$tr(B) = tr(A(P^{-1}P))$ $[\because P^{-1}P = I_d]$

$\boxed{tr(B) = tr(A)}$

(iii) Rank (A) = rank (B)

Since it is given that both the matrix are similar therefore, the dimension are have to be same $n \times n$. dim A = dim B.

~~The bo~~

Therefore the base variables are equal also.

Thus the number of free variables are equal.

If No of free variables are same.

Nullity (B) = dim N(B) = K = dim N (A) = Nullity(A)

Thus ~~the~~ both will have same number of base variables as pivot elements.

$\therefore$ The Rank (A) = N - Nullity (~~B~~A) = N - Nullity (B)

= Rank(B).

$\therefore$ $\boxed{\text{Rank}(A) = \text{Rank}(B)}$. [Hence Proved]