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

**Internal Examination**

**B. Sc. Semester - IV**

**19-3-2016]** **Mathematics - 402** [1-30 to 3-00

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**1.** **(a)** Explain matrix associated with a Linear Transformation

**(b)** **Attempt any one.**

(i) Find inverse of a matrix $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & 1 \\ 0 & 1 & -1 \end{bmatrix}$ by the row-reduction method.

(ii) A function $T : R^2 \to R^2$, $T(x, y) = (x, -y)$, $x, y \in R$. The ordered basis of $IR^2$ are $B_1 = \{(1, 1), (1, 0)\}$ and $B_2 = \{2, 3,), (4, 5)\}$ Find the matrix $[T : B_1, B_2]$

**2.** **(a)** Define inner product space with illustration.

**(b)** **Attempt any one.**

(i) State & prove schwarz's inequality.

(ii) State only Gram-schmidt Orthogonalization Process. Prove that $A \subseteq B \Rightarrow B^{\perp} \subseteq A^{\perp}$. Where A and B are Subjects of an inner product space V

**3.** **(a)** Defines : Eigen value, characteristic polynomial, characteristic equation.

**(b)** **Attempt any one.**

(i) Find eigen values and eigen vectors of a matrix $\begin{bmatrix} 2 & 3 \\ 5 & 4 \end{bmatrix}$

(ii) Find inverse of the matrix $\begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$ using. C.H. theorem.

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