Total No. of Questions : 4] SEAT No. : 33

[Total No. of Pages : 2

PC-445

[6359]-566

S.E. (Computer Science and Engineering (Data Science)) (Insem.)

MATHEMATICAL FOUNDATION FOR DATA SCIENCE - I

(2019 Pattern) (Semester - III) (210641)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates :

1) *Answer Q1 or Q2, Q3 or Q4.*
2) *Drawn neat diagrams wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume Suitable data if necessary.*

Q1) a) Define Vector & Explain vector Operations. [4]

b) Explain Types of Linear transformations and its applications in data science. [6]

c) The vectors are $\vec{a} = 3\underline{i} - \underline{j} + 2\underline{k}$ & $\vec{b} = \underline{i} - \underline{j} + \underline{k}$ then find [5]

i) $I\vec{a}I$ and $I\vec{b}I$ ii) $\vec{a} \times \vec{b}$

iii) $\vec{a} \cdot \vec{b}$ iv) Angle between $\vec{a}$ & $\vec{b}$

v) $\hat{a}$

OR

Q2) a) Find Eigenvalues and Eigenvectors of Matrix A $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$. [4]

b) Explain rotation matrix in 2D and 3D and its applications in data science. [6]

c) If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 4 & 6 \\ 1 & 1 & 1 \end{bmatrix}$ & $B = \begin{bmatrix} 0 & 10 \\ 2 & 1 \\ 18 & 9 \end{bmatrix}$ find AB. [5]

P.T.O.

Q3) a) Define Limits & Continuity. What are the applications of limits and continuity in data science? [6]

b) Explain all basic rules of the derivate with examples? [4]

c) Define the multivariate function and explain how to find partial derivative of multivariate function with suitable example? [5]

OR

Q4) a) What are the applications of calculus in data science? [6]

b) Explain all basic rules of the integrations with examples. [4]

c) Define gradient vector. Find gradient of $f(x, y) = x^2 + y^2$. [5]

⌘⌘⌘