Seat No.	

Total No of Pages: 2

Kamala College, Kolhapur

(Autonomous)

B.C.A. (Part-I) (Semester-I)

Examination November, 2023.

NEP - 2020 Level – 5.0

Mathematical Foundations for Computer Applications-II

Subject Code: OE 110

Day and Date: Wednesday, 08/11/2023 **Total Marks: 40**

Time: 08.00 a.m. to 10.00 a.m.

Instructions:

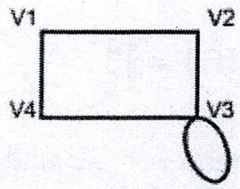
1. **Que. 1 is compulsory.**
2. **Attempt any four questions from Que. 2 to Que. 7.**

Que-1) Select the correct alternative and rewrite the statement. (08)

1) If $A = \begin{bmatrix} 2 & 3 \\ 4 & -1 \\ 5 & 0 \end{bmatrix}$ *then* $A^T = -----$

a) $\begin{bmatrix} 3 & 2 \\ -1 & 4 \\ 0 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 4 & -1 \\ 2 & 3 \\ 5 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 4 & 5 \\ 3 & -1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 3 & -1 & 0 \\ 2 & 4 & 0 \end{bmatrix}$

2) The degree of Vertex V_3 in the adjoining multigrpah is _____



a)4 b) 2 c) 3 d) 5

3) If the order of the matrix A = [aij] is 3 x 2 and order of the matrix B=[bij] is 2x4, then the order of AB is _____

a) 3x3 b) 3x4 c) 2x2 d) 3x2

4) If A = $\begin{bmatrix} 2 & -1 \\ 5 & 7 \end{bmatrix}$ then 2C2 gives new matrix as _____.

a) $A \sim \begin{bmatrix} 4 & -1 \\ 10 & 7 \end{bmatrix}$ b) $\begin{bmatrix} 4 & -2 \\ 10 & 14 \end{bmatrix}$ c) $\begin{bmatrix} 2 & -2 \\ 5 & 14 \end{bmatrix}$ d) $\begin{bmatrix} 5 & 7 \\ 2 & -1 \end{bmatrix}$

5) A complete graph K_5 consists of exactly _____ edges.
a) 10 b) 11 c) 5 d) 12

6) The number of vertices in Km., n is _____
a) m+n b) m^2+n^2 c) mn d) m-n

7) If the matrix $A = \begin{bmatrix} x & -8 \\ 1 & 3 \end{bmatrix}$ and $A^2 = I$, then the value of x is _____
a) -3 b) -2 c) 0 d) -1

8) Number of edges in 4-regular graph on 6 vertices is _____
a) 4 b) 6 c) 12 d) 24

Q.2) Define Pseudograph with example, and Explain Walk, path and cycle. **(08)**

Q.3) Define singular and non-singular matrix. **(08)**
Also find x and y, if

$$[2\ 0\ 3]\left\{3\begin{bmatrix} 6 & 3 \\ -1 & 2 \\ 5 & 4 \end{bmatrix} + 2\begin{bmatrix} -4 & -1 \\ 1 & 0 \\ -3 & -4 \end{bmatrix}\right\} = [x, y]$$

Q.4) Define degree of a vertex and hence explain even vertex, odd vertex, Isolated vertex and pendant vertex with examples. **(08)**

Q.5) Define Null matrix and scalar matrix.
And hence find the inverse of A,
if $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ **(08)**

Q.6) i) Explain Diagrph and weighted graph. **(04)**

ii) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & -2 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 7 \end{bmatrix}$ *then*

find A + 2B and 2A - B **(04)**

Q.7) Write short notes on any TWO of the following. **(08)**
1) Determinant of a matrix of order 2 x 2.
2) Complete graph and Bipartite graph.
3) Operations of Graph.

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