

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

- (a)  $\frac{2}{9}$       (b)  $\frac{1}{9}$       (c)  $\frac{8}{9}$       (d)  $\frac{7}{9}$       [AIEEE 2005]

(2) A random variable  $X$  has Poisson distribution with mean 2. Then  $P(x > 1.5)$  equals

- (a)  $\frac{2}{e^2}$       (b) 0      (c)  $1 - \frac{3}{e^2}$       (d)  $\frac{3}{e^2}$       [AIEEE 2005]

(3) Let  $A$  and  $B$  be two events such that  $P(\overline{A \cup B}) = \frac{1}{6}$ ,  $P(A \cap B) = \frac{1}{4}$  and  $P(\overline{A}) = \frac{1}{4}$ , where  $\overline{A}$  stands for complement of event  $A$ . Then events  $A$  and  $B$  are

- (a) equally likely and mutually exclusive  
(b) equally likely but not independent  
(c) independent but not equally likely  
(d) mutually exclusive and independent      [AIEEE 2005]

(4) Let  $x_1, x_2, \dots, x_n$  be  $n$  observations such that  $\sum x_i^2 = 400$  and  $\sum x_i = 80$ . Then a possible value of  $n$  among the following is

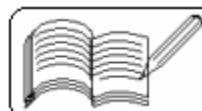
- (a) 15      (b) 18      (c) 9      (d) 12      [AIEEE 2005]

(5) 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

- (a)  $\frac{3}{20}$       (b)  $\frac{1}{5}$       (c)  $\frac{7}{20}$       (d)  $\frac{4}{5}$       [AIEEE 2004]

(6) The mean and variance of a random variable  $x$  having a binomial distribution are 4 and 2 respectively. Then  $P(x = 1)$  is

- (a)  $\frac{37}{256}$       (b)  $\frac{219}{256}$       (c)  $\frac{128}{256}$       (d)  $\frac{28}{256}$       [AIEEE 2004]



(7) A random variable  $X$  has the following probability distribution.

$X :$	1	2	3	4	5	6	7	8
$p(X) :$	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

For the events  $E = \{X \text{ is a prime number}\}$  and  $F = \{X < 4\}$ , the probability  $P(E \cup F)$  is

- (a) 0.87      (b) 0.77      (c) 0.35      (d) 0.50      [AIEEE 2004]

(8) The events  $A, B, C$  are mutually exclusive events such that  $P(A) = \frac{3x + 1}{3}$ ,

$P(B) = \frac{1 - x}{4}$  and  $P(C) = \frac{1 - 2x}{2}$ . The set of possible values of  $x$  are in the interval

- (a)  $\left[\frac{1}{3}, \frac{1}{2}\right]$       (b)  $\left[\frac{1}{3}, \frac{2}{3}\right]$       (c)  $\left[\frac{1}{3}, \frac{13}{3}\right]$       (d)  $[0, 1]$       [AIEEE 2003]

(9) 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

- (a)  $\frac{4}{5}$       (b)  $\frac{3}{5}$       (c)  $\frac{1}{5}$       (d)  $\frac{2}{5}$       [AIEEE 2003]

(10) The mean and variance of a random variable  $X$  having a binomial distribution are 4 and 2 respectively. Then,  $P(X = 1)$  is

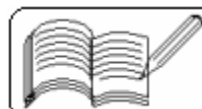
- (a)  $\frac{1}{32}$       (b)  $\frac{1}{16}$       (c)  $\frac{1}{8}$       (d)  $\frac{1}{4}$       [AIEEE 2003]

(11) The probabilities of a student getting Ist, IInd and IIIrd division in an examination are respectively  $\frac{1}{10}$ ,  $\frac{3}{5}$  and  $\frac{1}{4}$ . The probability, that a student fails in the examination is

- (a)  $\frac{197}{200}$       (b)  $\frac{27}{100}$       (c)  $\frac{83}{100}$       (d)  $\frac{33}{200}$       [AIEEE 2002]

(12) A bag contains 4 red and 3 black balls. A second bag contains 2 red and 4 black balls. One bag is selected at random. If from the selected bag one ball is drawn, then the probability that the ball drawn is red is

- (a)  $\frac{1}{42}$       (b)  $\frac{3}{41}$       (c)  $\frac{9}{42}$       (d)  $\frac{19}{42}$       [AIEEE 2002]



( 13 ) 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 the probability that it is rusted or a nail is

- ( a )  $\frac{3}{16}$       ( b )  $\frac{5}{16}$       ( c )  $\frac{11}{16}$       ( d )  $\frac{14}{16}$       [ AIEEE 2002 ]

( 14 ) A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that both the socks are of the same colour is

- ( a )  $\frac{9}{108}$       ( b )  $\frac{18}{108}$       ( c )  $\frac{36}{108}$       ( d )  $\frac{48}{108}$       [ AIEEE 2002 ]

( 15 ) A 6-faced fair dice is rolled repeatedly till 1 appears for the first time. The probability that the dice is rolled for even number of times is

- ( a )  $\frac{1}{6}$       ( b )  $\frac{5}{36}$       ( c )  $\frac{6}{11}$       ( d )  $\frac{5}{11}$       [ IIT 2005 ]

( 16 ) Three distinct numbers are chosen randomly from first 100 natural numbers, then the probability that all are divisible by 2 and 3 both is

- ( a )  $\frac{4}{33}$       ( b )  $\frac{4}{35}$       ( c )  $\frac{4}{25}$       ( d )  $\frac{4}{1155}$       [ IIT 2004 ]

( 17 ) Two numbers are chosen from  $\{ 1, 2, 3, 4, 5, 6 \}$  one after another without replacement. Find the probability that the smaller of the two is less than 4.

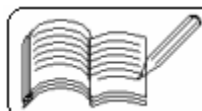
- ( a )  $\frac{4}{5}$       ( b )  $\frac{1}{15}$       ( c )  $\frac{1}{5}$       ( d )  $\frac{14}{15}$       [ IIT 2003 ]

( 18 ) If  $P(B) = \frac{3}{4}$ ,  $P(\bar{A} \cap B \cap \bar{C}) = \frac{1}{3}$  and  $P(A \cap B \cap \bar{C}) = \frac{1}{3}$ , then  $P(B \cap C)$  is

- ( a )  $\frac{1}{12}$       ( b )  $\frac{3}{4}$       ( c )  $\frac{5}{12}$       ( d )  $\frac{23}{36}$       [ IIT 2003 ]

( 19 ) If the integers  $m$  and  $n$  are chosen at random between 1 and 100, then the probability that the number of the form  $7^m + 7^n$  is divisible by 5 equals

- ( a )  $\frac{1}{4}$       ( b )  $\frac{1}{7}$       ( c )  $\frac{1}{8}$       ( d )  $\frac{1}{49}$       [ IIT 1999 ]



( 20 ) The probabilities that a student passes in Mathematics, Physics and Chemistry are  $m$ ,  $p$  and  $c$  respectively. Of these subjects, the student has a 75% chance of passing in at least one, a 50% chance of passing in at least two and 40% chance of passing in exactly two. Which of the following relations are true?

( a )  $p + m + c = \frac{19}{20}$     ( b )  $p + m + c = \frac{27}{20}$

( c )  $pmc = \frac{1}{10}$     ( d )  $pms = \frac{1}{4}$

[ IIT 1999 ]

( 21 ) If from each of the three boxes containing 3 white and 1 black, 2 white and 2 black, 1 white and 3 black balls, one ball is drawn at random, then the probability that 2 white and 1 black ball will be drawn is

( a )  $\frac{13}{32}$     ( b )  $\frac{1}{4}$     ( c )  $\frac{1}{32}$     ( d )  $\frac{3}{16}$

[ IIT 1998 ]

( 22 ) A fair coin is tossed repeatedly. If tail appears on first four tosses, then the probability of head appearing on fifth toss equals

( a )  $\frac{1}{2}$     ( b )  $\frac{1}{32}$     ( c )  $\frac{31}{32}$     ( d )  $\frac{1}{5}$

[ IIT 1998 ]

( 23 ) Seven white balls and three black balls are randomly placed in a row. The probability that no two black balls are placed adjacently equals

( a )  $\frac{1}{2}$     ( b )  $\frac{7}{15}$     ( c )  $\frac{2}{15}$     ( d )  $\frac{1}{3}$

[ IIT 1998 ]

( 24 ) If  $E$  and  $F$  are events with  $P(E) \leq P(F)$  and  $P(E \cap F) > 0$ , then

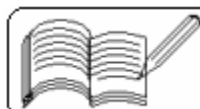
- ( a ) occurrence of  $E \Rightarrow$  occurrence of  $F$
- ( b ) occurrence of  $F \Rightarrow$  occurrence of  $E$
- ( c ) non-occurrence of  $E \Rightarrow$  non-occurrence of  $F$
- ( d ) none of the above implications holds

[ IIT 1998 ]

( 25 ) There are four machines and it is known that exactly two of them are faulty. They are tested, one by one, in a random order till both the faulty machines are identified. Then the probability that only two tests are needed is

( a )  $\frac{1}{3}$     ( b )  $\frac{1}{6}$     ( c )  $\frac{1}{2}$     ( d )  $\frac{1}{4}$

[ IIT 1998 ]



(26) If  $\bar{E}$  and  $\bar{F}$  are the complementary events of the events E and F respectively and if  $0 < P(F) < 1$ , then

- (a)  $P(E/F) + P(\bar{E}/F) = 1$       (b)  $P(E/F) + P(E/\bar{F}) = 1$   
(c)  $P(\bar{E}/F) + P(E/\bar{F}) = 1$       (d)  $P(E/\bar{F}) + P(\bar{E}/\bar{F}) = 1$       [ IIT 1998 ]

(27) If for the three events A, B and C,  $P(\text{exactly one of the events A or B occurs}) = P(\text{exactly one of the events B or C occurs}) = P(\text{exactly one of the events C or A occurs}) = p$  and  $P(\text{all the three events occur simultaneously}) = p^2$ , where  $0 < p < \frac{1}{2}$ , then the probability of at least one of the three events A, B and C occurring is

- (a)  $\frac{3p + 2p^2}{2}$       (b)  $\frac{p + p^2}{4}$       (c)  $\frac{p + p^2}{2}$       (d)  $\frac{3p + 2p^2}{4}$       [ IIT 1996 ]

(28) Three of the six vertices of a regular hexagon are chosen at random. The probability that the triangle with these three vertices is equilateral equals

- (a)  $\frac{1}{2}$       (b)  $\frac{1}{5}$       (c)  $\frac{1}{10}$       (d)  $\frac{1}{20}$       [ IIT 1995 ]

(29) The probability of India winning a test match against West Indies is  $\frac{1}{2}$ . Assuming independence from match to match, the probability that in a 5 match series India's second win occurs at the third test is

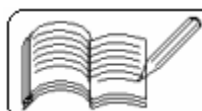
- (a)  $\frac{1}{8}$       (b)  $\frac{1}{4}$       (c)  $\frac{1}{2}$       (d)  $\frac{2}{3}$       [ IIT 1995 ]

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

- (a)  $P(B/A) = P(B) - P(A)$       (b)  $P(A' \cup B') = P(A') + P(B')$   
(c)  $P(A \cup B') = P(A')P(B')$       (d)  $P(A/B) = P(A)$       [ IIT 1995 ]

(31) An unbiased die with faces marked 1, 2, 3, 4, 5 and 6 is rolled four times. Out of four face values obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than 5 is then,

- (a)  $\frac{16}{81}$       (b)  $\frac{1}{81}$       (c)  $\frac{80}{81}$       (d)  $\frac{65}{81}$       [ IIT 1993 ]



(32) Let E and F be two independent events. If the probability that both E and F happen is  $\frac{1}{12}$  and the probability that neither E nor F happens is  $\frac{1}{2}$ , then P(E) and P(F) respectively are

- (a)  $\frac{1}{3}, \frac{1}{4}$       (b)  $\frac{1}{2}, \frac{1}{6}$       (c)  $\frac{1}{6}, \frac{1}{2}$       (d)  $\frac{1}{4}, \frac{1}{3}$  [ IIT 1993 ]

(33) India plays two matches each with West Indies and Australia. In any match, the probabilities of India getting points 0, 1 and 2 are 0.45, 0.50 and 0.50 respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is

- (a) 0.8750      (b) 0.0875      (c) 0.0625      (d) 0.0250 [ IIT 1992 ]

(34) For any two events A and B in a sample space

- (a)  $P\left(\frac{A}{B}\right) \geq \frac{P(A) + P(B) - 1}{P(B)}$ ,  $P(B) \neq 0$  is always true  
(b)  $P(\bar{A}) = P(A) - P(\bar{A})P(\bar{B})$  does not hold  
(c)  $P(A \cup B) = 1 - P(\bar{A})P(\bar{B})$ , if A and B are independent  
(d)  $P(A \cup B) = 1 - P(\bar{A})P(\bar{B})$ , if A and B are disjoint [ IIT 1991 ]

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

- (a) E and F are mutually exclusive  
(b) E and  $F^c$  (the complement of event F) are independent  
(c)  $E^c$  and  $F^c$  are independent      (d)  $P(E/F) + P(E^c/F) = 1$  [ IIT 1989 ]

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

- (a)  $\frac{1}{2}$       (b)  $\frac{49}{101}$       (c)  $\frac{50}{101}$       (d)  $\frac{51}{101}$  [ IIT 1988 ]

(37) For two events A and B,  $P(A \cup B)$  is

- (a) not less than  $P(A) + P(B) - 1$       (b) not greater than  $P(A) + P(B)$   
(c) equal to  $P(A) + P(B) - P(A \cap B)$       (d) equal to  $P(A) + P(B) + P(A \cap B)$  [ IIT 1988 ]



(38) The probability that at least one of the events A and B occur is 0.6. If A and B occur simultaneously with probability 0.2, then  $P(\bar{A}) + P(\bar{B})$  is

- (a) 0.4      (b) 0.8      (c) 1.2      (d) 1.4      (e) none of these      [ IIT 1987 ]

(39) A student appears for tests I, II and III. The student is successful if he passes either in tests I and II or tests I and III. The probabilities of the student passing in tests I, II and III are p, q and  $\frac{1}{2}$  respectively. If the probability that the student is successful is  $\frac{1}{2}$ , then

- (a)  $p = q = 1$       (b)  $p = q = \frac{1}{2}$       (c)  $p = 1, q = 0$   
(d)  $p = 1, q = \frac{1}{2}$       (e) none of these      [ IIT 1986 ]

(40) Three identical dice are rolled. The probability that the same number will appear on each of them is

- (a)  $\frac{1}{6}$       (b)  $\frac{1}{36}$       (c)  $\frac{1}{18}$       (d)  $\frac{3}{28}$       [ IIT 1984 ]

(41) If M and N are two events, the probability that exactly one of them occurs is

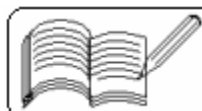
- (a)  $P(M) + P(N) - 2P(M \cap N)$       (b)  $P(M) + P(N) - P(M \cap N)$   
(c)  $P(M^c) + P(N^c) - 2P(M^c \cap N^c)$       (d)  $P(M \cap N^c) + P(M^c \cap N)$       [ IIT 1984 ]

(42) Fifteen coupons are numbered 1, 2, ..., 15, respectively. Seven coupons are selected at random one at a time with replacement. The probability that the largest number appearing on a selected coupon is 9, is

- (a)  $\left(\frac{9}{16}\right)^6$       (b)  $\left(\frac{8}{15}\right)^7$       (c)  $\left(\frac{3}{5}\right)^7$       (d) none of these      [ IIT 1983 ]

(43) If A and B are two events such that  $P(A) > 0$  and  $P(B) \neq 1$ , then  $P(\bar{A}/\bar{B})$  is equal to

- (a)  $1 - P(A/B)$       (b)  $1 - P(\bar{A}/B)$   
(c)  $\frac{1 - P(A \cup B)}{P(\bar{B})}$       (d)  $\frac{P(\bar{A})}{P(\bar{B})}$       [ IIT 1982 ]



( 44 ) Two fair dice are tossed. Let X be the event that the first die shows an even number, and Y be the event that the second die shows an odd number. The two events X and Y are

- ( a ) mutually exclusive      ( b ) independent and mutually exclusive  
( c ) dependent                  ( d ) none of these

[ IIT 1979 ]

( 45 ) There are n persons (  $n \geq 3$  ), among whom are A and B, who are made to stand in a row in random order. Probability that there are exactly r (  $r \leq n - 2$  ) persons between A and B is

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

( 46 ) There are 8 players from which four teams each of two players are formed. What is the probability that two specific players are in one team ?

- ( a )  $\frac{1}{4}$       ( b )  $\frac{15}{28}$       ( c )  $\frac{1}{8}$       ( d )  $\frac{1}{7}$

( 47 ) A natural number is selected from the first 20 natural numbers. The probability that  $\frac{x^2 - 15x + 50}{x - 15} < 0$  is

- ( a )  $\frac{1}{5}$       ( b )  $\frac{2}{5}$       ( c )  $\frac{3}{5}$       ( d )  $\frac{4}{5}$

**Answers**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
b	c	c	b	c	d	b	a	d	a	b	d	c	d	d	d	a	a	a	b
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
a	a	b	d	b	a,d	a	c	b	c,d	a	a,d	b	a,c	b,c,d	d	a,b,c	c	c	b
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
a,c,d	c	c	d	c	d	b													

