JEE MAIN : CHAPTER WISE TEST-12

SUBJECT :- MATHEMATICS **DATE.....**

CLASS :- 12th **NAME.....**

CHAPTER :- PROBABILITY **SECTION.....**

(SECTION A)

1. From a well shuffled pack of 52 playing cards a card is drawn, its outcome is noted & then replaced. The process is continued indefinitely till a heart is obtained for the first time. The probability that an even number of draws will be needed is :

(A) 3/7 (B) 4/7

(C) 1/2 (D) 9/16

2. If the integer α and β are chosen at random between 1 and 100, then the probability that $7^{\alpha} + 7^{\beta}$ is divisible by 5, is

(A) $\frac{1}{4}$ (B) $\frac{1}{8}$ (C) $\frac{1}{7}$ (D) $\frac{1}{49}$

3. The minimum value of $P(A \cup B)$, if $P(\overline{B}) = \{P(A \cup B)\}^2$ is

(A) $\frac{\sqrt{5}-1}{2}$ (B) $\frac{\sqrt{5}+1}{2}$

(C) $\frac{\sqrt{3}-1}{2}$ (D) None of these

4. The probability that a particular day in the month of july is a rainy day is $\frac{3}{4}$. Two person whose credibility are $\frac{4}{5}$ and $\frac{2}{3}$ respectively claim that 15th july was a rainy day. The probability that it was real a rainy day.

(A) $\frac{3}{4}$ (B) $\frac{24}{25}$

(C) $\frac{8}{9}$ (D) none of these

5. A can hit a target 4 times in 5 shots, B three times in 4 shots and C twice in 3 shots. They fire a target if exactly two of them hit the target then the chance that it is C who has missed is

(A) $\frac{6}{13}$ (B) $\frac{1}{5}$ (C) $\frac{4}{5}$ (D) $\frac{4}{15}$

6. One ticket is selected at random from 100 tickets numbered 00, 01, 02,..... , 98, 99. If X & Y denote the sum & the product of the digits on the tickets, then $P(X = 9 \mid Y = 0)$ is

(A) 2/19 (B) 1/50

(C) 4/19 (D) 10/19

7. Let F denote the set of all onto functions from $A = \{a_1, a_2, a_3, a_4\}$ to $B = \{x, y, z\}$. A function f is chosen at random from F. The probability that $f^{-1}(x)$ consists of exactly two elements is

(A) 2/3 (B) 1/3 (C) 1/6 (D) 0

8. A letter is known to have come from either TATANAGAR or CALCUTTA. On the envelope, just two consecutive letters TA are visible . The probability that the letter has come from CALCUTTA is

(A) 4/11 (B) 1/3

(C) 5/12 (D) None of these

9. Three teams participate in a tournament in which each team plays both of the other two teams exactly once. The teams are evenly matched so that in each game, each team has a 50% chance of winning the game. No game can end in a tie. At the end of the tournament, if one team has more wins than both of the other two teams, that team is declared the unique winner of the tournament. Otherwise, the tournament ends in a tie. The probability that the tournament ends in a tie, is

(A) 1/8 (B) 1/4 (C) 3/8 (D) 1/2

10. A firing squad is composed of three policemen A, B and C who have probabilities 0.6, 0.7 and 0.8 respectively of hitting the victim. Only one of the three bullets is live and is allocated at random.
If the victim was found to be hit by live bullet, the probability that it was C who had the live round, is

(A) $\frac{1}{3}$ (B) $\frac{8}{21}$ (C) $\frac{6}{21}$ (D) $\frac{9}{21}$

11. Consider a set 'P' containing 'n' elements. A subset 'A' of 'P' is drawn and there after set 'P' is reconstructed. Now one more subset 'B' of 'P' is drawn. Probability of drawing sets A and B so that $A \cap B$ has exactly one element –

(A) $(3/4)^n.n$ (B) $n.(3/4)^{n-1}$

(C) $n.(3/4)^n$ (D) None of these

12. If two events A and B are such that $P(A^C) = 0.3$, $P(B) = 0.4$ and $P(AB^C) = 0.5$ then $P[B/(A \cup B^C)]$ is equal to-

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

13. Two persons A and B throw a die alternately till one of them get a "six" and wins the game. The probability of winning of B is-

(A) $\frac{6}{11}$ (B) $\frac{5}{11}$

(C) $\frac{3}{11}$ (D) None of these

14. A person throws a dice while he gets a number greater than 2. The probability that he gets a 6 in the last thrown is

(A) 2/3 (B) 1/4
(C) 1/3 (D) 1/12

15. What is the probability that the two squares chose randomly on a chess board, share a side -

(A) 1/18 (B) 13/254
(C) 105/288 (D) 13/96

16. Two person A and B agree to meet at a place between 5 to 6 pm. The first one to arrive waits for 20 minute and then leave. If the time of their arrival be independent and at random then the probability that A & B meet is -

(A) 1/3 (B) 4/9
(C) 5/9 (D) 2/3

17. Three person A_1, A_2, A_3 are to speak at a function along with 5 other persons. If the person speak in random order, the probability that A_1 speaks before A_2 and A_2 speaks before A_3 is -

(A) 1/6 (B) 3/5
(C) 3/8 (D) None of these

18. Three critics review a book. Odds in favour of the book are 5 : 2, 4 : 3 and 3 : 4 respectively for the three critics. The probability that majority are in favour of the book is

(A) $\frac{35}{49}$ (B) $\frac{125}{343}$
(C) $\frac{164}{343}$ (D) $\frac{209}{343}$

19. Let A and B are event's of an experiment and $P(A) = \frac{1}{4}$, $P(A \cup B) = \frac{1}{2}$, then value of $P(B/A^c)$ is

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{5}{6}$ (D) $\frac{1}{2}$

20. While answering a question in a multiple choice test, an examinee either knows or guesses the answer, with probability of his knowing the answer being $p > 0$. Assume that m is the number of multiple choices alternatives in which only one is correct. The probability that an examinee knows the answer to the question if he correctly answered that question, is given by

(A) $\frac{mp}{mp+1}$ (B) $\frac{mp}{(m-1)p+1}$

(C) $\frac{p}{m+1-p}$ (D) $\frac{p}{(m-1)p+1}$

(SECTION B)

21. A five digit number is formed by digits 1, 2, 3, 4 and 5 without repetition. If probability that the number is divisible by 4 be k, then the integral part of $(\sqrt{2} + 1)^{1/k}$ is…..

Q.22 Pal's gardener is not dependable , the probability that he will forget to water the rose bush is 2/3. The rose bush is in questionable condition . Any how if watered, the probability of its withering is 1/2 & if not watered then the probability of its withering is 3/4. Pal went out of station & after returning he finds that rose bush has withered. The probability that the gardener did not water the rose bush.

(A) 50% (B) 60% (C) 75% (D)80%

Q.23 A person is known to speak truth 3 out of 4 times. He throws a dice and responds that it is a six. If the probability that it is actually a six is P, find 1000P.

24. An urn contains 3 white balls 5 black balls and 2 red balls. Two persons draw balls in turn without replacement. The first person to draw a white ball wins the game. If a red ball is drawn the game is a tie. Suppose A_1 = {the player who begins the game is the winner}, A_2= {the second participant is the winner} and B = {the game is a tie}. Find $5P(A_1)\ P(A_2)\ P(B)$

25. If , in lowest terms, be the probability that a randomly chosen positive divisor of 10^{99} is an integral multiple of 10^{88} then (m + n) is equal to
(A) 634 (B) 643 (C) 632 (D)692

26. There are N + 1 identical boxes each containing N wall clocks. The first box contains zero defective clocks. The second box contains one defective and (N–1) effective clocks, in general r^{th} boxcontains (r – 1) defective and (N – r + 1) effective clocks ($1 \le r \le N+1$). Thus, the $(N + 1)^{th}$ box contains all defective clocks. A wall clock is selected and found an effective one. The probability that it is from k^{th} box is $\frac{\lambda N - \lambda K + \lambda}{N^2 + N}$ find λ.

27. Shots are being fired independently from a gun at a target with a maximum score of 10 points per shot. Given that the probability of scoring 30 points in 3 shots is $\frac{1}{64}$, probability of scoring eight points in one shot is $\frac{1}{5}$ and less than eight points in one shot is $\frac{2}{5}$. If the probability of scoring at least 28 points in 3 shots is $\frac{p}{1600}$, then find the value of p.

28. If p and q are chosen from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, with replacement, the probability that the roots of the equation $x^2 + 2px + q = 0$ are real is k find the value of 100k

29. A bag contains n + 1 coins. It is known that one of these coins shows heads on both sides, whereas the other coins are fair. Once coin is selected at random and tossed. If the probability that toss results in heads is $\frac{7}{12}$, then the value of n is -

30. A box contains 20 balls out of which 10 are blue and 10 are green. The balls are drawn at random from the box one at a time with replacement. The probability that a blue ball is drawn 4^{th} time on the 7^{th} draw is k then find the value of 32k :