

1. 6 married couples are standing in a room. If 4 people are chosen at random, then the chance that exactly one married couple is among the 4 is-

(A)  $\frac{16}{33}$

(B)  $\frac{8}{33}$

(C)  $\frac{17}{33}$

(D)  $\frac{24}{33}$

2. The probability that a positive two digit number selected at random has its tens digit at least three more than its unit digit is -

(A)  $\frac{14}{45}$

(B)  $\frac{7}{45}$

(C)  $\frac{36}{45}$

(D)  $\frac{1}{6}$

3. A 5 digit number is formed by using the digits 0,1,2,3,4 & 5 without repetition. The probability that the number is divisible by 6 is :

(A) 8%

(B) 17%

(C) 18%

(D) 36%

4. A cube with all six faces coloured is cut into 64 cubical blocks of the same size which are thoroughly mixed. Find the probability that the 2 randomly chosen blocks have 2 coloured faces each -

5. A card is drawn at random from a well shuffled deck of cards. Find the probability that the card is a-

(i) king or a red card (ii) club or a diamond (iii) king or a queen (iv) king or an ace

(v) spade or a club (vi) neither a heart nor a king

6. A bag contain 5 white, 7 black, and 4 red balls, find the chance that three balls drawn at random are all white.

7. If four coins are tossed, Two events A and B are defined as

A : No two consecutive heads occur (HTHT) (THTH) (HTTH) (THTT)

B : At least two consecutive heads occur.

Find P(A) and P(B). State whether the events are equally likely, mutually exclusive and exhaustive.

8. Thirteen persons take their places at a round table, Find the odds against two particular persons sitting together.

9. A has 3 shares in a lottery containing 3 prizes and 9 blanks, B has 2 shares in a lottery containing 2 prizes and 6 blanks. Compare their chances of success.

10. Mr. A forgot to write down a very important phone number. All he remembers is that it started with 713 and that the next set of 4 digit involved are 1,7 and 9 with one of these numbers appearing twice. He guesses a phone number and dials randomly. The odds in favour of dialing the correct telephone number, is -

(A) 1 : 35

(B) 1 : 71

(C) 1 : 23

(D) 1 : 36

11. Consider a function  $f(x)$  that has zeroes 4 and 9. Given that Mr. A randomly selects a number from the set  $\{-10, -9, -8, \dots, 8, 9, 10\}$ , what is the probability that Mr. A chooses a zero of  $f(x^2)$  ?

12. (a) A fair die is tossed. If the number is odd, find the probability that it is prime.

(b) Three fair coins are tossed. If both heads and tails appear, determine the probability that exactly one head appears.

**SBG STUDY**

13. Mr. A lives at origin on the cartesian plane and has his office at (4,5). His friend lives at (2,3) on the same plane. Mr. A can go to his office travelling one block at a time either in the +y or +x direction. If all possible paths are equally likely then the probability that Mr. A passed his friends house is -  
 (A)  $1/2$  (B)  $10/21$  (C)  $1/4$  (D)  $11/21$
14. I have 3 normal dice, one red, one blue and one green and I roll all three simultaneously. Let P be the probability that the sum of the numbers on the red and blue dice is equal to the number on the green die. If P is written in lowest terms as  $a/b$  then the value of  $(a + b)$  equals -  
 (A) 79 (B) 77 (C) 61 (D) 57
15. There are three passengers on an airport shuttle bus that makes stops at four different hotels. The probability that all three passengers will be staying at different hotels, is -  
 (A)  $\frac{1}{16}$  (B)  $\frac{1}{4}$  (C)  $\frac{3}{8}$  (D)  $\frac{3}{4}$

### PART # 2

1. In throwing 3 dice, the probability that atleast 2 of the three numbers obtained are same is -  
 (A)  $1/2$  (B)  $1/3$  (C)  $4/9$  (D) none
2. There are 4 defective items in a lot consisting of 10 items. From this lot we select 5 items at random. The probability that there will be 2 defective items among them is -  
 (A)  $\frac{1}{2}$  (B)  $\frac{2}{5}$  (C)  $\frac{5}{21}$  (D)  $\frac{10}{21}$
3. From a pack of 52 playing cards, face cards and tens are removed and kept aside then a card is drawn at random from the remaining cards. If  
 A: The event that the card drawn is an ace  
 H: The event that the card drawn is a heart  
 S : The event that the card drawn is a spade  
 then which of the following holds ?  
 (A)  $9P(A) = 4P(H)$  (B)  $P(S) = 4P(A \cap H)$  (C)  $3P(H) = 4P(A \cup S)$  (D)  $P(H) = 12P(A \cap S)$
4. If two of the 64 squares are chosen at random on a chess board, the probability that they have a side in common is -  
 (A)  $1/9$  (B)  $1/18$  (C)  $2/7$  (D) none
5. Two red counters, three green counters and 4 blue counters are placed in a row in random order. The probability that no two blue counters are adjacent is -  
 (A)  $\frac{7}{99}$  (B)  $\frac{7}{198}$  (C)  $\frac{5}{42}$  (D) none
6. South African cricket captain lost the toss of a coin 13 times out of 14. The chance of this happening was  
 (A)  $\frac{7}{2^{13}}$  (B)  $\frac{1}{2^{13}}$  (C)  $\frac{13}{2^{14}}$  (D)  $\frac{13}{2^{13}}$

7. There are ten prizes, five A's, three B's and two C's, placed in identical sealed envelopes for the top ten contestants in a mathematics contest. The prizes are awarded by allowing winners to select an envelope at random from those remaining. When the 8<sup>th</sup> contestant goes to select the prize, the probability that the remaining three prizes are one A, one B and one C, is  
 (A)  $1/4$  (B)  $1/3$  (C)  $1/12$  (D)  $1/10$
8. A coin is tossed and a die is thrown. Find the probability that the outcome will be a head or a number greater than 4.
9. A coin is biased so that heads is three times as likely to appear as tails. Find  $P(H)$  and  $P(T)$ . If such a coin is tossed twice find the probability that head occurs at least once.
10. Given two independent events A, B such that  $P(A) = 0.3$ ,  $P(B) = 0.6$ . Determine  
 (i)  $P(A \text{ and } B)$  (ii)  $P(A \text{ and not } B)$  (iii)  $P(\text{not } A \text{ and } B)$  (iv)  $P(\text{neither } A \text{ nor } B)$   
 (v)  $P(A \text{ or } B)$
11. The probabilities that a student will receive A, B, C or D grade are 0.40, 0.35, 0.15 and 0.10 respectively. Find the probability that a student will receive  
 (i) not an A grade (ii) B or C grade (iii) at most C grade
12. In a single throw of three dice, determine the probability of getting  
 (i) a total of 5 (ii) a total of atmost 5 (iii) a total of at least 5.
13. A natural number  $x$  is randomly selected from the set of first 100 natural numbers. Find the probability that it satisfies the inequality.  $x + \frac{100}{x} > 50$
14. 3 students A, B and C are in a swimming race. A and B have the same probability of winning and each is twice as likely to win as C. Find the probability that B or C wins. Assume no two reach the winning point simultaneously.
15. A box contains 7 tickets, numbered from 1 to 7 inclusive. If 3 tickets are drawn from the box without replacement, one at a time, determine the probability that they are alternatively either odd-even-odd or even-odd-even.
16. Let a red die, a blue die, a green die and a white die are rolled once, the dice being fair. The outcomes on the red, blue, green and white die denote the numbers, a, b, c and d respectively. Let E denotes the event that absolute value of  $(a - 1)(b - 2)(c - 3)(d - 6) = 1$ , then  $P(E)$  is -  
 (A)  $\frac{1}{324}$  (B)  $\frac{1}{648}$  (C)  $\frac{2}{324}$  (D)  $\frac{1}{162}$
17. 5 different marbles are placed in 5 different boxes randomly. Find the probability that exactly two boxes remain empty. Given each box can hold any number of marbles.
18. Let A and B be events such that  $P(\bar{A}) = 4/5$ ,  $P(B) = 1/3$ ,  $P(A/B) = 1/6$ , then :  
 (a)  $P(A \cap B)$   
 (b)  $P(A \cup B)$   
 (c)  $P(B/A)$   
 (d) Are A and B independent?