

(6 pages)

Reg. No. : .....

Code No. : 40602 E

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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 × 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 diagraph have an edge going between then 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

- (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)  $p \vee \sim p$

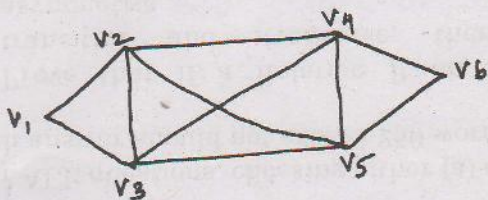
(ii)  $P \Rightarrow (p \vee q)$

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

Or

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

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  $R \subseteq S$ , the  $R^{-1} \subseteq S^{-1}$

(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.