the probability that A speaks before B and B speaks before C

A. $\frac{3}{8}$

B. $\frac{1}{6}$

C. $\frac{3}{5}$

D. $\frac{5}{6}$

Answer: B

Watch Video Solution

57. Three numbers are selected at random without replacement from the set of numbers {1, 2, 3, ... n}. The conditional probability that the 3rd

number lies between the 1st two. If the 1st number is known to be smaller than the 2nd, is

A. $\frac{1}{6}$

B. $\frac{2}{3}$

C. $\frac{1}{3}$

D. $\frac{5}{6}$

Answer: C

Watch Video Solution

58. One hundred identical coins, each with probability 'p' of showing heads are tossed once. If $0 < p < 1$ and the probability of heads showing on 50 coins is equal to that of heads showing on 51 coins, then the value of p is

A. $\frac{1}{2}$

B. $\frac{51}{101}$

C. $\frac{49}{101}$

D. $\frac{47}{101}$

Answer: B

Watch Video Solution

59. about to only mathematics

A. $\frac{119}{128}$

B. $\frac{117}{128}$

C. $\frac{113}{128}$

D. $\frac{111}{128}$

Answer: A

Watch Video Solution

60. A biased die is tossed and the respective probabilities for various faces to turn up are

Face	:	1	2	3	4	5	6
Probability	:	0.1	0.24	0.19	0.18	0.15	0.14

If an even face has turned up, then the probability that it is face 2 or face 4, is

A. 0.25

B. 0.42

C. 0.75

D. 0.9

Answer: C

Watch Video Solution

61. about to only mathematics

A. $\frac{196}{{}^{64}C_3}$

B. $\frac{49}{{}^{64}C_3}$

C. $\frac{36}{{}^{64}C_3}$

D. $\frac{98}{{}^{64}C_3}$

Answer: A

Watch Video Solution

62. 2 cards are selected randomly from a pack of 52 cards. The probability that the first card is a club and second is not a king, is

A. $\frac{82}{221}$

B. $\frac{41}{221}$

C. $\frac{1}{221}$

D. $\frac{4}{17}$

Answer: B

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63. If x and y co-ordinates of any point P are chosen randomly from intervals $[0, 2]$ and $[0, 1]$ respectively, then the probability $y \leq x^2$ is (A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) $\frac{3}{4}$ (D) $\frac{1}{4}$

A. $\frac{1}{2}$

B. $\frac{2}{3}$

C. $\frac{3}{4}$

D. $\frac{1}{4}$

Answer: B

Watch Video Solution

64. Five different games are to be distributed among 4 children randomly. The probability that each child get at least one game is $1/4$ b. $15/64$ c. $5/9$ d. $7/12$

A. $\frac{1}{4}$

B. $\frac{15}{64}$

C. $\frac{13}{64}$

D. $\frac{17}{64}$

Answer: B

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Assignment Section C Objective Type Questions More Than One Options Are Correct

1. If A and B are two events, the probability that exactly one of them occurs is given by

A. $P\left(A \cup \overline{B}\right) + P\left(\overline{A} \cap B\right)$

B. $P(A \cup B) - P(A \cap B)$

C. P(A) + P(B)

D. $P(A) + P(B) - 2P(A \cap B)$

Answer: A::D

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2. There are 7 seats in a row. Three persons take seats at random the probability that the middle seat is always occupied and no two persons are consecutive is

A. $\frac{8}{35}$

B. $\frac{4}{35}$

C. $\frac{4}{.^7C_3}$

D. $\frac{.^4C_1}{.^7C_3}$

Answer: B::C::D

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3. Box A has 3 white and 2 red balls, box B has 2 white and 4 red balls. If two balls are selected at random without replacements from the box A and 2 more are selected at random from B, the probability that all the four balls are white is

A. $\frac{1}{10}$

B. $\frac{1}{50}$

C. $1-\left(\frac{.^2C_2}{.^5C_2}.\frac{.^4C_2}{.^5C_2}\right)$

D. $\frac{.^3C_2.^2C_2}{.^5C_2.^6C_2}$

Answer: B::D

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4. If $P(A)=\frac{2}{3}, P(B)=\frac{4}{9}$ and $P(A\cap B)=\cap$, then $P(A'\cap B')$ is greater than or equal to`

A. $\frac{37}{45}$

B. $\frac{1}{5}$

C. $\frac{4}{5}$

D. $\frac{41}{45}$

Answer: A::B::C

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5. If A and B are two events such that $P(A \cup B) = \frac{3}{4}, P(A \cap B) = \frac{1}{4}$ and $P(\overline{A}) = \frac{2}{3}$ then $P(\overline{A} \cap B)$ is equal to

A. $P(\overline{A} \cap B) = \frac{5}{12}$

B. $P(B) = \frac{2}{3}$

C. $P(\overline{A} \cup \overline{B}) = \frac{1}{4}$

D. $P(\overline{A} \cup \overline{B}) = \frac{3}{4}$

Answer: A::B::D

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6. Two dices are rolled and numbers r_1 and r_2 are chosen. Let $1+\omega^{r_1}+\omega^{r_2}=\lambda$ (where ω is a complex cube root of unity). Then

A. The probability that λ is zero is $\frac{1}{9}$

B. The probability that λ is zero is $\frac{2}{9}$

C. The probability that λ is 3 is $\frac{1}{9}$

D. The probability that λ is 3 is $\frac{2}{9}$

Answer: B::C

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7. Delegates of the five of the member countries of SAARC decide to hold a round table conference. There are 2 Indians, 2 Bangladeshis, 2 Pakistanis, 2 Srilankans and 2 Nepalis. The probability that people of same nationality sit together is

A. $\frac{3!\times(2!)^5}{9!}$

B. $\frac{2}{189}$

C. $\frac{(4!) \times (2!)^5}{9!}$

D. $\frac{2}{945}$

Answer: C::D

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8. If a Grand father along with his two grandsons and four grand daughters are to be seated in a line for a photograph so that he is always in the middle then the probability that his two grandsons are never adjacent to each other is

A. $\frac{6! - 4!.4.2!}{6!}$

B. $\frac{192}{720}$

C. $\frac{528}{720}$

D. $\frac{4}{15}$

Answer: A::C

Watch Video Solution

9. A quadratic equation is cjoen from the set of all quadratic equations which are unchanged by squaring the roots. The chance that the chosen equation has equal root, is

A. $\frac{2}{3}$

B. $\frac{3}{4}$

C. $\frac{3}{8}$

D. $\frac{7}{16}$

Answer: A

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10. A sample space consists of 3 sample points with associated probabilities given as $2p, p^2, 4p-1$. Then the value of p is p= a.$\sqrt{11}-3$ b. $\sqrt{10}-3$ c. $\frac{1}{4}<p<\frac{1}{2}$ d.none

A. p is an irrational number

B. p is a rational number

C. p is greater than $\frac{1}{2}$

D. p is less than $\frac{1}{2}$

Answer: A::D

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11. If A and B are two independent events such that $P(\overline{A}\cap B)=2/15$ and $P(A\cap\overline{B})=1/6, then P(B)$ is

A. $\frac{1}{5}$

B. $\frac{1}{6}$

C. $\frac{4}{5}$

D. $\frac{5}{6}$

Answer: B::C

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12. For two events A and B let, $P(A) = \frac{3}{5}, P(B) = \frac{2}{3}$, then which of the following is/are correct ?

A. $P(A \cap B') \leq \frac{1}{3}$

B. $P(A \cup B) \geq \frac{2}{3}$

C. $\frac{4}{15} \leq P(A \cap B) \leq \frac{3}{5}$

D. $\frac{2}{5} \leq P(A/B) \leq \frac{9}{10}$

Answer: A::B::C::D

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13. An unbiased coin is tossed n times. Let X denote the number of times head occurs. If $P(X=4), P(X=5)$ and $P(X=6)$ are in A.P, then the value of n can be

A. 15

B. 7

C. 9

D. 14

Answer: B::D

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14. A fair coin is tossed 99 times. Let X be the number of times heads occurs. Then (P(X=r) is maximum when r is

A. 49

B. 50

C. 51

D. 48

Answer: A::B

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15. Consider the following events for a family with children

A = {Children of both sexes}

B = {At-most one boy}

Then which of the following statements is true?

A. A and B are independent events if a family has 3 children

B. A and B are not independent events if a family has 3 children

C. A and B are not independent events if a family has only 2 children

D. A and B are independent events if a family has only 2 children

Answer: A::C

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16. A fair coin is tossed three times. Consider the events

A = {First toss is head}

B = {Second toss is head}

C = {Exactly two heads in a raw}

Which of the following statements is true?

A. A and B are independent

B. A and B are not independent

C. A and C are independent

D. B and C are not independent

Answer: A::C::D

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17. Two 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 the value of $P(B)$ is:

A. $P(A\cup B)\geq\frac{1}{2}$

B. $P(A\cap B)\leq\frac{1}{3}$

C. $P\left(A\cap\overline{B}\right)\geq\frac{1}{6}$

D. $P\left(\overline{A}\cup\overline{B}\right)\leq\frac{2}{3}$

Answer: A::B::C::D

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18. A, B, C in order roll a dice on the condition that one who gets a six, first wins then which of the following are true

A. A chances $\frac{36}{91}$

B. B chances $\frac{5}{6}.\frac{36}{91}$

C. C chances $\left(\frac{5}{6}\right)^2\frac{36}{91}$

D. All three has same chances

Answer: A::B::C

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19. There are 3 men, 2 women and 4 children. If 4 persons are selected then which of the following is/are true?

A. Probability of selecting exactly 2 children = $\frac{10}{21}$

B. Probability of selecting atmost 2 children = $\frac{5}{6}$

C. Probability of selecting exactly 2 children = $\frac{5}{21}$

D. Probability of selecting atmost 2 children = $\frac{25}{42}$

Answer: A::B

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20. If the letters of word ASSASSIN are written at random in a raw, then which of following are true?

A. Probability that all 'S' come together is $\frac{1}{14}$

B. Probability that all 'S' do not come together is $\frac{1}{7}$

C. Probability that no two 'S' come together is $\frac{1}{14}$

D. Probability that vowels occupy places of vowel only is $\frac{1}{56}$

Answer: A::C::D

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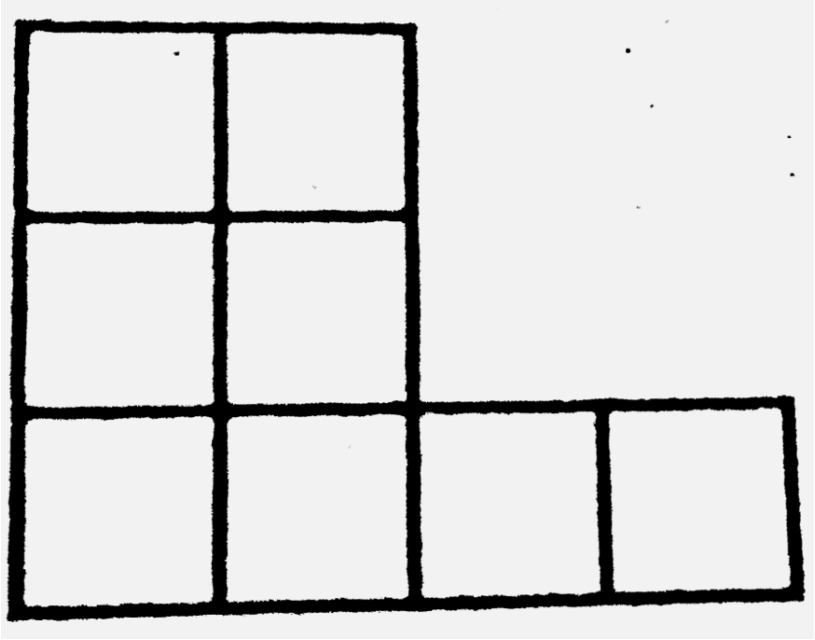
21. If alphabets of word RAKESH are written in given boxes, then probability that no row remains empty is



A. $\frac{13}{14}$

B. $\frac{.^8C_6 - 4}{.^8C_6}$

C. $\frac{11}{13}$

D. $\frac{.^8C_6 - 2}{.^8C_6}$

Answer: A::D

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Assignment Section D Linked Comprehension Type Questions

1. Three vertices are chosen at random from the vertices of a regular hexagon then

The probability that the triangle with these vertices is an equilateral triangle is equal to

A. $\frac{1}{10}$

B. $\frac{3}{5}$

C. $\frac{9}{10}$

D. $\frac{3}{10}$

Answer: A

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2. Three vertices are chosen at random from the vertices of a regular hexagon then

The probability that the triangle has exactly two sides common with the side of the hexagon is

A. $\frac{1}{10}$

B. $\frac{3}{5}$

C. $\frac{3}{10}$

D. $\frac{9}{10}$

Answer: B

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3. Three vertices are chosen at random from the vertices of a regular hexagon then

The probability that the triangle has exactly two sides common with the side of the hexagon is

A. $\frac{1}{10}$

B. $\frac{3}{5}$

C. $\frac{3}{10}$

D. $\frac{9}{10}$

Answer: C

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4. 5 Indian and 5 Russian couples meet at a party and shake hands.

The probability that no wife shakes hands with her husband is

A. $\frac{3}{5}$

B. $\frac{18}{19}$

C. $\frac{23}{38}$

D. $\frac{27}{38}$

Answer: B

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5. 5 Indian and 5 Russian couples meet at a party and shake hands.

The probability that no Indian wife shakes hands with a male is

A. $\frac{14}{19}$

B. $\frac{9}{19}$

C. $\frac{27}{38}$

D. $\frac{27}{28}$

Answer: A

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6. 5 Indian and 5 Russian couples meet at a party and shake hands.

The probability that no wife shakes hands with her husband and no Indian wife shakes hands with a male is

A. $\frac{23}{38}$

B. $\frac{27}{38}$

C. $\frac{9}{19}$

D. $\frac{3}{5}$

Answer: B

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7. Different words are being formed by arranging the letters of the word "SUCCESS".

The probability of selecting a word that begins and ends with S is

A. $\frac{2}{35}$

B. $\frac{8}{35}$

C. $\frac{24}{105}$

D. 1

Answer: B

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8. Different words are being formed by arranging the letters of the word "SUCCESS".

The probability of selecting a word that begins and ends with S is

A. $\frac{1}{7}$

B. $\frac{2}{7}$

C. $\frac{2}{35}$

D. $\frac{2}{5}$

Answer: A

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9. There are 20 pairs of shoes in a cupboard. Ten shoes are taken at random. The probability that exactly three complete pairs are possible from the

selected shoes is

A. $\frac{.^{20}C_3 \times .^{17}C_4 \times 2^4}{.^{40}C_{10}}$

B. $\frac{.^{20}C_{10} \times 2^{10}}{.^{40}C_{10}}$

C. $\frac{.^{20}C_4 \times .^{16}C_2 \times 2^2 + .^{20}C_5}{.^{40}C_{10}}$

D. $\frac{.^{20}C_{10}}{.^{40}C_{10}}$

Answer: B

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10. There are 20 pairs of shoes in a cupboard. Ten shoes are taken at random. The probability that exactly three complete pairs are possible from the

selected shoes is

A. (a) $\frac{20C_3 \times 17C_4 \times 2^4}{40C_{10}}$

B. (b) $\frac{20C_{10} \times 2^{10}}{40C_{10}}$

C. (c) $\frac{20C_4 \times 16C_2 \times 2^2 \times 20C_5}{40C_{10}}$

D. (d) $\frac{20C_3 \times 17C_4}{40C_{10}}$

Answer: A

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11. There are 20 pairs of shoes in a cupboard. Ten shoes are taken at random. The probability that exactly three complete pairs are possible from the

selected shoes is

A. $\frac{.^{20}C_3 \times .^{17}C_4 \times 2^4}{.^{40}C_{10}}$

B. $\frac{.^{20}C_{10} \times 2^{10}}{.^{40}C_{10}}$

C. $\frac{.^{20}C_4 \times .^{16}C_2 \times 2^2 + .^{20}C_5}{.^{40}C_{10}}$

D. $\frac{.^{20}C_4 + .^{20}C_5}{.^{40}C_{10}}$

Answer: C

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12. A class of problems that requires one to use permutations and combinations for computing probability has at its heart notion of sets and subsets. They are generally an abstract formulation of some concrete situation and require the application of counting techniques.

A is a set containing 10 elements. A subset P_1 of A is chosen and the set A is chosen and the set A is reconstructed by replacing the elements of P_1. A subset P_2 of A is chosen and again the set A is reconstructed by replacing the elements of P_2. This process is continued by choosing subsets $P_1, P_2, \ldots P_{10}$.

The number of ways of choosing subsets $P_1, P_2, \ldots P(10)$ is

A. A) 4^{100}

B. B) 2^{100}

C. C) 2^{20}

D. D) 4^{20}

Answer: B

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13. A class of problems that requires one to use permutations and combinations for computing probability has at its heart notion of sets and subsets. They are generally an abstract formulation of some concrete situation and require the application of counting techniques.

A is a set containing 10 elements. A subset P_1 of A is chosen and the set A is chosen and the set A is reconstructed by replacing the elements of P_1. A subset P_2 of A is chosen and again the set A is reconstructed by replacing the elements of P_2. This process is continued by choosing subsets $P_1, P_2, ...P_{10}$.

The probability that $P_i \cap P_j = \phi \quad \forall \quad i \neq j, i, j = 1, 2, ... , 10$ is

A. A. $\frac{11^{10}}{4^{100}}$

B. B. $\frac{10^{11}}{2^{100}}$

C. C. $\frac{11^{10}}{2^{100}}$

D. D, $\frac{10^{11}}{4^{100}}$

Answer: C

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14. A class of problems that requires one to use permutations and combinations for computing probability has at its heart notion of sets and subsets. They are generally an abstract formulation of some concrete situation and require the application of counting techniques.

A is a set containing 10 elements. A subset P_1 of A is chosen and the set A is chosen and the set A is reconstructed by replacing the elements of P_1. A subset P_2 of A is chosen and again the set A is reconstructed by replacing the elements of P_2. This process is continued by choosing subsets $P_1, P_2, ...P_{10}$.

The probability that $P_1 \cap P_2 \cap ...P_{10} = \phi$ is

A. A) $\frac{(1023)^{10}}{2^{100}}$

B. B) $\frac{(1025)^{10}}{4^{100}}$

C. C) $\frac{(1023)^{10}}{4^{100}}$

D. D) $\frac{(1025)^{10}}{2^{100}}$

Answer: A

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15. Let A, B and C be three mutually exclusive events such that P(A) = p_1, P(B) = p_2 and P(C) = p_3. Then,

Let $p_1 = \frac{1}{2}(1-p), p_2 = \frac{1}{3}(1+2p)$ and $p_3 = \frac{1}{5}(2+3p)$, then p belongs to

A. ϕ

B. (-1, 2)

C. $\left(-1, \frac{1}{47}\right)$

D. $\left(-\frac{1}{3}, \frac{2}{3}\right)$

Answer: A

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16. Suppose E_1, E_2 and E_3 be three mutually exclusive events such that $P(E_i) = p_i$ for $i = 1, 2, 3.$

If p_1, p_2 and p_3 are the roots of $27x^3 - 27x^2 + ax - 1 = 0$ the value of a is

A. 3

B. 6

C. 9

D. $\frac{1}{3}$

Answer: C

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17. Let A, B and C be three mutually exclusive events such that P(A) = $p_1, P(B) = p_2$ and $P(C) = p_3$. Then,

Let $p_1 = \frac{1}{3}(1 + 3p), p_2 = \frac{1}{4}(1 - p)$ and $p_3 = \frac{1}{4}(1 - 2p)$, then p belongs to

A. (-1, 0)

B. $\left(-\frac{2}{3}, \frac{2}{3} \right)$

C. $\left(-\frac{1}{3}, 1\right)$

D. $\left(-\frac{1}{9}, \frac{1}{4}\right)$

Answer: D

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18. Let bag A contains 3 red balls and 9 black balls. Bag B contains 8 red balls and 4 black balls. Bag C contains 10 red balls and 2 black balls. A card is drawn from a well shuffled pack of 52 playing cards. If a face card is drawn, a ball is selected from Bag A. If an ace is drawn, a ball is selected from Bag B. If any other card is drawn , a ball is selected from Bag C.

The conditional probability that a bag A was one from which a ball was selected ,given that a red ball is selected is

A. $\frac{107}{156}$

B. $\frac{15}{26}$

C. $\frac{3}{52}$

D. $\frac{4}{39}$

Answer: A

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19. Let bag A contains 3 red balls and 9 black balls. Bag B contains 8 red balls and 4 black balls. Bag C contains 10 red balls and 2 black balls. A card is drawn from a well shuffled pack of 52 playing cards. If a face card is drawn, a ball is selected from Bag A. If an ace is drawn, a ball is selected from Bag B. If any other card is drawn , a ball is selected from Bag C.

The conditional probability that Bag A was one from which a ball was selected, given that the ball selected was red

A. $\frac{156}{107} \times \frac{1}{3}$

B. $\frac{9}{107}$

C. $\frac{3}{52}$

D. $\frac{3}{107}$

Answer: B

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20. Let bag A contains 3 red balls and 9 black balls. Bag B contains 8 red balls and 4 black balls. Bag C contains 10 red balls and 2 black balls. A card is drawn from a well shuffled pack of 52 playing cards. If a face card is drawn, a ball is selected from Bag A. If an ace is drawn, a ball is selected from Bag B. If any other card is drawn , a ball is selected from Bag C.

The conditional probability that Bag B was one from which a ball was selected, given that the ball selected was black is

A. $\frac{9}{107}$

B. $\frac{4}{49}$

C. $\frac{98}{107}$

D. $\frac{45}{49}$

Answer: B

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Assignment Section E Assertion Reason Type Questions

1. Statement -1 : Let A and B be two mutually exclusive events such that $P(A) = \frac{1}{3}, P(B) = \frac{1}{2}$ then $P(A' \cap B') = \frac{1}{6}$

Statement -2 In case of mutually exclusive events $P(A \cup B) = P(A) + P(B)$.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: A

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2. Statement -1 : if the odds against an event is $\frac{2}{3}$, then probability of occuring of the event is $\frac{3}{5}$.

Statement-2 : For two events A and B, $P(A' \cap B') = 1 - P(A \cup B)$.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -2

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -2

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: B

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3. Let for two events A and B, $P(A) = p$ and $P(B) = q$.

Statement-1 : The probability that exactly one of the event A and B occurs is $p + q - 2pq$

Statement-2 : $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -3

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -3

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: D

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4. Consider the system of linear equation ax+by=0, cx+dy=0, a, b, c, d $\in$ {0, 1}

Statement-1 : The probability that the system of equations has a unique solution is $\frac{3}{8}$.

Statement-2 : The probability that the system has a solution is 1.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -4

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -4

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: B

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5. Statement -1 : Six different balls are put in three different boxes, no box being empty, the probability of putting balls in boxes in equal numbers is $\frac{1}{6}$

Statement-2 : Six letters are posted in 3 letter boxes. The probability that no letter box remains empty is $\frac{20}{27}$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -5

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -5

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: B

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6. A lot contains equal number of defective and non defective bulbs. Two bulbs ar drawn at random, one at a time, with replacement. The events A, B, C are defined as

A : The first bulb is defective

B : The second bulb is non defective

C : Two bulbs are either both defective and non defective.

Statement-1 : A, B, C are pairwise independent.

Statement-2 : A, B, C are mutually independent.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: C

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7. Let $P(A_i)$, the probability of happening of independent events $A_i(i = 1, 2, 3)$ be given by $P(A_i) = \frac{1}{i+1}$

Statement-1 : The probability that at least one event happens is $\frac{3}{4}$.

. Statement-2 : $P\left(\bigcup_{i=1}^{3} Ai\right) = 1 - \prod_{i=1}^{3} P(A'_i)$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: A

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8. Statement -1 : if A and B are exhaustive events, then $P(A \cup B) = 1$

Statement-2 If A and B are independent then $P(A \cap B) = P(A).P(B)$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: B

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9. Statement -1 : Let E_1, E_2, E_3 be three events such that $P(E_1) + P(E_2) + P(E_3) = 1, \quad \text{then} \quad E_1, E_2, E_3$ are exhaustive events.

Statement-2 if the events E_1, E_2 and E_3 be exhaustive events, then $P(E_1 \cup E_2 \cup E_3) = 1$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -9

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -9

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: D

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10. Statement -1 : A fair coin is tossed four times. The probability that heads exceed tails in number is $\frac{5}{16}$

Statement-2 : A fair coin is tossed, then the probability that it lands with heads is $\frac{1}{2}$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -10

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -10

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: B

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11. Statement -1 : Three fairs dice are rolled. The probability that the same number will appear on each of them is $\frac{1}{36}$

Statement-2 : When three dice are rolled, n(S) $= 6^3$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -11

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -11

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: A

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12. Statement -1 : Let x denotes the number of sixes in 3 consecutive throws of die, then $P(x=3)=\frac{1}{216}$

Statement-2 : The probability that sum of faces appeared is 10, when three dice are rolled is $\frac{{}^{9}C_{7}}{6^{3}}$

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -12

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -12

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: C

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13. Statement -1 : Mutually exclusive events, none of which being an impossible event, are not independent.

Statement-2 : Non impossible independent events are not mutually exclusive.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: A

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14. Statement -1 : Two cards are selected from a pack of 52 cards, the probability that both are red or queen is $\frac{55}{221}$.

Statement-2 : $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

A. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for statement -1

B. Statement-1 is true, Statement-2 is true, Statement-2 is Not a correct explanation for statement -1

C. Statement-1 is true, Statement-2 is False

D. Statement-1 is False, Statement-2 is true

Answer: A

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Assignment Section F Matrix Match Type Questions

1. Two fair dice are thrown. The probability that the difference between the numbers is $K(0 \leq K \leq 5)$, is denoted by P(K). Match the following

Column I	Column II
(A) $K = 2$	(p) $P(K) = \frac{1}{18}$
(B) $K = 3$	(q) $P(K) = \frac{1}{6}$
(C) $K = 0$	(r) $P(K) = \frac{2}{9}$
(D) $K = 5$	(s) $P(K) = \frac{4}{9}$

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2. A box contains 3 red, 4 black and 5 white balls. Three balls are drawn at random. Then the probability of 2 white balls and 1 red ball is

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3. Match the following

Column-I	Column-II
$\vec{a}\times(\vec{b}+\vec{c})+\vec{b}\times(\vec{c}+\vec{a})$	(p) $[\vec{c}\ \vec{b}\ \vec{a}]\,\vec{a}$
$\vec{a}\times(\vec{b}\times\vec{c})+\vec{b}\times(\vec{c}\times\vec{a})$	(q) $[\vec{c}\ \vec{b}\ \vec{a}]\,\vec{b}$
$(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{b})$	(r) $(\vec{a}\times\vec{b})\times\vec{c}$
$(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{a})$	(s) $(\vec{a}+\vec{b})\times\vec{c}$

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4. Words are made using all letters of the words INDEPENDENCE and a word is chosen at random what is the probability that the word starts with P.

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5. In a binomial distribution $\left(\frac{2}{5}+\frac{3}{5}\right)^6$ probability of success of any event is $\frac{2}{5}$ then

Column-I	Column-II
(A) Mean is	(p) $\frac{864}{3125}$
(B) Variance is	(q) $\frac{12}{5}$
(C) Standard deviation is	(r) $\frac{6}{5}$
(D) $P(x = 3)$ is	(s) $\frac{36}{25}$
	(t) $\frac{6}{25}$

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Assignment Section G Integer Answer Type Questions

1. Letters are arranged in all possible ways of the words `DISCRETE MATHMATICS'. One word is selected at random then the probability that all T are at maximum distance is a/b (a and b has no common factor) then a is____.

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2. Two different numbers are selected at random from the set S={1, 2, 3, ... 10}, then the probability that sum of selected numbers is divisible by 2 a/b, where a and b are co-prime then b is equal to ___.

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3. Ten equally spaced point are lying on a circle, if p is the probability that a chosen chord is diameter of the circle, then 18p+2 is equal to _____.

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4. Let p be the probability that sum of digits of a five digit number is even then 4p is equal to_____.

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5. A and B are said to be independent if $P(A \cap B) = P(A).P(B)$. If B is independent with every subset of sample space then the value of 6 P(B) is _____

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6. If the probability that two queens, placed at random on a chess-board, do not take on each other, is $\frac{K}{207}$, then K equals_____

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7. Each of the n urns contains 4 white and 6 black balls. The (n + 1)th urn contains 5 white and 5 black balls. One of the n + 1 urns is chosen at random and two balls turn out to be black. If the probability that the (n + 1)th urn was chosen to draw the balls is 1/16, then find the value of n.

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Assignment Section H Multiple True False Type Questions

1. From set S = {1, 2, 3, 4, 5, 6 ..... , 20} four numbers are chosen without replacement.

Statement-1 : The probability that the chosen numbers when arranged in some order will form an AP is $\frac{1}{85}$

Statement-2 : If the four chosen numbers form an AP then the set of all possible values of common difference is {1,2,3,4,5} `.

A. FFF

B. TTF

C. TFT

D. FFT

Answer: C

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2. Statement-1 : A coin is tossed 16 times. For the first 15 consecutive times, it shows heads. The probability that it will show heads in the 16th toss is less than $\frac{1}{2}$.

Statement-2 : The probability that a heart will be drawn from a pack of well shuffled pack of cards is $\frac{1}{4}$.

Statement-3 : The probability that a king will be drawn from a pack of well shuffled pack of cards is $\frac{1}{13}$.

A. TTF

B. TFT

C. FFT

D. FTT

Answer: D

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3. Statement-1 : An urn contains m white and n black balls. All the balls except for one ball, are draw from it. The probability that the last ball remaining in the urn is white is equal to $\frac{m}{m+n}$.

Statement-2 : An urn contains m white balls and n black balls. Balls are drawn one by one till all the balls are drawn. The probability that the second drawn ball is white is $\frac{n}{m+n}$.

Statement-3 : An urn contains 6 balls, 3 white and 3 black ones, a person selected at random an even number of balls (all the different ways of drawing an even number of balls are considered equally probable, irrespective of their number). Then the probability that there will be the same numberof black and white balls among them is $\frac{11}{15}$.

A. TTT

B. FTT

C. TFT

D. FFF

Answer: C

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4. Statement-1 : Three natural number are taken at random from the set $A = \{x : 1 < x \leq 100, x \in N\}$ the probability that the A.M of the numbers taken is 25 is equal to $\frac{^{74}C_2}{^{100}C_3}$.

Statement-2 : Let A = {2, 3, 4 .... 20}. A number is chosen at random from set A and it is bound to be a prime number. The probability that it is more than 10 is $\frac{1}{5}$.

Statement-3 : The probability of three person having the same date month for the birthday is $\frac{1}{(365)^2}$.

A. A) TTT

B. B) FTT

C. C) TFT

D. D) FFF

Answer: A

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5. If the square of 8×8 chess board are painted either white or black at random then

Statement-1 : The probability that not all squares are in any coloumn, are alternating in colour is $\left(1-\frac{1}{2^7}\right)^8$.

Statement-3 : The probability that the chess board contains equal number of white and black squares is $\frac{64!}{2^{64}.32!}$.

A. TFT

B. FTT

C. TTT

D. TFF

Answer: D

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6. Let A and B be two independent even such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{4}$, then

Statement-1 : $P\left(\frac{A}{A \cup B}\right)$ is equal to $\frac{1}{12}$.

Statement-2 : $P\left(\frac{A'}{B}\right)$ is equal to 0.

Statement-3 : $P\left(\frac{B}{A' \cap B'}\right)$ is equal to $\frac{2}{3}$.

A. TFT

B. FTT

C. FFF

D. TFF

Answer: C

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Assignment Section I Subjective Type Questions

1. Seven digits from the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 are written in random order. Let the probability that this number is divisible by 9 be $p = \frac{a}{b}$. Where a, b are relatively prime positive integers, then the value of a + b is .....

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2. A person throws four standard six sided distinguishable dice. The probability that the product of four numbers on the upper faces is 144 is p then 81p is equal to .....

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3. The probability of the number of permutations of the letters AAAABBBC in which the A's appear together in a block of four letters or the B's appear in a block of three letters is p then 770p is equal to .....

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4. In how many ways can a mixed doubles game in tennis be arranged from 5 married couples, if no husband and wife play in the same game and two males are always opponents to two females?

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5. A bag contains n+1 coins, one of which is a two heads coin and the rest are fair. A coin is selected at random and tossed. If the probability. That the toss result in a head is 7/12 then the value of n is

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6. A bag contains a white and b black balls. Two players, $AandB$ alternately draw a ball from the bag, replacing the ball each time after the draw till one of them draws a white ball and wins the game. A begins the game. If the probability of A winning the game is three times that of B, then find the ratio $a:b$

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7. An ellipse of eccentricity $\frac{2\sqrt{2}}{3}$ is inscribed in a circle and a point within the circle is chosen at random. Let the probability that this point lies outside the ellipse be p. Then the value of 105 p is

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8. A number is chosen randomly from one of the two sets X={2001, 2002, 2003,....., 2100}, Y={1901, 1902, 1903,....., 2000}. If the number chosen represents a calander year and p is the probability that selected year has 53 Sunday, then 2800p is equal to

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Assignment Section J Aakash Challengers Questions

1. Consider a twon with n people. A person spreads a rumour to a second, who in turn repeats it to a third and so on. Supppose that at each stage, the recipient of the rumour is chosen at random from the remaining (n-1) people. The probability that the rumour will be repeated n times without being repeated to the originator is

A. $\frac{n-1}{n}$

B. $\frac{n-1}{(n-2)(n-3)}$

C. $\left(1-\frac{1}{n-1}\right)^{n-1}$

D. $\left(\frac{n-2}{n-1}\right)$

Answer: C

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2. Two players P_1 and P_2 are playing the final of a chess championship, which consists of a series of matches. Probability of P_1 winning a matic is 2/3 and that of P_2 is 1/3. Thus winner will be the one who is ahead by 2

games as compared to the other player and wins at least 6 games. Now, if the player P_2 wins the first four matches, find the probability of P_1 wining the championship.

A. $\frac{1077}{3645}$

B. $\frac{1088}{3645}$

C. $\frac{1099}{3645}$

D. $\frac{1000}{3645}$

Answer: A

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3. If a and b are chosen randomly from the set consisting of number 1, 2, 3, 4, 5, 6 with replacement. Then the probability that $\lim_{x \to 0} \left[\left(a^x + b^x\right)/2\right]^{2/x} = 6$ is

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{8}$

D. $\frac{1}{9}$

Answer: C

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4. Two dice are thrown simultaneously to get the co-ordinates of a point on x-y plane. The probability that this point lies on or inside the region bounded by $|x|+|y|=3$.

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{1}{12}$

D. $\frac{1}{36}$

Answer: A

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5. A function f is such that $f(x) = x^3 + ax^2 + bx + c$, where a, b, c are chosen by throwing a die three times. The probability that f is an increasing function is

A. $\frac{1}{9}$

B. $\frac{2}{9}$

C. $\frac{1}{3}$

D. $\frac{4}{9}$

Answer: B

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6. Two point P, Q are taken at random on a straight line OA of length a. The chance that $PQ > b$, where $b < a$ is

A. $\frac{|a-b|}{a}$

B. $\frac{|b-a|}{a}$

C. $\frac{(a-b)^2}{a^2}$

D. $\frac{(b-a)^2}{b^2}$

Answer: B

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7. If two points are taken at random on the circumference of circle, the chance that their distance apart is greater than the radius of the circle is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

Answer: C

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8. Three points P, Q and R are selected at random from the cirumference of a circle. Find the probability p that the point lie on a semi-circle

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

Answer: C

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9. 3 six faced dice are thrown. One die bears numbers 0 to 5, second bears numbers 1 to 6 and third has numbers 2 to 7. The probability that sum of numbers shown is six is

A. $\frac{7}{108}$

B. $\frac{5}{108}$

C. $\frac{5}{216}$

D. $\frac{7}{216}$

Answer: B

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10. A bag contains $(2n+1)$ coins. It is known that n of these coins have a head on both sides whereas the rest of the coins are fair. A coin is picked up at random from the bag and is tossed. If the probability that the toss results in a head is $\frac{31}{42}$, determine the value of n.

A. 10

B. 21

C. 31

D. 41

Answer: D

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11. about to only mathematics

A. $\frac{49}{{}^{64}C_3}$

B. $\frac{98}{{}^{64}C_3}$

C. $\frac{147}{{}^{64}C_3}$

D. $\frac{196}{{}^{64}C_3}$

Answer: C

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