Q1(A)

(a) for R to be reflexive, $(a,a) \in R \ \forall\ a \in A$

$\because$ $(3,3)$, $(4,4)$ doesn't exis in R, it is <u>not Reflexive</u>

(b) Since $(1,1)$, $(2,2)$ are present in R, it is <u>not irreflexive</u>

(c) For R to be symmetric, $(a,b) \in R$ and $(b,a) \in R$ for all & all (a,b).

$\because$ All pairs have their symmetric present, R is <u>Symmetric</u>

(d) It is <u>not antisymmetric</u> as $(a,b) \in R$, $(b,a) \in R$ & <u>$a \neq b$</u>.

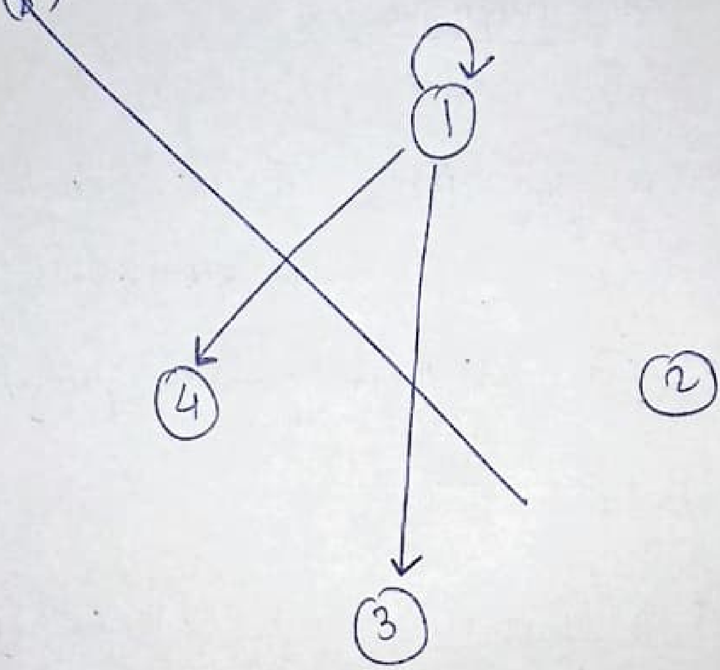
(e) For R to be transitive, aRb, bRc, then aRc also

$\because$ $(1,3)$ exits & $(3,1)$ exists but $(3,3)$ doesnt thus, its <u>not Transitive</u>

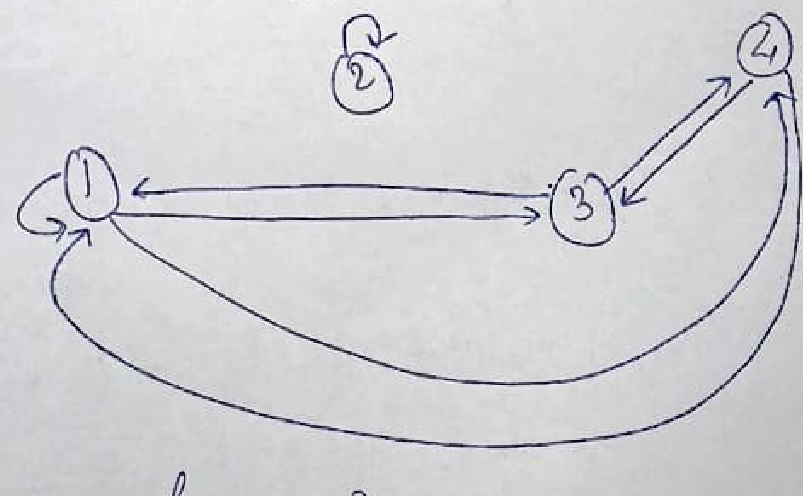
Q1. (B). (a) M_R:

$$\begin{array}{c c} & \\ \begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \end{array} & \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix} \\ & \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \end{array}$$

~~(a)~~



(b)



(c)

Dom (R) = {1, 2, 3, 4}

Range (R) = {1, 2, 3, 4}

Q2. $A = \{1, 2, 3, 4, 5\}$

~~$R = \{(1,1)(1,2)$~~ $\qquad$ $(a \geq b) \rightarrow R$

$R = \{(5,5), (5,4), (5,3), (5,2), (5,1), (4,4), (4,3),$
$(4,2), (4,1), (3,3), (3,2), (3,1), (2,2), (2,1)$
$(1,1)\}.$

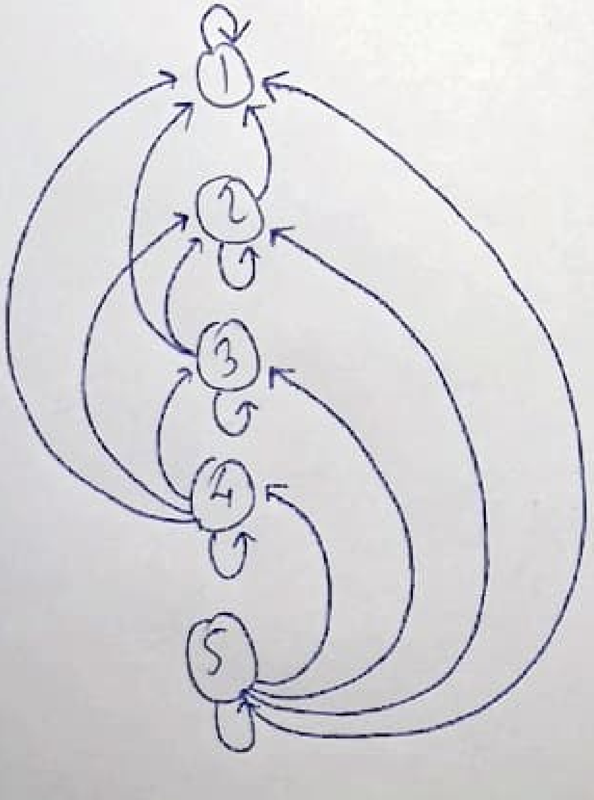
Since R is transitive the following have no new pairs.

$R^2 = R$
and $R^* = R$

} because R is transitive as →

→ (aRb, bRc, aRc
$a \geq b$, $b \geq c$, $a \geq c$ is always true for R.)

Diagraph of R, R^2, R^*:



Q3. for relation R on Set A.

Reflexivity: $aRa, \forall a \in A$.

This is ~~not~~ true as all ~~exists~~ exists.

Symmetry: for all $(a,b) \in R$, $(b,a) \in R$ also.

Transitive: for aRb, bRc, thus aRc should exists too.

All 3 are true thus Relation R is an equivalence Relation.