

**COLLEGE OF SCIENCE & TECHNOLOGY**

**Sample Paper -2020**

**Information Technology (Semester-I)**

**Subject – Discrete Mathematics**

1. If A and A are complementary events, then  $P(A) = \dots\dots\dots$ 
  - a.  $1+P(A)$
  - b.  $1-P(A)$
  - c.  $P(A)$
  - d.  $-P(A)$
  
2. If A and B are independent events then, conditional probability  $P(A/B) = \dots\dots\dots$ 
  - a.  $P(A)-P(B)$
  - b.  $P(A)$
  - c.  $P(B)$
  - d.  $P(A)+P(B)$
  
3. If A and B are independent events then,  $P(AB) = \dots\dots\dots$ 
  - a.  $P(A)$
  - b.  $P(B)$
  - c.  $P(A) + P(B)$
  - d.  $P(A) P(B)$
  
4. Probability can be  $\dots\dots\dots$ 
  - a. Greater than or equal to 10
  - b. Greater than 1
  - c. Less than 0
  - d. Between 0 and 1

5. When two dice are tossed, probability of getting six as uppermost face on both the dice is

- a.  $\frac{1}{2}$
- b.  $\frac{1}{6}$
- c.  $\frac{1}{36}$
- d.  $\frac{1}{3}$

6. Which one of the following can be probability ratio ?

- a.  $\frac{3}{2}$
- b.  $\frac{17}{11}$
- c.  $\frac{2}{3}$
- d.  $-\frac{1}{2}$

7. A graph with parallel edges with no loop or parallel edges is called as

- a. null graph
- b. compound graph
- c. hasse diagram
- d . spanning graph

8. A ticket is drawn at random from a box containing 30 tickets and a number on it is observed. Obtain the probability that ticket drawn has a number less than 6

- a.  $\frac{1}{6}$
- b.  $\frac{5}{6}$
- c.  $\frac{2}{3}$
- d .  $\frac{1}{3}$

9. A ticket is drawn at random from a box containing 30 tickets and a number on it is observed. Obtain the probability that ticket drawn has a number multiple of 5

a.  $\frac{2}{5}$

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

c.  $\frac{1}{3}$

d.  $\frac{2}{7}$

10. From a well shuffled pack of cards, a card is selected at random what is the probability that the card is red card

a.  $\frac{2}{5}$

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

c.  $\frac{1}{2}$

d.  $\frac{2}{7}$

11. From a well shuffled pack of cards, a card is selected at random what is the probability that the card is club card

a.  $\frac{2}{5}$

b.  $\frac{1}{2}$

c.  $\frac{1}{3}$

d.  $\frac{2}{7}$

12. When two dice are thrown find the probability of getting doublets

a.  $\frac{2}{5}$

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

c.  $\frac{1}{6}$

d.  $\frac{2}{7}$

13. From a well shuffled pack of cards, 2 cards are selected at random what is the probability that both cards are red

a.  $\frac{25}{102}$

b.  $\frac{35}{102}$

c.  $\frac{1}{3}$

d.  $\frac{2}{7}$

14. From a well shuffled pack of cards, 2 cards are selected at random what is the probability that both cards are aces

a.  $\frac{7}{221}$

b.  $\frac{5}{221}$

c.  $\frac{1}{221}$

d.  $\frac{2}{221}$

15. What is probability that a year selected at random will have 53 sundays?

a.  $\frac{2}{5}$

b.  $\frac{1}{7}$

c.  $\frac{1}{3}$

d.  $\frac{2}{9}$

16. Two dice are thrown simultaneously. Find the probability of getting a sum of 5 or 9

a.  $\frac{2}{9}$

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

c.  $\frac{1}{3}$

d.  $\frac{2}{7}$

17. Two dice are thrown simultaneously. Find the probability that the sum of the numbers on the uppermost faces are either even or a perfect square

a.  $\frac{2}{5}$

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

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

d .  $2/7$

18. It is known that 50% of students passes in Mathematics, 60% passes in Economics and 40% in both the subjects. If a student is selected at random what is the probability that he passes in either of the subjects,

a.  $7/10$

b.  $1/5$

c.  $1/3$

d .  $2/7$

19. The probability of P winning the in a game is  $1/3$  and that of Q winning is  $1/4$ . What is the probability that one of them wins.

a.  $5/12$

b.  $1/5$

c.  $1/3$

d .  $2/7$

20. Two cards are drawn at random from a pack of 52 card. Find the probability of getting both black cards

a.  $25/102$

b.  $26/102$

c.  $1/3$

d .  $2/7$

21. Two cards are drawn at random from a pack of 52 card. Find the probability of getting both spade cards

a.  $7/10$

b.  $1/17$

c.  $1/3$

d.  $2/7$

22. Two cards are drawn at random from a pack of 52 cards. Find the probability of getting one spade card and other red card

a.  $7/10$

b.  $1/17$

c.  $1/3$

d.  $2/7$

23. The intersection of the sets  $\{1, 2, 5\}$  and  $\{1, 2, 6\}$  is the set \_\_\_\_\_

a)  $\{1, 2\}$

b)  $\{5, 6\}$

c)  $\{2, 5\}$

d)  $\{1, 6\}$

24. If  $n(A)=20$  and  $n(B)=30$  and  $n(A \cup B) = 40$  then  $n(A \cap B)$  is?

a) 20

b) 30

c) 40

d) 10

25. In the given figure the if  $n(A)=20, n(U)=50, n(C)=10$  and  $n(A \cap B)=5$  then  $n(B)=?$

a) 20

b) 35

c) 40

d) 10

26. Consider the recurrence relation  $a_1=4, a_n=5n+a_{n-1}$ . The value of  $a_{64}$  is \_\_\_\_\_

a) 10399

b) 23760

c) 75100

d) 53700

27. Determine the solution of the recurrence relation  $F_n=20F_{n-1} - 25F_{n-2}$  where  $F_0=4$  and  $F_1=14$ .

a)  $a_n = 14 \cdot 5^{n-1}$

- b)  $a_n = 7/2 * 2^n - 1/2 * 6^n$
- c)  $a_n = 7/2 * 2^n - 3/4 * 6^{n+1}$
- d)  $a_n = 3 * 2^n - 1/2 * 3^n$

28. What is the recurrence relation for 1, 7, 31, 127, 499?

- a)  $b_{n+1} = 5b_{n-1} + 3$
- b)  $b_n = 4b_n + 7!$
- c)  $b_n = 4b_{n-1} + 3$
- d)  $b_n = b_{n-1} + 1$

29. Find the value of  $a_4$  for the recurrence relation  $a_n = 2a_{n-1} + 3$ , with  $a_0 = 6$ .

- a) 320
- b) 221
- c) 141
- d) 65

30. The solution to the recurrence relation  $a_n = a_{n-1} + 2n$ , with initial term  $a_0 = 2$  are

- 
- a)  $4n + 7$
  - b)  $2(1 + n)$
  - c)  $3n^2$
  - d)  $5 * (n + 1) / 2$

31. Determine the solution for the recurrence relation  $a_n = 6a_{n-1} - 8a_{n-2}$  provided initial conditions  $a_0 = 3$  and  $a_1 = 5$ .

- a)  $a_n = 4 * 2^n - 3^n$
- b)  $a_n = 3 * 7^n - 5 * 3^n$
- c)  $a_n = 5 * 7^n$
- d)  $a_n = 3! * 5^n$

32. A function is said to be \_\_\_\_\_ if and only if  $f(a) = f(b)$  implies that  $a = b$  for all  $a$  and  $b$  in the domain of  $f$ .

- a) One-to-many
- b) One-to-one
- c) Many-to-many
- d) Many-to-one

33. An injection is a function which is?

- a) many-one

- b) one-one
- c) onto
- d) none of the mentioned

34. A simple graph can have \_\_\_\_\_

- a) multiple edges
- b) self loops
- c) parallel edges
- d) no multiple edges, self-loops and parallel edges

35. Degree of a graph with 12 vertices is \_\_\_\_\_

- a) 25
- b) 56
- c) 24
- d) 212

36. In a finite graph the number of vertices of odd degree is always \_\_\_\_\_

- a) even
- b) odd
- c) even or odd
- d) infinite

37. A trail in a graph can be described as \_\_\_\_\_

- a) a walk without repeated edges
- b) a cycle with repeated edges
- c) a walk with repeated edges
- d) a line graph with one or more vertices

38. Two vertices  $v_1$  and  $v_2$  in a graph are said to be-----  
---- to each other if they are the end vertices of the same  
edge

a. adjacent

b. incident

c. loop

d. image

39. A graph with  $n$  vertices without edges is called as

a. regular graph

b. compound graph

c. hasse diagram

d . spanning graph<sup>4</sup>

40. A graph with parallel edges with no loop or parallel edges is called as

a. null graph

b. compound graph

c. hasse diagram

d . spanning graph

41. Some graphs have same structure but differs in representation is termed as

a) Spanning

b) Rooted

c) Weighted graph

d) Isomorphic

42. Every tree contains at least one ----- vertex

a) Pendent

b) Isolated

c) Weighted graph

d) Isomorphic

43. The ----- of vertex is defined as number of edges incident on it

a) degree

b) edges

c) Weights

d) Isomorphic

44. Two vertices  $v_1$  and  $v_2$  in a graph are said to be----- to each other if they are the end vertices of the same edge

a) incident

b) connected

c) cut

d) adjacent

45. If all vertices of a graph  $G$  have same degree then  $G$  is called as

- a) Regular graph
- b) isomorphic graph
- c) Null graph
- d) Weighted graph

46. The vertex with minimum eccentricity is called as----- of graph

- a) radius
- b) centre
- c) diametre
- d) cycle

47. A graph is said to be ----- graph if all the edges of a graph is assigned a non-negative real number

- a) Unweighted graph
- b) Regular graph
- c) Weighted graph
- d) cycle

48. The vertex with minimum eccentricity is called as----- of graph

- a) Radius
- b) Centre
- c) Diametre
- d) Cycle

49. A graph is said to be ----- graph if all the edges of a graph is assigned a non-negative real number

- a) Spanning
- b) Rooted
- c) Weighted graph
- d) Cycle

50. In a maximum spanning tree the weighted graph is of \_\_\_\_\_

- a) maximum number of edges
- b) maximum number of cyclic trees
- c) minimum number of vertices
- d) maximum weight

