

(6 pages)

Reg. No. :

Code No. : 40602 E Sub. Code : SACS 11/
SASE 11

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

First Semester

Computer Science/Software Engineering

DISCRETE MATHEMATICS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL the questions.

Choose the correct answer :

1. _____ is relation R on a set A is symmetric if whenever (a,b) \in R Then (b,a) \in R.
(a) Reflexive (b) Symmetric
(c) Non reflexive (d) Irreflexive

2. A relation is _____ if no two distinct points in the diagram have an edge going between them in both directions.
(a) Reflexive (b) Transitive
(c) Antisymmetric (d) Symmetric
3. The inverse of the exponential function is called the _____ function.
(a) Irrational (b) Rational
(c) Logarithm (d) Exponential
4. The floor function is often also called the _____ function.
(a) Smaller integer (b) Greater integer
(c) Simple integer (d) Complex integer
5. A proposition consisting of only a Single Propositional Variable is called _____ proposition.
(a) Composite (b) molecular
(c) atomic (d) Compound
6. The normal forms also called as _____ forms
(a) Conjunction (b) Disjunction
(c) Canonical (d) Complex



7. The numbers $a_{11}, a_{12}, \dots, a_{nm}$ Constituting $m \times n$ matrix are called _____

- (a) values (b) properties
(c) elements (d) domain

8. if $a_{ij} = 0$ for all $i \neq j$ and $a_{ii} = C$ then its called _____ matrix.

- (a) Square (b) Row
(c) Null (d) Scalar

9. A Graph consists of set of _____

- (a) Order (b) Lines
(c) Arc (d) Vertices

10. An _____ graph consists of set of Vertices and a set of edges such that each edge is associated with an unordered pair of Vertices.

- (a) Directed (b) Undirected
(c) Unidirected (d) Bidirected

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Prove that if a Relation R on set A is transitive and irreflexive, then it is asymmetric.

Or

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(b) Let R be the Relation represented by the

matrix $M_R = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ find the matrix

representation of R^{-1} and R' .

12. (a) Define functions and its terms.

Or

(b) Show that if $(x, y) = x^y$ is a primitive recursive function.

13. (a) Write short notes on Connectives and Negation.

Or

(b) Prove that the following propositions are tautology.

- (i) $p \vee \sim p$ (ii) $P \Rightarrow (p \vee q)$

14. (a) List out the properties of Matrix addition.

Or

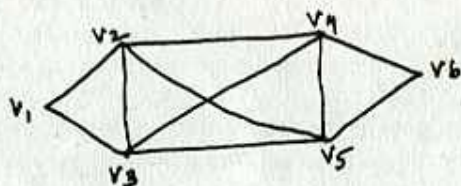
(b) By using elementary row transformation find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 7 \end{bmatrix}$

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[P.T.O.]



15. (a) Find the degree of each vertex of the following graph.



Or

- (b) Discuss about Sub graph.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the types of Relations in a set

Or

- (b) Let R and S be relation from A to B show that

(i) if $R \subseteq S$, then $R^{-1} \subseteq S^{-1}$

(ii) $(R \cap S)^{-1} = R^{-1} \cap S^{-1}$

17. (a) Write detail notes on classification of functions.

Or

- (b) Show that function $f(x,y)=xty$ is primitive recursive function. Hence compute the value of $f(2,4)$.

18. (a) Discuss about Drived Connectives.

Or

- (b) Obtain the Conjunctive normal form of the following.

(i) $p \wedge (p \Rightarrow q)$

(ii) $[qv(p \wedge q)] \wedge \sim[(pvr) \wedge q]$

19. (a) Solve, with help of matrices

$$x + 2y + 3z = 4$$

$$x + 4y + 9z = 6$$

$$xty + z = 3$$

Or

- (b) Explain the properties of Inverse of matrix.

20. (a) Discuss about types of graphs.

Or

- (b) Write detail notes on operations of graphs.

