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Mathematical Foundations for Computer Applications

Question Bank

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Q. Choose a correct alternative.

Q.1. A Collection of well defined object is called.....

- a) set b)empty set c)finite set d)infinite set

Q.2. If $A=\{1, 2, 3, 4\}$ and $B= \{3, 4, 5, 6\}$, then $A \cup B =$ -----

- a){1, 4, 5, 3} b){ 3, 4} c){1, 2, 3, 4, 5, 6} d){1, 2, 3, 4}

Q.3 .If $|A| = 0$, then the matrix a is called -----

- a)non- singular b)singular c)symmetric d)skew-symmetric

Q.4 . A set containing no element is called ----- set.

- a)Finite b)singleton c)Empty d)subset

Q.5. If A is subset of B, then $A \cup B=$ -----

- a) A' b)B c)Both d)none of these

Q.6. If $A=\{1, 2\}$, then $n(A \times A) =$ -----

- a)1 b)2 c)3 d)4

Q.7. If $A' = A$, then A is called -----

- A)non- singular b)skew- symmetric c)symmetric d)singular

Q.8. A set containing one element is called ----- set.

- a)non- singular b)skew- symmetric c)symmetric d)singular

Q.9 Which of the following is statement?

- a)Please, give your pen. b)What is your name? c)Sit down. d)sun rises in east.

Q.10. If p: 2 is even number , q: 3 is an odd number, then $p \vee q$: -----

- a) 2 is even number and 3 is an odd number b)2 is even number or 3 is an odd number c) If 2 is even number, then 3 is an odd number d)2 is even number if and only if 3 is an odd number

Q.12. The negation of the statement " Price increases" is -----

- a)Price increases b)Price is not increases c)Price are not increases d) Price does not increases

Q.13. Which of the following methods are used to represent the sets?

- a)Venn Diagramm b)Roster Method c)Set-Builder method d)all of these

Q.14. The truth value of " Tirupati is in Andhra pradesh" is ----

- a)T b)F c)Both d)can not say

Q.15 . The converse of " If $2+3 < 5$, then $5 > 2$ " is -----

- a)If $2+3 < 5$, then $5 > 2$ b) If $2+3 > 5$, then $5 > 2$ c)If $5 < 2$, then $2+3 > 5$ d)If $5 > 2$, then $2+3 < 5$

Q.16. The truth value of $p \vee q$ is ----

- a)T, T, F, F b)T, F, F, F c)T, T, F, T d)T, T, T, F

Q.17. The complement of a set is denoted by -----

- a) A' b)U c)X d)A

Q.18. $p \vee (q \vee r) = (p \vee q) \vee r$ is called as -----

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|--------------------|---------------------|-----------------|--------------------|
| a) Associative law | b) Distributive law | c) identity law | d) De-Morgan's law |
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Q.19. Which of the following are valid argument form?

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| a) modus ponens | b) modus tollens | c) generalization | d) all of these |
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Q.20. a matrix $\begin{bmatrix} 2 & 4 & 6 & 8 \end{bmatrix}$ is called -----

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|------------------|----------------|---------------|--------------------|
| a) column matrix | b) null matrix | c) row matrix | d) identity matrix |
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Q.21. State the order of matrix $C = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$.

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| a) 2×3 | b) 3×2 | c) 1×3 | d) 3×1 |
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Q.22. A rectangular array of numbers enclosed by a pair of brackets is called a

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| a) row | b) matrix | c) column | d) determinant |
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Q.23. A diagonal matrix whose all elements are equal is called a ----- matrix.

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| a) square | b) null | c) scalar | d) row |
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Q.24. If $A = \{x, y, z, w\}$ and $B = \{y, z, u, v\}$, then $A - B =$ -----

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| a) column matrix | b) $\{y, z\}$ | c) $\{x, z\}$ | d) $\{x, y\}$ |
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Q.25. A matrix having only one column is called ----- matrix.

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| a) column matrix | b) $\{y, z\}$ | c) $\{x, z\}$ | d) $\{x, y\}$ |
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Q.26. If $\begin{bmatrix} 1 & 2 & 3 & 4 \end{bmatrix}$, then $|A| =$ -----

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| a) 2 | b) -2 | c) 3 | d) 0 |
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Q.27. The total number of elementary transformations used in matrices are -----

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| a) 3 | b) 6 | c) 9 | d) 4 |
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Q.28. A vertex with odd degree is called

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| a) vertex | b) odd vertex | c) even vertex | d) isolated vertex |
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Q.29. A vertex of a degree zero is called

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| a) vertex | b) odd vertex | c) even vertex | d) isolated vertex |
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Q.30. A vertex with degree one is called

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|-----------|---------------|----------------|--------------------|
| a) vertex | b) odd vertex | c) even vertex | d) isolated vertex |
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Q.31. A vertex with even degree is called

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| a) vertex | b) odd vertex | c) even vertex | d) isolated vertex |
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Q.32. Every conditional statement is equivalent to

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| a) its contrapositive | b) its invers | c) its convers | d) only itself |
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Q.33. which of the following is a statement

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|------------------|----------------------|----------------------|-------------------------|
| a) open the door | b) do your home work | c) switch on the fan | d) two plus two is four |
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Q.34. which of following is a statement in logic ...

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| a) go away | b) how beautiful | c) $x > 5$ | d) $2 = 3$ |
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Q.35. $p \wedge p \equiv p$. and $p \vee p \equiv p$ is

a)commutative law b)identity law c)idempotent law d) conditional law

Q.36. $p \vee q \equiv q \vee p$ and $p \wedge q \equiv q \wedge p$

a)commutative law b)identity law c)idempotent law d) conditional law

Q.37. $p \wedge (q \wedge r) \equiv (p \wedge q) \wedge r$

a)commutative law b)identity law c)associative law d) conditional law

Q.38. $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$

a) Commutative law b) distributive law c) associative law d) conditional law

Q.39. $p \wedge T \equiv p$ $p \wedge F \equiv F$

a) commutative law b)identity law c)associative law d) conditional law

Q.40. $p \vee (p \wedge q) \equiv p$, $p \wedge (p \vee q) \equiv p$

a) commutative law b)identity law c)associative law d) absorption law

Q.41. if $p \wedge q$ is false and $p \vee q$ is true ,the is not true

a) $p \vee q$ b) $p \leftrightarrow q$ c) $\sim p \vee \sim q$ d) $q \vee \sim p$

Q.42. Empty set is

a) finite set b) infinite set c)proper set d) power set

Q.43. a set containing uncountable elements is called

a) finite set b) infinite set c)proper set d) power set

Q.44. a set containing no elements is called

a) Finite set b) infinite set c)empty set d) power set

Q.45. a set containing only one element is called

a) Finite set b) infinite set c) proper set d) singleton set

Q.46. a set containing a countable element is called

a)finite set b) infinite set c)proper set d) power set

Q.47. a set containing an uncountable element is called

a)finite set b) infinite set c)proper set d) power set

Q.48. which of the following is a statement

a)open the door b)do your home work c)switch on the fan d)two plus two is four

Q.49. $p \vee q \equiv q \vee p$ and $p \wedge q \equiv q \wedge p$

a) commutative law b) identity law c) idempotent law d) conditional law

Q.50. a set of all subset of a given set is

a) finite set b) infinite set c) proper set d) power set

Q.2 Short answer question

Q.1. Describe the following sets in roster form

a) $A = \{x/x \text{ a letter of word "MOVEMENT"}\}$

b) $B = \{x/x \text{ is a natural number } 5 < x < 9\}$

Q.2. write down the following sets in set builder form

a) $\{10, 20, 30, 40, 50\}$

b) $\{a, e, i, o, u\}$

c) $\{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$

Q.3. $A = \{1, 2, 3, 4, 5\}$, $B = \{3, 4, 5\}$ find

$(A \cup B)$, $(A \cap B)$, A^c , $(A \cup B)^c$

Q.4. $A = \{1, 3, 5, 7, 9\}$, $B = \{4, 5, 6\}$

Find

A^c , $(A \cup B)$, $(A \cup B)^c$

Q.5. $X = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $Y = \{2, 4, 6, 8\}$ Find - $(X \cup Y)$, $(X \cap Y)$, $(X \cup Y)^c$

Q.6. Using truth table solve

$(p \wedge q) \vee (p \rightarrow q)$

Q.7. Using truth table solve

$(p \vee p) \wedge (r \wedge p)$

Q.8. Using truth table solve

$(p \vee q) \wedge (q \vee r)$

Q.9. using truth table

$(p \wedge q) \rightarrow r$

Q.10. using truth table

$$(p \wedge r) \leftrightarrow (q \wedge r)$$

Q.3 Broad answer question

Q.1. Using truth table ,examine tautology,or contradiction or contingency

$$[(p \wedge q) \rightarrow (\sim p \vee \sim q)]$$

Q.2. Using truth table ,examine tautology,or contradiction or contingency

$$[(p \wedge \sim q \vee r) \rightarrow (p \vee \sim q \wedge r)]$$

Q.3. Using truth table ,examine tautology,or contradiction or contingency

$$(p \leftrightarrow q) \equiv (p \wedge q) \vee (\sim p \wedge \sim q)$$

Q.4. Using truth table ,examine tautology,or contradiction or contingency

$$(p \wedge q) \rightarrow r \equiv p \rightarrow (q \rightarrow r)$$

Q.5. Using truth table ,examine tautology,or contradiction or contingency

$$p \rightarrow (q \vee r) \equiv (p \rightarrow q) \vee (p \rightarrow r)$$

Q.6 $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ find A inverse,by row methode

Q.7. $A = \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$ then A inverse by adjoint methode

Q.8. if $A = \{1,2,3,4,5,6,7,8,9\}$, $B = \{1,3,5\}$, $C = \{4,5\}$

Find $(A \cup B \cup C)^c$,

$$(A \cup B)^c, (A \cap B)^c, (B \cap C)^c$$

Q.9. IF $X = \{2,4,6,8,10,12,14\}$, $Y = \{4,6,8\}$ then find $(X \cup Y)^c$, X^c , $(X \cap Y)^c$

Q.10. Definition of even vertex, odd vertex, isolated vertex, pendent vertex,

Q.11. define simple graph, direct graph ,ends points, isolated

Q.12. Using truth table ,examine tautology,or contradiction or contingency

$$[(p \vee q) \vee r] \leftrightarrow [p \vee (q \vee r)]$$

Q.13.find the inverse of $A = \begin{bmatrix} 3 & 1 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}$ by using elementary row transformation

Q.14.find the inverse of $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ by elementary column transformation

Q.15. . Using truth table ,examine tautology,or contradiction or contingency

$$(p \rightarrow q) \wedge [(q \rightarrow r) \rightarrow (p \rightarrow r)]$$

Q.4 SHORT ANSWER NOTES

Q.1. Construct truth table

$$P \rightarrow (q \rightarrow p)$$

Q.2. Construct truth table

$$(\sim p \vee q) \leftrightarrow \sim (p \wedge q)$$

Q.3. Construct truth table

$$\sim (\sim p \wedge \sim q) \vee q$$

Q.4. if $\begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix}$ apply transformation ($R_1 \leftrightarrow R_2$)

Q.5. if $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$ s, apply the transformation $R_1 \leftrightarrow R_2$ and then $C_1 \rightarrow C_1 + 2C_3$

Q.6. using truth table show that logical equivalence

$$\sim p \wedge q \equiv (p \vee q) \wedge \sim p$$

Q.7. . using truth table show that logical equivalence

$$\sim(p \wedge q) \vee (\sim p \wedge q) \equiv \sim p$$

Q.8. construct truth table

$$(p \wedge q) \wedge (\sim p \vee \sim q)$$

Q.9. construct truth table

$$.[p \wedge (p \rightarrow \sim q)] \rightarrow p$$

Q.10. $A = \{3, 4, 5, 6, 8, 9\}$ and $B = \{5, 6\}$ Find

$$A^c, (A \cup B), (A \cup B)^c, (A \cap B)^c$$

Q.11. $p = \{a, b, c, d, e, f, g\}$, $Q = \{c, d, e\}$, then find

$$P^c, Q^c, (P \cup Q), (P \cup Q)^c, (P \cap Q)$$

Q.12. $X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $Y = \{3, 4, 5\}$ and $Z = \{8, 9\}$ Then find

$$(X \cup Y \cup Z), (Y \cup Z), (X \cup Y)^c, (Y \cup Z)^c, (X \cup Z)$$

Q.13. Construct truth table

$$(p \rightarrow q) \vee (p \rightarrow r)$$

Q.14. define simple graph,multi graph,null graph

Q.15.define even vertex,odd vertex,isolated vertex,pendent vertex

Q.16. $\text{app}A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 3 & 4 \end{bmatrix}$ tranformation $C1 \rightarrow C1 + 2C3$

Q.17. $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & -2 & 5 \end{bmatrix}$ Apply $R1 \leftrightarrow R2$ and then $C1 \rightarrow C1 + 2C3$

Q.18. $A = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 1 & 0 \\ 3 & 3 & 1 \end{bmatrix}$ apply $C3 + 2C2$ and $3R3$

Q.19. Construct truth table

$$[(p \wedge q) \vee r] \wedge [\sim r \vee (p \wedge q)]$$

Q.20. Construct truth table

$$[(\sim p \vee q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$$