P.S.SCIENCE & H.D.PATEL ARTS COLLEGE, KADI

INTERNAL EXAMINATION

07/03/2019 | B.Sc. Sem - IV | Mathematics 402 | [Marks 40 | [1.45 to 3.45

Que 1: Attempt any two.

a) Explain matrix associate with a linear transformation.

b) Solve the system of equations by Echelon method. $x+y+z = 6$; $2x-y+z = 3$; $x+3y-z = 4$.

c) Let T: $R^3 \rightarrow R^2$ be a linear transformation defined by $T(a,b,c) = (a+b,b+c)$, where $B_1 = \{(,1,1,1),(1,2,3),(1,0,0)\}$ and $B_2 = \{(1,1),(1,-1)\}$ are basis of R^3 and R^2 respectively. Find $[T: B_1, B_2]$.

Que 2: Attempt any two.

a) Define a inner product space. In a vector space R^2, for $x = (x_1,x_2)$,$y = (y_1,y_2) \in R^2$ define $\langle x, y \rangle = x_1y_1+x_1y_2+x_2y_1+5x_2y_2$. Show that $\langle x, y \rangle$ is an inner product in R^2

b) For a linear map T: $R^2 \rightarrow R^2$, $T(\alpha,\beta) = (\alpha + 5\beta, 3\alpha + \beta)$, find T^*.

c) Using Gram-Schmidt process obtain the orthonormal basis from the basis $\{(0,0,2),(2,1,0),(-1,2,1)\}$.

Que 3: Attempt any two.

d) Define : Eigen value , Characteristic equation.

e) Find the eigen values and corresponding eigen vectors of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 2 \end{bmatrix}$

f) Using Cayley-Hamilton theorem find the inverse of $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$

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