# 21.PROBABILITY

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## I. JEE MAIN / AIEEE

1) It is given that the events $A$ and $B$ are such that $\Pr(A) = \frac{1}{4}, \Pr(A|B) = \frac{1}{2}$ and $\Pr(B|A) = \frac{2}{3}$. Then $\Pr(B)$ is                [2008]

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

2) A die is thrown. Let $A$ be the event that the number obtained is greater than 3. Let $B$ be the event that the number obtained is less than 5. Then $\Pr(A \cup B)$ is                [2008]

   a) $\frac{3}{5}$          b) 0          c) 1          d) $\frac{2}{5}$

3) In a binomial distribution $B\left(n, p = \frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than:                [2009]

   a) $\frac{1}{\log_{10} 4 + \log_{10} 3}$
   b) $\frac{9}{\log_{10} 4 - \log_{10} 3}$
   c) $\frac{4}{\log_{10} 4 - \log_{10} 3}$
   d) $\frac{1}{\log_{10} 4 - \log_{10} 3}$

4) One ticket is selected at random from 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, equals:                [2009]

   a) $\frac{1}{7}$          b) $\frac{5}{14}$          c) $\frac{1}{50}$          d) $\frac{1}{14}$

5) Four numbers are chosen at random (without replacement) from the set $\{1, 2, 3, \ldots 20\}$.
   **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 A.P, then the set of all possible values of common difference is $(\pm1, \pm2, \pm3, \pm4, \pm5)$.                [2010]
   a) Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1
   b) Statement-1 is true, Statement-2 is false
   c) Statement-1 is false, Statement-2 is true.
   d) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1.

6) An urn contains nine balls of which three are red, four are blue and two are green. Three balls are drawn at random without replacement from the urn. The probability that the three balls have different colours is                [2010]

   a) $\frac{2}{7}$          b) $\frac{1}{21}$          c) $\frac{2}{23}$          d) $\frac{1}{3}$

7) Consider 5 independent Bernoulli's trails each with probability of success p. If the probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the interval                [2011]

a) $\left(\frac{3}{4}, \frac{11}{12}\right]$

c) $\left(\frac{11}{12}, 1\right]$

b) $\left[0, \frac{1}{2}\right]$

d) $\left(\frac{1}{2}, \frac{3}{4}\right]$

8) If $C$ and $D$ are two events such that $C \subset D$ and $\Pr(D) \neq 0$. then the correct statement among the following is [2011]

a) $\Pr(C|D) \geq \Pr(C)$

c) $\Pr(C|D) = \frac{\Pr(D)}{\Pr(C)}$

b) $\Pr(C|D) < \Pr(C)$

d) $\Pr(C|D) = \Pr(c)$

9) Three numbersare chosen at random without replacement from $\{1, 2, 3 \ldots 8\}$. The probability that their minimum is 3, given that their maximum is 6, is : [2012]

a) $\frac{3}{8}$

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

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

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

10) A multiple choice examination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just by guessing is: [*JEEM*2013]

a) $\frac{17}{3^5}$

b) $\frac{13}{3^5}$

c) $\frac{11}{3^5}$

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

11) Let $A$ and $B$ be two events such that $\Pr\left(\overline{A \cup B}\right) = \frac{1}{6}$, $\Pr\left(A \cap B\right) = \frac{1}{4}$, and $\Pr\left(\overline{A}\right) = \frac{1}{4}$, where $\overline{A}$ stands for the complement of the event A. Then the events $A$ and $B$ are [*JEEM*2014]

a) independent but not equally likely.

c) mutually exclusive and independent.

b) independent and equals likely.

d) equally likely but not independent.

12) If 12 identical balls are to be placed in 3 identical boxes, then the probability that one of the boxes contains exactly 3 balls is: [*JEEM*2015]

a) $220 \left(\frac{1}{3}\right)^{12}$

c) $\frac{55}{3} \left(\frac{2}{3}\right)^{11}$

b) $22 \left(\frac{1}{3}\right)^{11}$

d) $55 \left(\frac{2}{3}\right)^{10}$

13) Let two fair six-faced dice $A$ and $B$ be the thrown simultaneously. If $E_1$ is the event thta die $A$ shows up four, $E_2$ is the event that die $B$ shows up two and $E_3$ is the event that the sum of numbers on both dice is odd, then which of the following statement is NOT true? [*JEEM*2016]

a) $E_1$ and $E_3$ are independent.

c) $E_1$ and $E_2$ are independent.

b) $E_1$, $E_2$ and $E_3$ are independent.

d) $E_2$ and $E_3$ are independent.

14) A box contains 15 green and 10 yellow balls. If 10 balls are randomly drawn, one-by-one, with replacement, then the variance of the number of green balls drawn is: [*JEEM*2017]

a) $\frac{6}{25}$

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

c) 6

d) 4

15) If two different numbers are taken from the set from the set $(0, 1, 2, 3, \ldots, 10)$. Then the probability that their sum as well as absolute difference are both multiple of 4, is: [*JEEM*2017]

a) $\frac{7}{55}$

b) $\frac{6}{55}$

c) $\frac{12}{55}$

d) $\frac{14}{55}$