GOVERNMENT COLLEGE OF ENGINEERING: (An autonomous institute of Govt. of Maharashira)

CT-1 W-2016 SHU-101 ENGG. MATHS-1 [CE/MECH/ELFO/EXTC/CS/IN/IT] MARKS-15 TIME-1 HOUR Date-19/09/2016

1. Find the eigen values and eigen vectors of a matrix $A = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$ 2. Attempt any Four

2. Attempt any Four (3)

Define linearly dependent and independent. Is the system of vectors

 $X_1 = (2.2.1)^n$, $X_2 = (1.3.1)^n$, $X_3 = (1.2.2)^n$ linearly dependent.

Find the characteristic equation for $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ and use it to simplify the expression

A3+5A4-6A3+2A2-4A+71

For different values of k, discuss the nature of solution for the system of equation x + 2y - z = 0, 3x + (k + 7)y - 3z = 0, 2x + 4y + (k - 3)z = 0

Find non singular matrices P and Q such that PAQ is in no. na. form if

$$A = \begin{bmatrix} 1 & 2 & 3 & -2 \\ 2 & -2 & 1 & 3 \\ 3 & 0 & 4 & 1 \end{bmatrix}$$

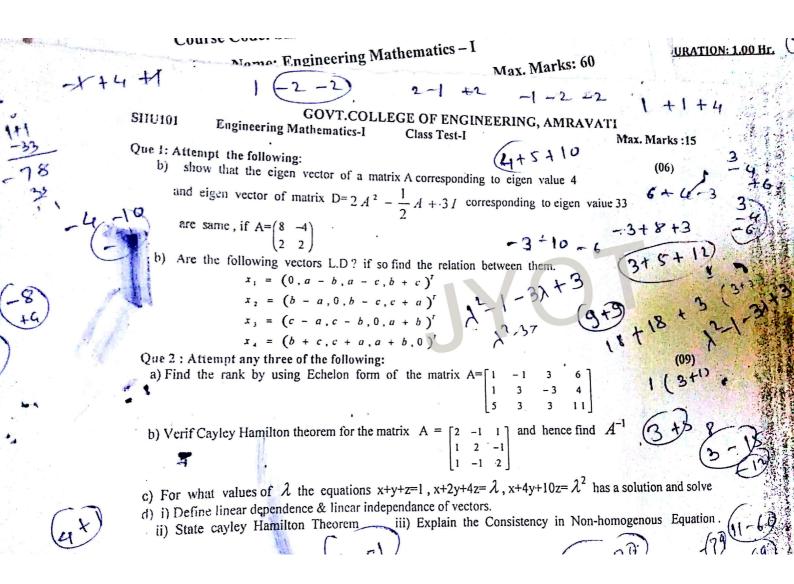
Find the rank of a matrix by using Echelon form, where

$$A = \begin{bmatrix} 0 & 2 & 1 & 1 \\ 3 & 5 & 1 & 2 \\ 5 & -1 & 2 & 2 \\ 2 & 6 & 5 & 3 \\ 1 & 3 & -3 & -1 \end{bmatrix}$$

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GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI CLASS TEST NO.1 Winter-2015

Date:07/09/2015

SHU101, ENGINEERING MATHEMATICS-I

CLASS: B.Tech First Year

Max Marks:15

Que 1: Attempt any four of the following:

- a) Define rank of matrix and hence find it of $\begin{bmatrix} 2 & -1 & 0 & 5 \\ 0 & 3 & 1 & 4 \end{bmatrix}$. Verify it using normal form.
- b) Reduce the following matrix to echelon form and find its rank.

- Determine the values of λ for which the following set of equations may possess nontrivial solution. $3x + y \lambda z = 0$; 4x 2y 3z = 0; $2\lambda x + 4y + \lambda z = 0$. For each permissible value of λ , determine the general solution.
- d) For the matrix A, find non-singular matrices P and Q such that PAQ is in the normal form and hence find $A^{-1}, \text{ where } A = \begin{bmatrix} 8 & 4 & -3 \\ 2 & 1 & 1 \end{bmatrix}$