

F.Y.B.Sc IT SEM 1

Discrete mathematics

SAMPLE QUESTIONS

1. The members of the set $S = \{x \mid x \text{ is the square of an integer and } x < 100\}$ is _____

- a) $\{0, 2, 4, 5, 9, 58, 49, 56, 99, 12\}$
- b) $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 81\}$
- c) $\{1, 4, 9, 16, 25, 36, 64, 81, 85, 99\}$
- d) $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 121\}$

2. Which of the following option is true?

- a) If the Sun is a planet, elephants will fly
- b) $3 + 2 = 8$ if $5 - 2 = 7$
- c) $1 > 3$ and 3 is a positive integer
- d) $-2 > 3$ or 3 is a negative integer

3. Let P: This is a great website, Q: You should not come back here. Then 'This is a great website and you should come back here.' is best represented by?

- a) $\sim P \vee \sim Q$
- b) $P \wedge \sim Q$
- c) $P \vee Q$
- d) $P \wedge Q$

4. What is the negation of the statement $A \rightarrow (B \vee (or) C)$?

- a) $A \wedge \sim B \wedge \sim C$
- b) $A \rightarrow B \rightarrow C$
- c) $\sim A \wedge B \vee C$
- d) None of the mentioned

5. Let P, Q, R be true, false true, respectively, which of the following is true?

- a) $P \wedge Q \wedge R$

b) $P \wedge \sim Q \wedge \sim R$

c) $Q \rightarrow (P \wedge R)$

d) $P \rightarrow (Q \wedge R)$

6. Translate $\forall x \exists y (x < y)$ in English, considering domain as a real number for both the variable.

a) For all real number x there exists a real number y such that x is less than y

b) For every real number y there exists a real number x such that x is less than y

c) For some real number x there exists a real number y such that x is less than y

d) For each and every real number x and y such that x is less than y

7. "The product of two negative real numbers is not negative." Is given by?

a) $\exists x \forall y ((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$

b) $\exists x \exists y ((x < 0) \wedge (y < 0) \wedge (xy > 0))$

c) $\forall x \exists y ((x < 0) \wedge (y < 0) \wedge (xy > 0))$

d) $\forall x \forall y ((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$

8. The premises $(p \wedge q) \vee r$ and $r \rightarrow s$ imply which of the conclusion?

a) $p \vee r$

b) $p \vee s$

c) $p \vee q$

d) $q \vee r$

9. Let the statement be "If n is not an odd integer then square of n is not odd.", then if P(n) is "n is an not an odd integer" and Q(n) is "(square of n) is not odd." For direct proof we should prove _____

a) $\forall n P((n) \rightarrow Q(n))$

b) $\exists n P((n) \rightarrow Q(n))$

c) $\forall n \sim(P((n)) \rightarrow Q(n))$

d) $\forall n P((n) \rightarrow \sim(Q(n)))$

10. Which of the arguments is not valid in proving sum of two odd number is not odd.

a) $3 + 3 = 6$, hence true for all

b) $2n + 1 + 2m + 1 = 2(n+m+1)$ hence true for all

c) All of the mentioned

d) None of the mentioned

11. For the given Arithmetic progression find the position of first negative term?

50, 47, 44, 41,.....

a) 17

b) 20

c) 18

d) None of the mentioned

12. In the given Geometric progression find the number of terms.

32, 256, 2048, 16384,.....,250.

a) 11

b) 13

c) 15

d) None of the mentioned

13. For the sequence $a_n = \lfloor \sqrt{2n+1/2} \rfloor$, a_7 is _____

a) 1

b) 7

c) 5

d) 4

14. For the sequence $a_n = 6 \cdot (1/3)^n$, a_4 is _____

a) $2/25$

b) $2/27$

c) $2/19$

d) $2/13$

15. The inverse of function $f(x) = x^3 + 2$ is _____

a) $f^{-1}(y) = (y - 2)^{1/2}$

b) $f^{-1}(y) = (y - 2)^{1/3}$

c) $f^{-1}(y) = (y)^{1/3}$

d) $f^{-1}(y) = (y - 2)$

16. Suppose S is a finite set with 7 elements. How many elements are there in the largest equivalence relation on S ?

a) 56

b) 78

c) 49

d) 100

17. The number of equivalence relations of the set $\{3, 6, 9, 12, 18\}$ is _____

a) 4

b) 25

c) 22

d) 90

18. Determine the number of equivalence classes that can be described by the set $\{2, 4, 5\}$.

a) 125

b) 5

c) 16

d) 72

19. G is an undirected graph with n vertices and 26 edges such that each vertex of G has a degree at least 4. Then the maximum possible value of n is _____

a) 7

b) 43

c) 13

d) 10

20. In a _____ the degree of each and every vertex is equal.

a) regular graph

b) point graph

c) star graph

d) euler graph

21. Neela has twelve different skirts, ten different tops, eight different pairs of shoes, three different necklaces and five different bracelets. In how many ways can Neela dress up?

a) 50057

b) 14400

c) 34870

d) 56732

22. How many numbers must be selected from the set {1, 2, 3, 4} to guarantee that at least one pair of these numbers add up to 7?

a) 14

b) 5

c) 9

d) 24

23. A number lock contains 6 digits. How many different zip codes can be made with the digits 0–9 if repetition of the digits is allowed upto 3 digits from the beginning and the first digit is not 0?

a) 254307

b) 453600

c) 458760

d) 972340

d) ${}^{15}P_7$

24. In how many ways can the letters of the word SANFOUNDRY be rearranged such that the vowels always appear together?

a) $(8+3)! / 2!$

b) $6! / 2!$

c) $8! * 3!$

d) $4! / 8!$

25. Two cards are chosen at random from a standard deck of 52 playing cards. What is the probability of selecting a jack and a Spade from the deck?

a) $4/13$

b) $1/13$

c) $4/13$

d) $1/52$