DATE					
1				2	-
11	1		- 1	0	

ii) Also , check wheather A is diagonalizable if yes then

diagonalize A.

iii) also find eign values of a) A'-2A3+3I-5A!

b) A!

c) adj(A).

$$= \Rightarrow i) \text{ baisen } A = \begin{bmatrix} -9 & 2 & 6 \\ 5 & 0 & -3 \\ -16 & 4 & 11 \end{bmatrix}$$

... The characteristic equation is 
$$[A-\lambda 2]=0$$
.

$$\begin{bmatrix} -9-\lambda & 2 & 6 \\ 5 & 0-\lambda & -3 \\ -16 & 4 & 11-\lambda \end{bmatrix}=0$$

(us Know, 3 - SI 2 + S2 7 - | A) = 0.

where  $S_1 = 2 \text{ sum of diagonal elements}$  and  $S_2 = 2 \text{ sum of miner of diagonal elements}$ .  $S_1 = -9 + 0 + 11 = 2$ 

$$S_2 = \begin{vmatrix} 0 & -3 \end{vmatrix} + \begin{vmatrix} -9 & 6 \end{vmatrix} + \begin{vmatrix} -9 & 2 \end{vmatrix} = 0 + 12 - 99 + 96 + 0 - 10 = -1$$

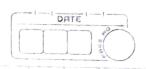
: Equation duranes, 3-27-7+2=0.

also 
$$|A| = |-q| 2 |6|$$
 $|5| 0 - 3| = 2$ 

, so seulor regis. Espero, rontanto primbos.

7= -1 2 31.

you for eiger vectors



$$\therefore \left[ \beta - (-i) \mathcal{I} \right] X = 0.$$

$$\begin{bmatrix} -9+1 & 2 & 6 & \boxed{x_1} & \boxed{0} & 0 & 0 \\ 5 & 1 & -3 & \boxed{x_2} & = 0 & 0 & 0 \\ -16 & 4 & 11+1 & \boxed{x_3} & \boxed{0} & 0 & 0 \end{bmatrix}$$

Consider, 
$$-8x_1+2x_2+6x_3=0$$
.

By Gramor's stude, 
$$x_1 = -x_2 = x_3 = t$$
.
$$\begin{vmatrix} 2 & 6 & | -8 & 6 & | -8 & 2 \\ | & 1 & -3 & | & 5 & -3 & | & 5 \end{vmatrix}$$

$$\frac{-13}{x^{1}} = \frac{-9}{-x^{3}} = \frac{-18}{x^{3}} = f$$

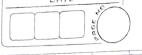
$$\therefore X_1 = \begin{bmatrix} -12t \\ 6t \\ -18t \end{bmatrix} \qquad \therefore X_1 = t \begin{bmatrix} 2 \\ -1 \end{bmatrix} - \left( \frac{1}{2} - \frac{1}{2} \right) = 0.$$

$$\therefore \left[ U - 5 Z \right] X = 0$$

$$\begin{bmatrix} -16 & 4 & 11-5 \end{bmatrix} \begin{bmatrix} \alpha^3 \\ 2 & -5 & -3 \end{bmatrix} \begin{bmatrix} \alpha^3 \\ \alpha^5 & = 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\therefore \begin{bmatrix} U - 5I \end{bmatrix} X = 0$$

$$\begin{bmatrix} -11 & 2 & 6 \\ 5 & -2 & -3 \\ -16 & 4 & 9 \end{bmatrix} \begin{bmatrix} \alpha_1 \\ \alpha_2 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$



$$\frac{x_{1}}{|x-6|} = -x_{2} = x_{3} = +$$

$$\frac{-6}{3} = \frac{-3}{3} = \pm \frac{-3}$$

$$\therefore x_2 = \begin{bmatrix} -6t \\ -3t \end{bmatrix} \therefore x_2 = t \begin{bmatrix} 2 \\ -1 \end{bmatrix} - \left( \frac{1}{2} \right)$$

$$\therefore \quad \partial x' - x^3 - 3x^3 = 0$$

$$\frac{\alpha_1}{|-1|-3|} = \frac{\alpha_2}{|-1|} = \frac{\alpha_3}{|-1|} = \frac{1}{|-1|}$$

$$\frac{3}{2} = \frac{3}{2} = \frac{3}{2} = \frac{1}{2}$$

$$X_3 = \begin{bmatrix} 2t \\ -2t \end{bmatrix} = \therefore X_3 = t \begin{bmatrix} 1 \\ -1 \end{bmatrix} = (dividing duy 2) = 3$$

: Eigen values are 
$$X_1 = -1$$
,  $X_2 = 2$ ,  $X_3 = 1$ . and Eigen Vectors are  $X_1 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$ ,  $X_2 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$ ,  $X_3 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$ ,  $\begin{bmatrix} -1 \\ 2 \end{bmatrix}$ 



en A sintem ett tristeit ere eenler regie ett lle: (ii Mosilrogail

also The algebric multiplicity and geometric multiplicity 0061.

for 7 = -1, algebric multiplicity = geometriz multiplicity=1.

for >= 2> daebric multiplicity = geometric multiplicity = 1

algebric multiplicity = geometric multiplicity=1

Horro, AH and GIH for each eigen value of A matrix

Therefore, A is digensiable matrix.

Therefore, A is digensiable matrix.

Therefore, A is digensiable matrix.

-1 -1 -1

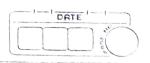
-1 -1 -1

. sinter langarib ..

$$D = \mu^{-1}AH$$

$$D = \begin{bmatrix} 2 & 2 & 1 \\ -1 & -1 & -1 \end{bmatrix} \begin{bmatrix} -q & 2 & 6 \\ 5 & 0 & -3 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} 2 & 4 & 2 \\ 3 & 4 & 2 \end{bmatrix}$$

$$: O = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$



$$(-1)^{4} - 2A^{3} + 3I - 5A^{-1} = 0 \quad \text{fout } A = \lambda$$

$$(-1)^{4} - 2A^{3} + 3I - 5A^{-1} = 0 \quad (-1)^{4} - 2(-1)^{3} + 3 - 5(-1) = 1 - 2(-1) + 3 - 5(-1)$$

$$(-1)^{4} - 2(-1)^{3} + 3 - 5(-1) = 1 + 2 + 3 + 5$$

$$\int_{0}^{\infty} (1)^{4} - 2(1)^{3} + 3I - 5(1) = 1 - 2 + 3 - 5 = 3$$

∴ Eigen values for P'-2A3+3I-5A-1 is 11 31-3.

: The characteristic equation is  $[A^{-} \Lambda I] = 0$ . :  $\Lambda^{3} - S_{1} \Lambda^{2} + S_{2} \Lambda - [A^{7}] = 0$ .

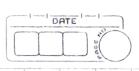
where Si is soun of diagonal elements and . Si est elements.

$$S_{1} = -9 + 11 = 2$$

$$S_{2} = \begin{vmatrix} 0 & 4 \\ -3 & 11 \end{vmatrix} + \begin{vmatrix} -9 & -16 \\ 6 & 11 \end{vmatrix} + \begin{vmatrix} -9 & 5 \\ 2 & 0 \end{vmatrix}$$

 $= 0+12-99+96+0-10 \quad \text{and } |R^{\dagger}| = -2$ 





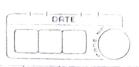
: Eigen values of A is -1,2,1.

and 
$$\lambda_1 = -1$$
,  $\lambda_2 = 2$ ,  $\lambda_3 = 1$ .

$$adj(R) = |R| = -2$$
  $-2$   $-2$   $-2$   $-2$   $-2$ 

Given that, 
$$\lambda = 4,1$$
 and vectors are  $X_1 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$  and  $X_2 = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$  for eigen values  $\lambda_1 = 4$  and  $\lambda_2 = 1$ .

and Diagonal Matrice = 
$$0 = \begin{bmatrix} \lambda_1 & 0 \end{bmatrix} = \begin{bmatrix} 4 & 0 \\ 0 & \lambda_2 \end{bmatrix} \begin{bmatrix} 4 & 0 \\ 0 & 1 \end{bmatrix}$$



e sixtem ett piuttug pel :.

$$A = \begin{bmatrix} 1 & -2 \end{bmatrix} \begin{bmatrix} 4 & 0 \end{bmatrix} \begin{bmatrix} 0.2 & 0.4 \end{bmatrix}$$

$$|A = [A - 2][0.7 0.4]$$

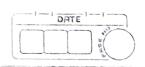
93. Using Cayley hamilton yind  $R' - 3R^3 + 5R^2 - 6R + 7I$ for  $R = \begin{bmatrix} -9 & 2 & 6 \\ 5 & 0 & -3 \end{bmatrix}$ 

dry Caxley homilton,

put sue know characteristic equation,  $3^3 - 2 \ 3^2 - \lambda + 2 = 0$ 

 $\frac{A^{3}-2A^{3}-A+2I}{A^{3}-A^{3}+A^{3}+A^{2}-AA+AI} = \frac{A^{3}+2A^{3}+A^{2}-AA+AI}{A^{3}-A^{3}+A^{2}+A^{2}+A^{2}}$   $\frac{A^{3}-A^{3}+A^{3}+A^{2}+A^{2}+A^{2}}{A^{3}-A^{3}+A^{2}+A^{2}+A^{2}}$   $\frac{A^{3}-AA+AI}{AA^{3}-AA+AI}$ 

$$\frac{QR}{QR} = \frac{QR}{QR} - \frac{QR}{QR} + \frac{QR}{QR} = \frac{QR}{QR} + \frac{QR}{QR} + \frac{QR}{QR} = \frac{QR}{QR} + \frac{QR$$



$$= 4 \begin{bmatrix} -9 & 2 & 6 \\ 5 & 0 & -3 \\ -16 & 4 \end{bmatrix} \begin{bmatrix} -9 & 2 & 6 \\ 5 & 0 & -3 \\ -16 & 4 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 & 11 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \\ -16 & 4 & 11 \\ -16 & 4 &$$

$$= 4 \begin{bmatrix} -5 & 6 & 6 \end{bmatrix} - 9 \begin{bmatrix} -9 & 2 & 6 \\ 3 & -2 & -3 \end{bmatrix} + \begin{bmatrix} 5 & 0 & -3 \\ -12 & 12 & 13 \end{bmatrix} \begin{bmatrix} -16 & 4 & 11 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\therefore A' - 3A^{3} + 5A^{2} - 6A + 7I = \begin{bmatrix} 70 & 6 & -30 \\ -33 & 1 & 15 \\ 96 & 12 & -38 \end{bmatrix}$$