School of Computing Science and Engineering

B.Tech CSE
ETE - Jun 2023

Time : 3 Hours **Marks : 100**

Sem II -E1UA203B - B130210T
Mathematics of Big Data and Optimization
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1. Formulate the problem as a linear programming problem to minimize the cost of the mixture K2 CO1 (5)

Resource	Food-I	Food-II	Requirements
Vita,ins A (Units/kg)	2	1	8
Vitamin C (Units/Kg)	1	2	10
Cost (Rs/Kg)	50	70	

2. Draw complete graph for $k_5 \; and \; k_6$ K3 CO1 (5)

3. Define the types of big data analytics with an exapmle K1 CO1 (5)

4. Describe the different types of data analytics techniques with an examples K2 CO1 (10)

5. Show that the vectors $\{u_1, \; u_2, \; u_3\}$ are orthogonal K4 CO2 (10)

$$u_1 = \begin{bmatrix} -1 \\ 4 \\ 3 \end{bmatrix}, \; u_2 = \begin{bmatrix} 5 \\ 2 \\ -1 \end{bmatrix}, \; u_3 = \begin{bmatrix} 3 \\ -4 \\ 7 \end{bmatrix}$$

6. K1 CO1 (10)

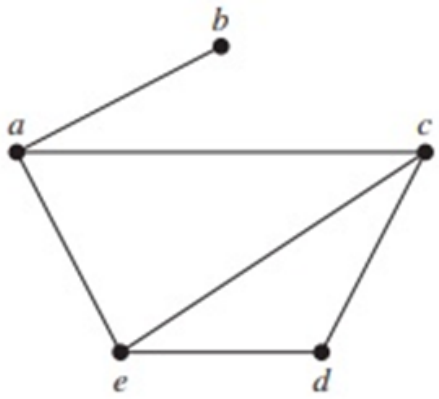
Determine the distance between the two vectors $u = \begin{bmatrix} 0 \\ -5 \\ 2 \end{bmatrix} \; and \; v = \begin{bmatrix} -4 \\ -1 \\ 8 \end{bmatrix}$ also check if the two vectors are orthogonal

7) Analyse if the following system of evaluation is consistent, find the solution K4 CO2 (10)

$$\begin{aligned} x_1 - 2x_2 + \; x_3 &= 0 \\ 2x_2 - 8x_3 &= 8 \\ 5x_1 \quad - 5x_3 &= 10 \end{aligned}$$

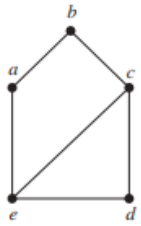
OR

Evaluate the adjancy matrix and incident matrix from the following graphs K4 CO2 (10)

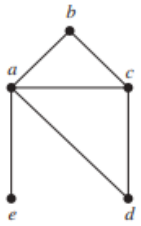


PTO

8. Show that the following two graphs G and H are not isomorphic K3 CO3 (15)



G



H

9) Solve the given system of equations using Gauss elimination method K4 CO3 (15)

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

OR

Calculate the value of x,y, and z using gauss Jordon method K4 CO5 (15)

$$x + 20y + z = -18,$$
$$25x + y - 5z = 19,$$
$$3x + 4y + 8z = 7.$$

10. Solve the following system of equation using gauss Jacobi Iteration method K3 CO3 (15)

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$