GUJARAT UNIVERSITY

M.Sc. (Artificial Intelligence & Machine Learning) - Defense Specific

Semester – I

Sessional - I

Subject Name: Mathematical Foundation

Time : 1.5 Hours **Total Marks : 40**

Date: 18-10-22

Q-1 In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only. [5]

Q-2 Given 3 distinct non-collinear points in 2-D cartesian coordinates, find the equation to calculate the area of a triangle. [5]

OR

Q-2 Find the normal form of equation of line if the following information is given: (i) Length of perpendicular (normal) from origin to line (ii) Angle which normal makes with positive direction of x-axis.

Q-3 Line through the points (–2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24). Find the value of x. [5]

Q-4 Find the projection of vector (b+c) on vector a, where a=2i-2j+k, b=i+2j-2k, and c=2i-j+4k [5]

Q-5 If a=2i+2j+3k, b=-i+2j+k, and c=3i+j are such that a+λb is perpendicular to c, then find the value of λ. [5]

Q-6 Show that the points A (1, – 2, – 8), B (5, 0, –2) and C (11, 3, 7) are collinear, and find the ratio in which B divides AC. [5]

Q-7 What is the span of vectors: A (2,1,1), B (1,2,1), and C (0,0,5) [5]

OR

Q-7 Check whether the following set B is a basis for R^3.
B= {(1,2,1), (-1,1,0), (5, -1,2)}

Q-8 A set B = $\{b_1,b_2\}$ given by B = {(5,-2),(1,4)} forms a basis for R^2 and a point P under this basis B is given by P=$(0.5b_1 + 2b_2)$. What would be the coordinates of this point P under standard basis given by $\{e_1,e_2\}$ = {(1,0),(0,1)}. [5]