5) d) (False)

given $\alpha^* = W^{-1} A^T (A W^{-1} A^T)^{-1} b$

This doesn't exist because $W = m \times m$

$W^{-1} \to m \times m$

$A^T \to n \times m$

$W^{-1} A$ is not possible

$\therefore$ this α^* can't satisfy the eqn

& $\exists$ $\hat{\alpha} = (A^T W A)^{-1} A^T W b$

which will satisfy $\min(\hat{\alpha}^T W \alpha)$

$= \| N \hat{\alpha} \|_2$

$\therefore$ in any case the soln is false

2) a) (False) if v is eigen vector of A

we can't say that αv is eigen vector of A

because if $\alpha = 0$ this can't be eigenvector

$\therefore$ the statement is false & will be true if $\alpha \neq 0$.

1) d) (True)

p	q	$\sim p$	$\sim q$	$(\sim p) \Rightarrow (\sim q)$
1	1	0	0	1
1	0	0	1	1
0	1	1	0	0
0	0	1	1	1

$A \Rightarrow B$ → if A is true then B is true

2) d) (True)

we use properties ~~(AB)^T = B~~ for matrices M & N

$(MN)^T = N^T M^T$ — ①

$(M+N)^T = M^T + N^T$ — ②

$\det(M) = \det M^T$ — ③

lets take char eq^n of AB

$\Rightarrow \det(\lambda I - AB) = 0$

$\Rightarrow \det((\lambda I - AB)^T) = 0 \quad \because \det(M^T) = \det(M)$

$\det((\lambda I)^T - (AB)^T) = \det(\lambda I - B^T A^T)$ from ① & ②

$B^T = B$ & $A^T = A$

$\Rightarrow \det(\lambda I - BA) = 0$

$\Rightarrow \det(\lambda I - AB) = \det(\lambda I - BA)$

Both have same char eq^n $\therefore$ same Eigen values