Seat No.	

Set: A

B.C.A. (Part-I) (Semester-II) (CBCS/NEP)

Examination Oct./Nov 2023.

College Name : Kamala College ,Kolhapur

Subject Name : Mathematical Foundations For Computer Applications

Subject Code : 80872 **Total Marks: 70**

Day and Date: Friday 03/11/2023 **Period: 3 hours**

Time: 12.00 p.m. to 03.00 p.m. **Total Pages: 04**

Instructions :

1) Que 1 and Que 6 are compulsory.

2) Attempt any three questions from que No 2 to que No 5

3) Figure to the eight indicate marks.

Q.1 A] Select the correct alternative for each of the following ……. [10]

1) Given that the set, A = {1, 2, 3}, B ={3, 4}, C = {4, 5, 6} then $A \cup (B \cap C)$ is :

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

2) The dual of $(\sim p \wedge q) \vee (p \wedge t)$

a) $(p \wedge q) \vee (p \wedge c)$ b) $(\sim p \vee \sim q) \wedge (\sim p \vee c)$

c) $(\sim p \vee q) \wedge (p \vee c)$ d) $(\sim p \vee q) \wedge (p \vee t)$

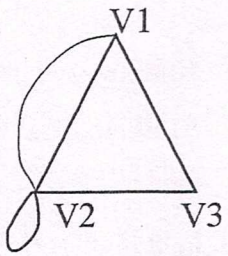
3) If $A = \begin{pmatrix} 1 & 5 & -7 \\ 2 & 6 & 8 \end{pmatrix}$ then A^T = …….

a) $\begin{pmatrix} 2 & 6 & 8 \\ 1 & 5 & -7 \end{pmatrix}$ b) $\begin{pmatrix} 5 & 1 & -7 \\ 6 & 2 & 8 \end{pmatrix}$

c) $\begin{pmatrix} 1 & 2 \\ 5 & 6 \\ -7 & 8 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 6 & 5 \\ 8 & -7 \end{pmatrix}$

4) The degree of vertex V_2 in the adjoining multigraph is....

a) 5 b) 4 c) 3 d) 6



5) If A and B are two sets such that n(A) = 50, n(B) = 30, n(A ∪ B) = 60 then n (A ∩ B) is equal to...

a) 140 b) 50 c) 20 d) 30

6) Which of the following sentence is not a statement?

a) 8 has 4 divisors b) Read the book

c) 8 + 9 = 17 d) Square of an odd number is even

7) The Value of $\begin{vmatrix} 1 & 0 & 2 \\ 2 & 1 & 1 \\ 1 & 2 & 3 \end{vmatrix}$ is .....

a) 1 b) 7 c) 9 d) 2

8) The number of vertices in Km, n is...

a) m + n b) $m^2 + n^2$ c) mn d) m-n

9) The power set of the set {O} is.....

a) Ø b) {O} c) {Ø} d) {Ø, {O}}

10) The converse of p → q is ....

a) q → p b) ~ p → q c) ~ q → ~ p d) ~ p → ~ q

B] Solve any Two of the following [10]

i) Let A = {1, 2, 3, 4}, B = { 4,5,6}, C = {5, 6} find,

i) A x $(B \cap C)$ ii) (A x B) $\cap$ (A x C)

ii) Define 'Graph' with example And Explain Walk, Path, cycle

iii) If A = $\begin{pmatrix} 7 & 3 \\ 3 & 5 \end{pmatrix}$ and B = $\begin{pmatrix} -5 & 3 \\ 3 & -7 \end{pmatrix}$

Find |A| and |B|, and show that AB is a non - singular matrix

Q.2) a) Define the term "statement" And write the converse, inverse and contrapositive of

"If you are good in logic, then you are good in Mathematics"

b) Define the term 'Tautology' And check whether the following statement pattern is a Tautology, Contradiction or contingency $[(p \rightarrow q) \wedge q] \longrightarrow p$ [5 + 5]

Q. 3) a) There are 260 persons with a Skin disorder. If 150 had been exposed to the chemical A, 74 to the chemical B and 36 to both chemical A and B, find the number of persons exposed to

i) Chemical A but not chemical B

ii) Chemical A or chemical B

b) Define finite set And solve

If A = {1, 2, 3, 4}, B = {3, 4, 5, 6} C = {4, 5, 6, 7, 8} and universal set

X = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} then verify that,

i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

ii) $(A \cup B)' = A' \cap B'$ [5 + 5]

Q 4) a) Define Degree of vertex, and hence explain even vertex, odd vertex, Isolated vertex and pendant vertex.

b) Define digraph and also explain walk, path, cycle [5 + 5]

Q 5) a) Define transpose of a matrix.

If $A = \begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix}$, $B = \begin{pmatrix} 0 & 4 \\ 2 & -1 \end{pmatrix}$ then show that $AB \neq BA$

b) Define Scalar matrix. Apply elementary transformation for,

$A = \begin{pmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{pmatrix}$, $2C_2$ and $B = \begin{pmatrix} 1 & 0 & 2 \\ 2 & 4 & 4 \end{pmatrix}$, $-3R_1$

Find the addition of two new matrices [5 + 5]

Q. 6) Write short note on the following [Any Four out of six] [20]

i) Operations on set

ii) Adjacency and Incidence matrix

iii) Diagonal matrix, singular matrix, Identity matrix

iv) Conjunction, disjunction, negation

v) Types of Functions

vi) Simple graph, complete graph, regular graph.

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