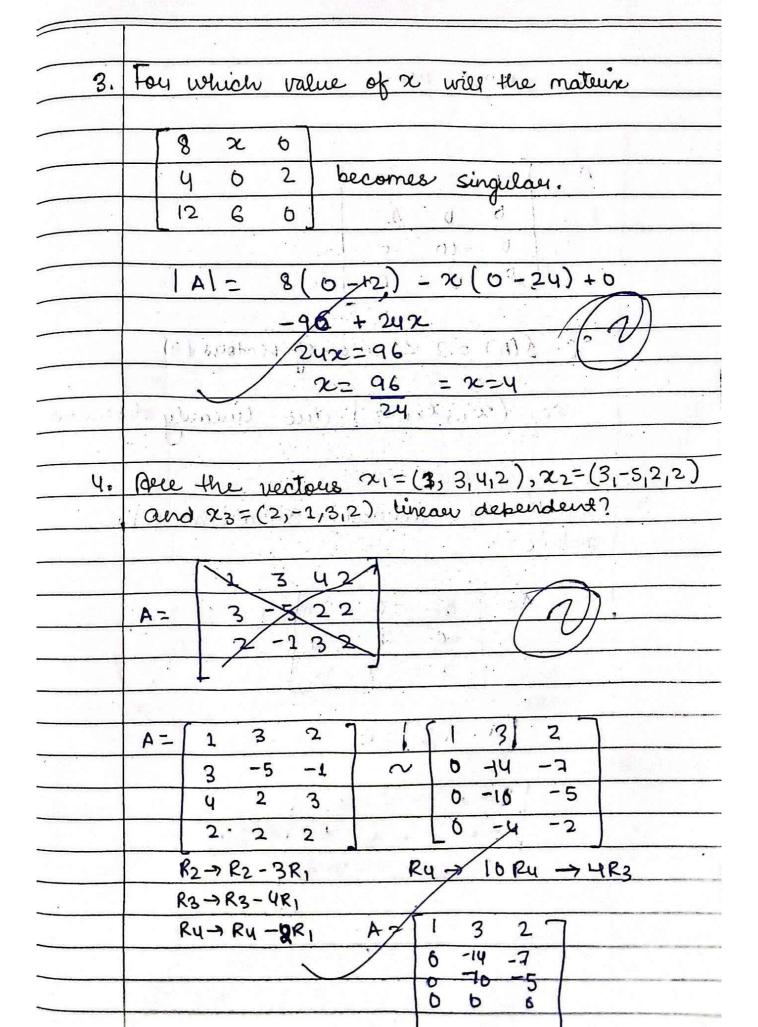
	PART-A
1.	Define lineau dependence and
	lineaer independence of vectoris.
Que	A set of n vector in an in-dimensional
	space is linearly dependent if the
<u>e</u> .	leanic of the materix found by these
- · · Y	vertous is less than the number of
45	Vectous.
	RancelA) a Total number of vectore
Se R. Kon	it set of or vectous is linearly independent
The second section of the second	it the evance of the materia found by
10-00 DEPT	if the evanue of the materia fourned by these vectors is equal to the number
8. 10. 6.5	of vectous.
4/1	Ranker = Total number of vectors
F (-	15 + (10) (SANGHINES OFF 1) (10)
	THE PORT OF FRANK A SEA
2.	Write the statement of Cayley- flamilton
	Theorem.
	Propagation of the state
Aug	Every square materix A satisfies its own
	Characteristics equation i.e. > 9 f A be any
	square materise of order n. Its characteristic
	egn is IA-AII = 0.

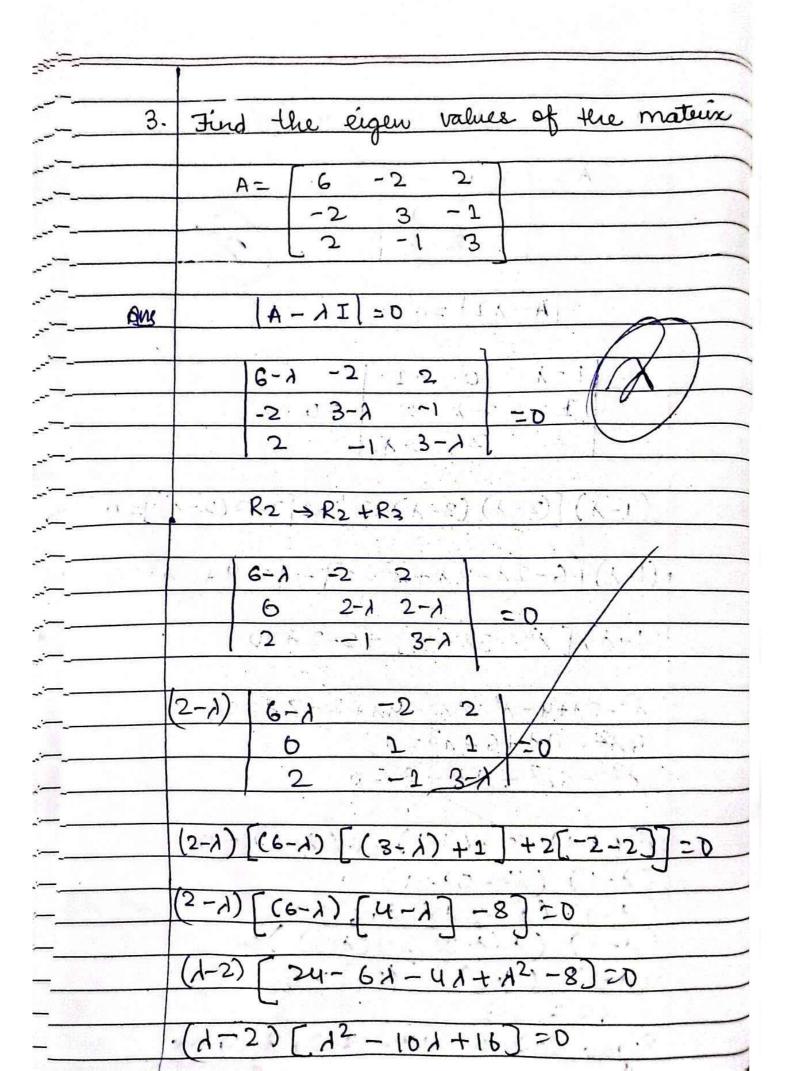


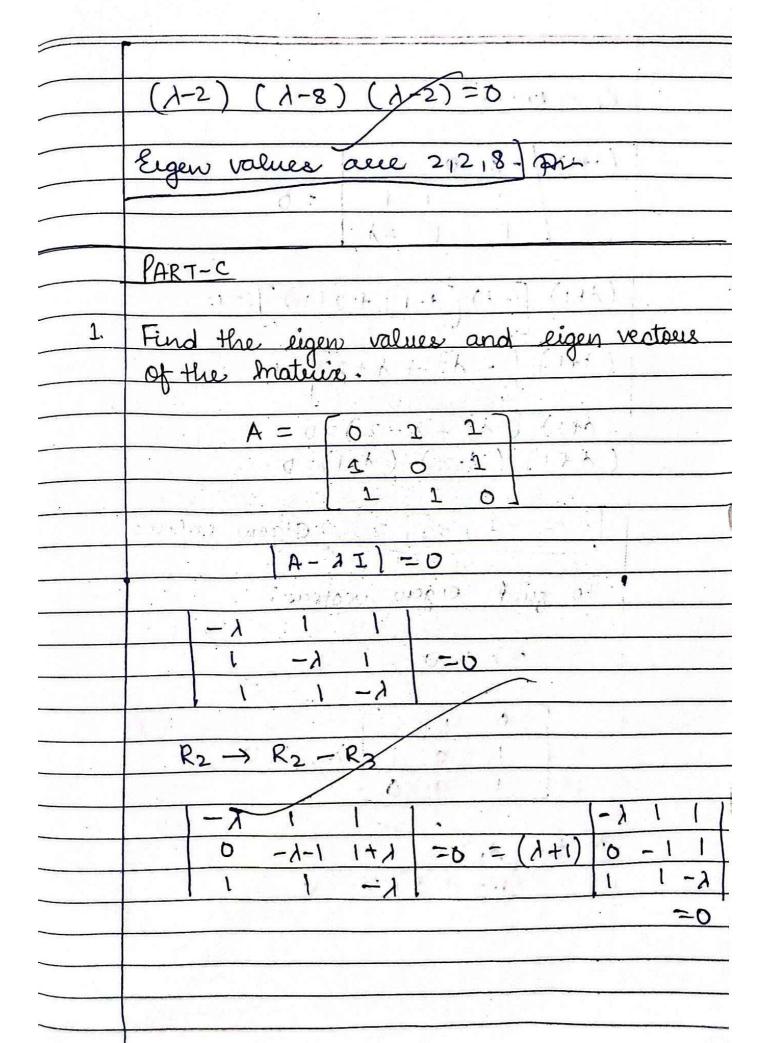
	R2 -> 10R2 - 14R3
_	A=[132]
	0 0 0
	0 -10 -5
	- (D - O - D -) - 1
	c = + D f
	% S(A) = 2 < No. of vectous (3)
	so, (x1, x2, x3] are linearly dependent
5.	Find the Characteristic Equation of the
3	materix:
	$A = \begin{bmatrix} 8 & -6 & 2 \end{bmatrix}$
	-6 7 -4
	2 -4 3 1
	$A - \lambda I = 0$
	8-1-62
	-6 7-1-4 =0
	- 12 1+4 3-1
	N 1 / 1 1

-	0 . 0 . 0 0		
	$R_2 \rightarrow R_2 + 3R_3$		
	8-16 2		
	0 -5-1 5-31 =0		
	2 -4 3-1		
4			
	(8-1) [(5+1) (1-3) + 4(5-31)]		
	+2[6(31-5)+2(5+1)]=0		
	(8-1) [12-101+5] +2[201-20]		
	182-451-13=011		
	13+451-1812=0) prie		
	PART-B		
1.	Check the vectors $x_1 = (1,1,1,3)/x_2 = (1,2,3)$		
	and 23 = (2,3,4,9) are unear dependent		
	ou lineau indépendent?		
Aus	let a materix A=[x,x2,x3]		
71	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
	$A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 1 & 2 \end{bmatrix}$		
	1 2 3		
	1 3 4		
	3 4 9 4X3		
2			

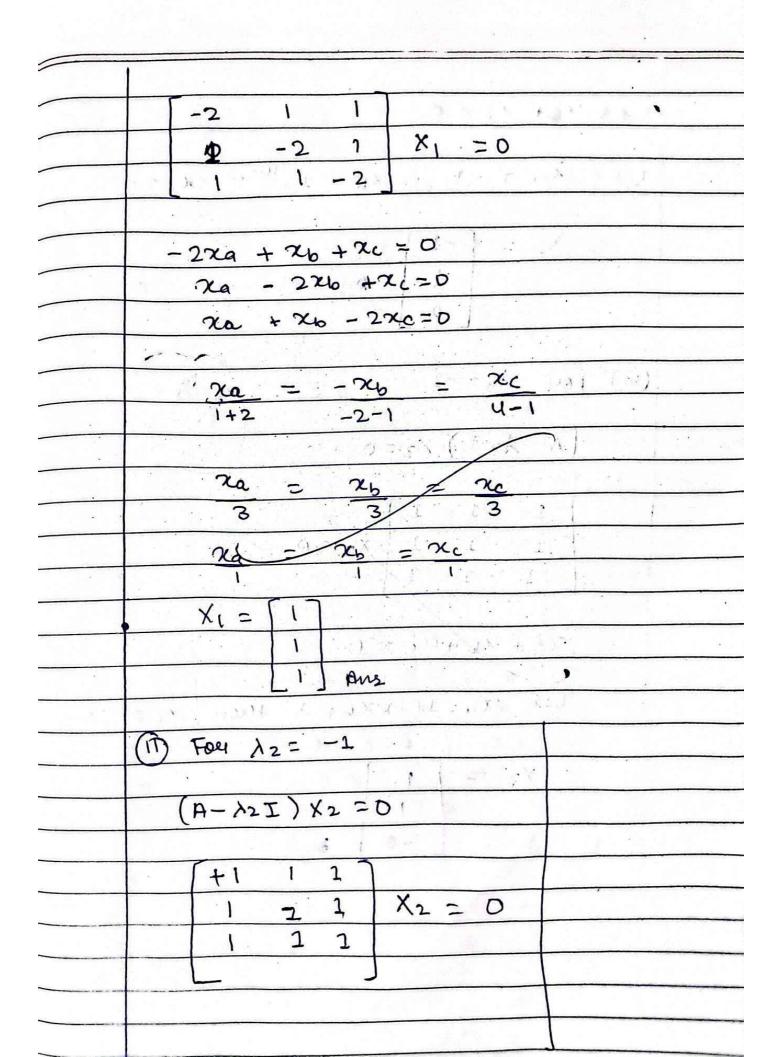
•			
$R_2 \rightarrow R_2 - R_1$			
R ₃ → R ₃ -R ₁			
Ru > Ru-3Ri			
A= [1 1 2]			
0 1 1			
(h 6 1 + 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
[0,13]			
•			
$R_2 \rightarrow R_2 - R_3$			
A= 1 1 2			
b, 0 b			
0 1 6			
D 1 3 4x3			
S(A) = 3 & No. of vectous = 3.			
Little Demonstrate (Intro-1) - 11 Section			
flence S(A) = No. of vectors.			
A state of the sta			
These 3 vectore $x_1, x_2 & x_3$ are			
Linearly independent:			

2.	Find the eight values of matrix
	$A = \begin{bmatrix} 1 & 0 & -1 \end{bmatrix}$
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
c	$ A-\lambda I =0$
-	
	1 - λ 0 - 1 1 - 2 - λ 1 = 0
	2 2 3-λ
	$(1-\lambda)[(2-\lambda)(3-\lambda)+2]+1[2-2(2-\lambda)]=0$
	$(1-\lambda)[6-2\lambda-3\lambda+\lambda^2-2]-1[2-4+2\lambda]=0$
	$(1-\lambda)[\lambda^2-5\lambda+4]+2-2\lambda=0$
	$1^{2}-51+4-1^{3}+51^{2}-41+2-21=0$ $61^{2}-111-6-1^{3}=0$
1	13-612+111-8-20
· V	12(1=1)=51(1-1)+6(1-1)=0
	$(\lambda - 1) (\lambda^2 - 5\lambda + 6) = 0$
	$(\lambda - 1) (\lambda^2 - 3\lambda - 2\lambda + 6) = 0$ $(\lambda - 1) (\lambda (\lambda - 3) - 2(\lambda - 3)) = 0$
	$(\lambda-1)$ $(\Lambda-2)$ $(\Lambda-3)=0$
	Eigen values aue 2;2,3 Aus





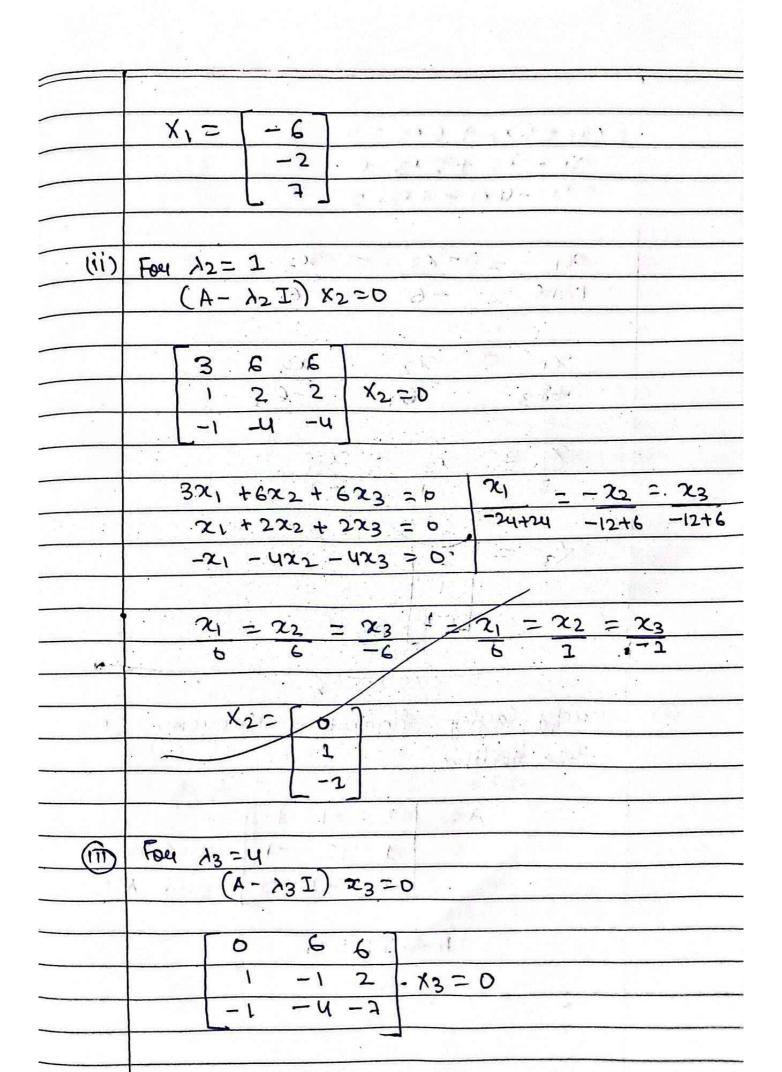
	$R_1 \rightarrow R_1 + R_2$
	(1+1) /-1 0 2 /
	0 -1 1 =0
	1 1 1 - 2
	7-19, 1
	(A+1) [(-A) [A-1] +2(1)] =0.
	$(\lambda+1) \left[-\lambda^2+\lambda+2\right] = 0$
	$(\lambda+1) \left(\lambda^2 - \lambda - 2\right) = 0$
	(A+1) (A-2) (A+1)=0
	1 = -2, -1, 2) -> eigen values
	U = T S - A
	To find eigen vectous:
1	AX FO
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	[011]
	1 0 1 X/=0
	1 1 0]
-	(1) Foei 1, = 2
- 1	(A-d, I) x, 20

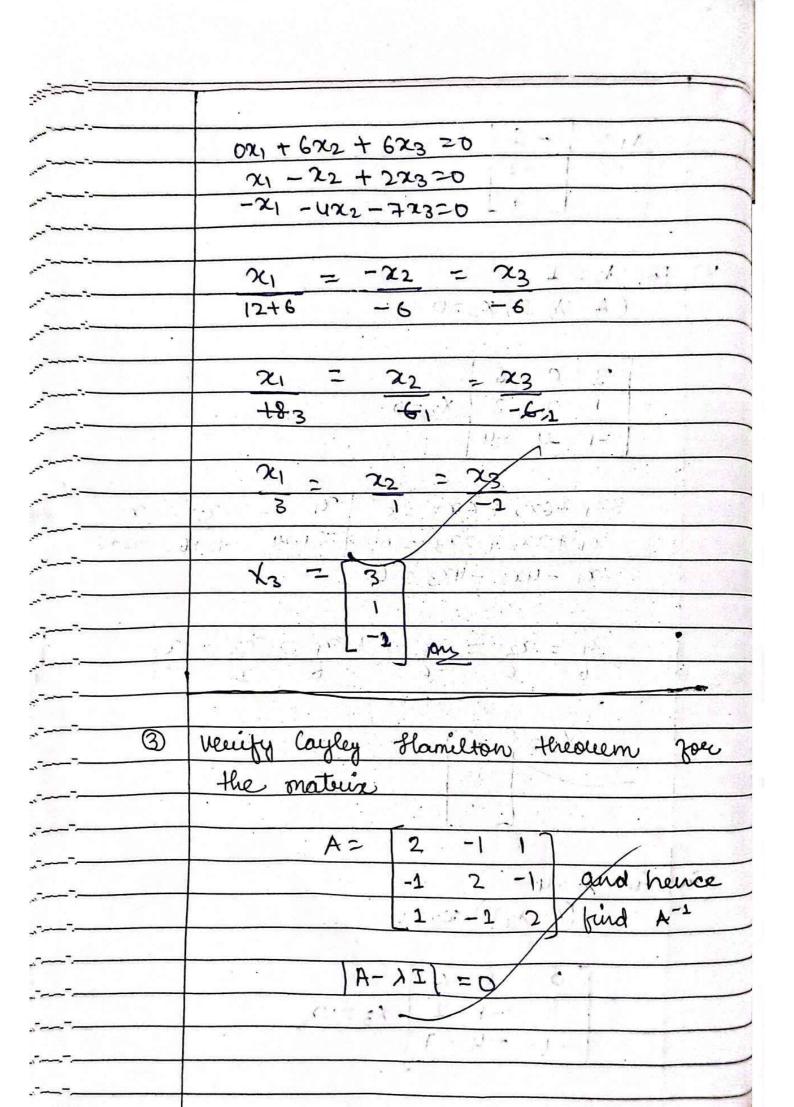


	20 xa + 26 + 2c = 0
	let 2/a = -1, 2/b = 1 then 2/1=0
	$X_2 = \begin{bmatrix} -1 \\ \end{bmatrix}$
-	1 - 1 pry
-	D - 1x + 2
	(iii) Fou 13=-1
	1-11
	$(A-\lambda_3I)\times_3=0$
	1 1 1 1
	1 1 1 X3 = 0
	1 1 1
	$\chi_{\alpha} + \chi_{\beta} + \chi_{c} = 0$
	let 2a=1 126=1 then 2c=-2
- 4	2 = 2 s A 1 57 (1)
	$x_3 = \begin{bmatrix} 1 \end{bmatrix}$
	100000000000000000000000000000000000000
	-2 Dry

2 Find H	he ligen values and eigen
vectous	he eigen values and eigen of the materix.
1.12.127	
A =	T4 6 6
	1,352
	-1 -4 -3
\ A	. U C (O = IK -)
	or entre of the
ч	- X 6 6 - \ - \ \ - \ \ \ \ \ \ \ \ \ \ \ \
	L 3-1 2 = D
	-1 -4 -3-1
	O(X) I $V - V(V)$
. R ₃	→ R3+R2
	1-1/6/6
	3-1/2 - 1
	ロース・インス・ストント
- C	1 u-x 6 6 1
(-1-7)	
	1 3-7 2 =0
	2= C2 - C3 01
0.	2= 62 - 63
(2+2)	1 4-2. O. 6
	1 1-1 2 =0
	6 6 2
1.5	

	$(\lambda+1)(1-\lambda)[4-\lambda]=0$
un't	[1 = -1, 1, 4] > 3 eigen value
~	
	To find eigen vectous
	$A \times = 0$
.*	
	14. 6. 6] = /I
,	1 3 2 x = U
	-1 -4 -3
,	
36	() For $\lambda = -1$
	$(A-\lambda I)X_1=0$
	1
	[5 & g]
	1 4 2 X = 0
•	-1 -4 -2
	$5x_1 + 6x_2 + 6x_3 = 0$
	$x_1 + 4x_2 + 2x_3 = 0$
	-x, -4x2+2x32011 (6-1.)
	2i = -22 = 23
	12-24 16-6 20-6
	$\chi_1 = \chi_2 = \chi_3$
	-124 -1
	A
	$\frac{1}{6} \chi_1 = \chi_2 = \chi_3$
	-6 -2 7





130	
	= 2-1 -1 1
	-1 2-2 -1 =0
	1 -1 -2-1
	$R_2 = R_2 + R_3$
	the second secon
-	-1 -1 -1 -1 -1 -1 -1 -1
	0 '1-1 1-1 0
	1 -1 2-1
=)	$(2-\lambda)[(\lambda-1)(\lambda-2)+(1-\lambda)]+1[(\lambda-1)$
	$+ (\lambda-1) = 0$
3.5	Jun) is some your buy the first of the first
7	$(2-1)$ $[\lambda^2 - 4\lambda + 3] + 2\lambda - 2 = 0$
•	=) 612-91 A4-13 = 0
	1-2-13-612 +910-4-0
1-1-	21-12-12-2-1-1
	By Cayley Hamilton theorem: A3-6A2+9A-4I=D
1	A3-6A2 +9A -4120
•	Multiply above equation by A-17 $A^2-6A+9I_3-4A-170$
	A2-6A + 9 13 - 4A = 70
	$UA^{-1} = A^2 - 6A + 9I_3$
	N-1 (D 2) (D 7)
	$A^{-1} = 1 \left[A^2 - 6A + 9I_3 \right]$
	4

6(0)

