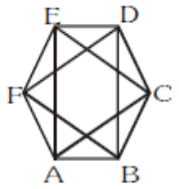
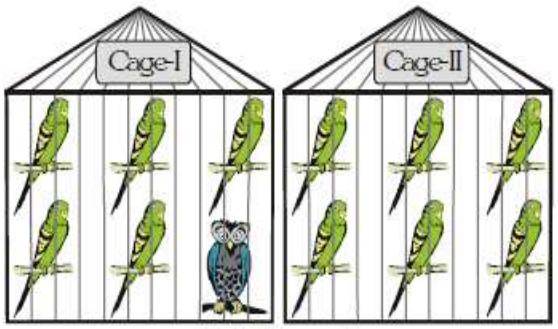
PRACTICE QUESTIONS FOR COMPETITIVE EXAMINATIONS

SUBJECT: MATHEMATICS

TOPIC: PROBABILITY

1.	Three vertices out of six vertices of a regular hexagon are chosen randomly. The probability of getting a equilateral triangle after joining three vertices is - (A) 1/5 (B) 1/20 (C) 1/10 (D) 1/2 
2.	A quadratic equation is chosen from the set of all quadratic equations which are unchanged by squaring their roots. The chance that the chosen equation has equal roots is - (A) 1/2 (B) 1/3 (C) 1/4 (D) 2/3
3.	5 persons entered the lift cabin on the ground floor of an 8 floor building. Suppose that each of them independently and with equal probability, can leave the cabin at any other floor, starting from the first. The probability that all 5 persons leave at different floors is - (A) $\left(\frac{5}{8}\right)^5$ (B) $\frac{{}^8C_5}{8^5}$ (C) $\frac{5!}{8^5}$ (D) $\frac{{}^8C_5\,5!}{8^5}$
4.	If the integers m and n are chosen at random between 1 and 100, then the probability that a 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) $\frac{1}{49}$
5.	A determinant is chosen at random from the set of all determinant of order 2 with elements 0 or 1 only. The probability that the determinant chosen has the value non negative is - (A) 3/16 (B) 6/16 (C) 10/16 (D) 13/16
6.	Lot A consists of 3G and 2D articles. Lot B consists of 4G and 1D article. A new lot C is formed by taking 3 articles from A and 2 from B. The probability that an article chosen at random from C is defective, is - (A) 1/3 (B) 2/5 (C) 8/25 (D) none
7.	Three numbers are chosen at random without replacement from {1, 2, 3,....., 10}. The probability that the minimum of the chosen numbers is 3 or their maximum is 7 is - (A) 1/2 (B) 1/3 (C) 1/4 (D) 11/40
8.	7 persons are stopped on the road at random and asked about their birthdays. If the probability that 3 of them are born on Wednesday, 2 on Thursday and the remaining 2 on Sunday is $\frac{K}{7^6}$, then K is equal to - (A) 15 (B) 30 (C) 105 (D) 210

9.	Before a race the chance of three runners A, B & C were estimated to be proportional to 5, 3 & 2 respectively but during the race A meets with an accident which reduces his chance to 1/3. If the respective chances of B and C are P(B) and P(C) then - (A) $P(B) = \frac{2}{5}$ (B) $P(C) = \frac{4}{15}$ (C) $P(C) = \frac{2}{5}$ (D) $P(B) = \frac{4}{15}$
10.	Let $0 < P(A) < 1$, $0 < P(B) < 1$ and $P(A \cup B) = P(A) + P(B) - P(A)\ P(B)$. Then - (A) $P\left(\frac{B}{A}\right) = P(B) - P(A)$ (B) $P(A^C \cup B^C) = P(A^C) + P(B^C)$ (C) $P((A \cup B)^C) = P(A^C)\ P(B^C)$ (D) $P\left(\frac{A}{B}\right) = P(A)$
11.	The probability that a radar will detect an object in one cycle is p. The probability that the object will be detected in n cycles is - (A) $1-p^n$ (B) $1-(1-p)^n$ (C) p^n (D) $p(1-p)^{n-1}$
12.	Two buses A and B are scheduled to arrive at a town central bus station at noon. The probability that bus A will be late is 1/5. The probability that bus B will be late is 7/25. The probability that the bus B is late given that bus A is late is 9/10. Then the probabilities (i) neither bus will be late on a particular day and (ii) bus A is late given that bus B is late, are respectively (A) 2/25 and 12/28 (B) 18/25 and 22/28 (C) 7/10 and 18/28 (D) 12/25 and 2/28
13.	Shalu brought two cages of birds : Cage-I contains 5 parrots and 1 owl and Cage-II contains 6 parrots, as shown. One day Shalu forgot to lock both cages and two birds flew from Cage-I to Cage-II. Then two birds flew back from Cage-II to Cage-I. Assume that all birds have equal chance of flying, the probability that the Owl is still in Cage-I, is - (A) 1/6 (B) 1/3 (C) 2/3 (D) 3/4  Birds like to fly
14.	In a maths paper there are 3 sections A, B & C. Section A is compulsory. Out of sections B & C a student has to attempt any one. Passing in the paper means passing in A & passing in B or C. The probability of the student passing in A, B & C are p, q & 1/2 respectively. If the probability that the student is successful is 1/2 then, which of the following is false - (A) p = q = 1 (B) p = q = 1/2 (C) p = 1, q = 0 (D) p = 1, q = 1/2

15. The number 'a' is randomly selected from the set {0, 1, 2, 3,.....98, 99}. The number 'b' is selected from the same set. Probability that the number $3^a + 7^b$ has a digit equal to 8 at the units place, is -

(A) $\frac{1}{16}$ (B) $\frac{2}{16}$ (C) $\frac{4}{16}$ (D) $\frac{3}{16}$

16. If $\bar{E}$ & $\bar{F}$ are the complementary events of events E & F respectively & 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) $P(E|\bar{F})+P(\bar{E}|\bar{F})=1$

Comprehension

Let S and T are two events defined on a sample space with probabilities

P(S) = 0.5, P(T) = 0.69, P(S/T) = 0.5

On the basis of above information, answer the following questions :

17. Events S and T are -

(A) mutually exclusive (B) independent

(C) mutually exclusive and independent (D) neither mutually exclusive nor independent

18. The value of P(S and T) -

(A) 0.3450 (B) 0.2500 (C) 0.6900 (D) 0.350

19. The value of P(S or T) -

(A) 0.6900 (B) 1.19 (C) 0.8450 (D) 0

20. Consider 5 independent Bernoulli's trials 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 :-

(1) $\left[0,\frac{1}{2}\right]$ (2) $\left(\frac{11}{12},1\right]$ (3) $\left(\frac{1}{2},\frac{3}{4}\right]$ (4) $\left(\frac{3}{4},\frac{11}{12}\right]$

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C	A	D	A	A	C	D	B	AB	CD	B	C	D	ABC	D	AD	B	A	C	1