QB365 Question Bank Software Study Materials

Discrete Mathematics 45 Important 1Marks Questions With Answers (Book Back and Creative)

12th Standard

Maths

Total Marks : 44

44 x 1 = 44

1) A binary operation on a set S is a function from

(a) S ⟶ S **(b) (SxS) ⟶ S** (c) S⟶ (SxS) (d) (SxS) ⟶ (SxS)

2) Subtraction is not a binary operation in

(a) R (b) Z **(c) N** (d) Q

3) Which one of the following is a binary operation on N?

(a) Subtraction **(b) Multiplication** (c) Division (d) All the above

4) In the set R of real numbers '*' is defined as follows. Which one of the following is not a binary operation on R?

(a) a*b = min (a.b) (b) a*b = max (a, b) (c) a*b = a **(d) $a*b = a^b$**

5) The operation * defined by $a * b = \frac{ab}{7}$ is not a binary operation on

(a) Q^+ **(b) Z** (c) R (d) C

6) In the set Q define a⊙b = a+b+ab. For what value of y, 3⊙(y⊙5) = 7?

(a) y = $\frac{2}{3}$ **(b) y = $\frac{-2}{3}$** (c) y = $\frac{-3}{2}$ (d) y = 4

7) If a * b=$\sqrt{a^2+b^2}$ on the real numbers then * is

(a) commutative but not associative (b) associative but not commutative **(c) both commutative and associative**

(d) neither commutative nor associative

8) Which one of the following statements has the truth value T?

(a) sin x is an even function (b) Every square matrix is non-singular

(c) The product of complex number and its conjugate is purely imaginary **(d) $\sqrt{5}$ is an irrational number**

9) Which one of the following statements has truth value F?

(a) Chennai is in India or $\sqrt{2}$ is an integer (b) Chennai is in India or $\sqrt{2}$ is an irrational number

(c) Chennai is in China or $\sqrt{2}$ is an integer (d) Chennai is in China or $\sqrt{2}$ is an irrational number

10) If a compound statement involves 3 simple statements, then the number of rows in the truth table is

(a) 9 **(b) 8** (c) 6 (d) 3

11) Which one is the inverse of the statement (pVq)→(pΛq)?

(a) (pΛq)→(pVq) (b) ¬(pvq)→(pΛq) (c) (¬pv¬q)→(¬pΛ¬q) **(d) (¬pΛ¬q)→(¬pV¬q)**

12) Which one is the contrapositive of the statement (pVq)⟶r?

(a) ¬r→(¬pΛ¬q) (b) ¬r⟶(pVq) (c) r⟶(pΛq) (d) p⟶(qVr)

13) The truth table for (p ∧ q) ∨ ¬q is given below

p	q	(p ∧ q) ∨ (¬q)
T	T	(a)

T	F	(b)
F	T	(c)
F	F	(d)

Which one of the following is true?

(a)

(a)	(b)	(c)	(d)
T	T	T	T

(b)

(a)	(b)	(c)	(d)
T	F	T	T

(c)

(a)	**(b)**	**(c)**	**(d)**
T	**T**	**F**	**T**

(d)

(a)	(b)	(c)	(d)
T	F	F	F

14) In the last column of the truth table for ¬(p ∨ ¬q) the number of final outcomes of the truth value 'F' are

(a) 1 (b) 2 **(c) 3** (d) 4

15) Which one of the following is incorrect? For any two propositions p and q, we have

(a) ¬ (p∨q) ≡ ¬ p ∧ ¬q (b) ¬ (p∧ q)≡¬p ∨ ¬q **(c) ¬ (p ∨ q)≡¬p∨¬q** (d) ¬(¬p)≡ p

16)

p	q	(p ∧ q) ⟶ ¬q
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

Which one of the following is correct for the truth value of (p ∧ q)⟶ ¬p?

(a)

(a)	(b)	(c)	(d)
T	T	T	T

(b)

(a)	**(b)**	**(c)**	**(d)**
F	**T**	**T**	**T**

(c)

(a)	(b)	(c)	(d)
F	F	T	T

(d)

(a)	(b)	(c)	(d)
T	T	T	F

17) The dual of ¬(p V q) V [p V (p ∧ ¬r)] is

(a) ¬(p ∧ q) ∧ [p V (p ∧ ¬r)] (b) (p ∧ q) ∧ [p ∧ (p V ¬r)] (c) ¬(p ∧ q) ∧ [p ∧ (p ∧ r)] **(d) ¬(p ∧ q) ∧ [p ∧ (pV ¬r)]**

18) The proposition p ∧ (¬p ∨ q) is

(a) a tautology (b) a contradiction **(c) logically equivalent to p ∧ q** (d) logically equivalent to p ∨ q

19) Determine the truth value of each of the following statements:

(a) 4 + 2 = 5 and 6 + 3 = 9

(b) 3 + 2 = 5 and 6 + 1 = 7

(c) 4 + 5 = 9 and 1 + 2 = 4

(d) 3 + 2 = 5 and 4 + 7 = 11

(a) (b) (c) (d)

(a)	**(b)**	**(c)**	**(d)**
F	**T**	**F**	**T**

(a)	(b)	(c)	(d)
T	F	T	F

(a)	(b)	(c)	(d)
T	T	F	F

(a)	(b)	(c)	(d)
F	F	T	T

20) Which one of the following is not true?

(a) Negation of a negation of a statement is the statement itself

(b) If the last column of the truth table contains only T then it is a tautology.

(c) If the last column of its truth table contains only F then it is a contradiction

(d) If p and q are any two statements then p↔q is a tautology.

21) The binary operation * defined on a set s is said to be commutative if _____

(a) a*b ∈ S ∀ a, b ∈ S **(b) a*b = b*a ∀ a, b ∈ S** (c) (a*b) * c = a*(b*c) ∀ a, b ∈ S (d) a*b = e ∀ a, b ∈ S

22) If * is defined by $a * b = a^2 + b^2 + ab + 1$, then (2 * 3) * 2 is _____

(a) 20 (b) 40 (c) 400 **(d) 445**

23) The number of binary operations that can be defined on a set of 3 elements is _____

(a) 3^2 (b) 3^3 (c) 3^9 (d) 3^1

24) Which one of the following is not a statement?

(a) 2 + 3 =5 **(b) How beautiful is this flower?** (c) Delhi is the capital of Tamil Nadu (d) A triangle has found angles.

25) Which of the following is a tautology?

(a) p ∨ q (b) p ∧ q **(c) q v ~ q** (d) q ∧ ~ q

26) Which of the following is a contradiction?

(a) p v q (b) p ∧ q (c) q v ~ q **(d) q ∧ ~ q**

27) Define * on Z by a * b = a + b + 1 ∀ a,b ∈ Z. Then the identity element of z is _____

(a) 1 (b) 0 (c) 1 **(d) -1**

28) A binary operation * is defined on the set of positive rational numbers Q^+ by a*b = $\frac{ab}{4}$. Then 3 * $\left(\frac{1}{5} * \frac{1}{2}\right)$ is _____

(a) $\frac{3}{160}$ (b) $\frac{5}{160}$ (c) $\frac{3}{10}$ (d) $\frac{3}{40}$

29) If a * b = a^2b^2 - ab then 3 * (1 * 1)

(a) 0 (b) 1 (c) 2 (d) 4

30) The number whose multiplication universe does not exist in C.

(a) 0 (b) 1 (c) 0 (d) 1

31) Let p: Kamala is going to school
q: There are 20 students in the class. Then Kamala is not going to school or there are 20 students in the class is represented by

(a) p v q (b) p ∧ q (c) ~ p **(d) ~ p v q**

32) If p is true and q is unknown, then _____

(a) ~ p is true (b) p v (~p) is false (c) p ∧ (~p) is true **(d) p v q is true**

33) '+' is not a binary operation on _____

(a) ~ (b) z (c) c **(d) Q- {0}**

34) '-' is a binary operation on _____

(a) ~ (b) Q-{0} (c) R-{0} **(d) Z**

35) Which of the following is a statement?

(a) 7+2< 10 (b) Wish you all success (c) All the best (d) How old are you?

36) In (N, *), x * y = max(x, y), x, y ∈ N then 7 * (-7)

(a) 7 (b) -7 (c) 0 (d) -49

37) In (S, *), is defined by x * y = x where x, y ∈ S, then

(a) associative (b) Commutative (c) associative and commutative (d) neither associative nor commutative

38) The number of commutative binary operations which can be defined on a set containing n elements is _____

(a) $n^{\frac{n(n+1)}{2}}$ (b) n^{n^2} (c) $n^{\frac{n}{2}}$ **(d) n^2**

39) On the set R of real numbers, the operation * is defined by a * b = a^2 - b^2 Then (3 * 5) * 4 is _____

(a) -240 (b) 240 (c) -72 (d) 72

40) In Z, we define a * b = a + b + 1. The identity element with respect to * is _____

(a) 1 (b) 0 **(c) -1** (d) 2

41) Which of the following are logically equivalent?

(a) $p \rightarrow q, q \rightarrow p$ **(b)** $q \rightarrow p, \neg q \vee p$ (c) $p \rightarrow q, \neg p \wedge q$ (d) $q \rightarrow p,\ q \vee \neg p$

42) The number of rows and columns for (p V q) V r will be _____

(a) 3, 8 (b) 8, 4 **(c) 8, 5** (d) 5, 8

43) If P V q is false (F), then _____

(a) p is false (b) q is false **(c) p and q are false** (d) p or q is false

44) The value of [3] $+_8$ [7] is

(a) a) [10] (b) a) [8] (c) a) [5] (d) a) [2]