B

1. It is same as set A.

2. $(P \to Q \wedge R)$; Q ; $(\sim R \to \sim S)$

Q is true, and R ~~must~~ be true.

~~Q~~ for $Q \wedge R$ to be true.

P can be both true or false.

- for $P \to (Q \wedge R)$ to be true

when $(Q \wedge R)$ is true.

If R is true then $\sim R$ is false

then $\sim R \to \sim S$ is always

true. So.

when Q, R are true and

P and S can be true or

false. The statements

are consistent.

3. $\{x, y, z\}, u\}$.

$R: \{ (x,y), (y,z), (z,x)$
$(x,u), (y,u), (z,u), (u,y)\}$

4. $\{x, y, z, u\}$.

xPy, yPz, xIz, uIx, zIu

yIu.

$x \in$ choice set.

5. Individual 1: $t\ z\ y\ x$

Individual 2: $z\ x\ t\ y$

Individual 3: $t\ y\ z\ x$.

Pareto optimal set

$\{t, z\}$.

$\{x, y, z, u, v, t\}$.

$x\ y\ z\ u\ v\ t : 1.$

$y\ z\ u\ x\ v\ t : 1$

$z\ x\ u\ y\ v\ t : 1.$

$N(x P_2 y) = 3 > N(y P_2 x) = 1 \rightarrow x P y.$

$N(y P_2 z) = 3 > N(z P_2 y) = 1 \rightarrow y P z.$

$N(x P_2 z) = 1 < N(z P_2 x) = 3 \rightarrow z P x.$

— cycle over x, y, z.

7. $\{x, y, z\}$

Individual 1 : $x\ y\ z$

" 2 : $y\ z\ x.$

" 3 : $z\ y\ x.$

Individual 4 : $x\ y\ z.$

Plurality method

Scores

x: 2

y: 1

z: 1

$\left(\begin{matrix} x \\ (yz) \end{matrix}\right)$ =

↙ Social ranking

Borda count.

Scores

x: $2+2=4$

y: $2+3=5$

z: $2+1=3$.

social ranking is $\left(\begin{matrix} y \\ x \\ z \end{matrix}\right)$ =.

—

8). Individual 1: $x\ z\ y\ t$

Individual 2: $z\ t\ x\ y$.

Individual 3: $z\ x\ t\ y$.

—

Individual 2 can be almost decisive over t against x.

Assume that Individual 2 is almost decisive over t against x.

By Weak Pareto principle

~~2 P t~~ 2 P t., 2 P y.

~~x P x~~. x P y.

We have.

2 P t, t P x, 2 P y, x P y.

From transitivity we have.

2 P x, and t P y.

So 2 t x y.

Individual 2 is ~~almost~~ decisive over all ordered pairs.

So it is dictator.

9. $\{x, y, u, v, t\}$.

$x P_1 y \rightarrow x P y$.

$u P_2 v \rightarrow u P v$

1

$x\ y\ v\ u\ t$

2

$y\ x\ v\ t$

3

$x\ v\ y\ u\ t$.

$xPy,\ uPv,\ xPv,\ xRu.$

$xPt.$

$x \in$ social choice set.

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6. $\{x, y, z, u, v, t\}$.

$x\ y\ z\ u\ v\ t$: 1

$y\ z\ u\ x\ v\ t$: 2

$z\ u\ x\ y\ v\ t$: 3

$u\ x\ y\ z\ v\ t$: 4.

$N(xP_2y) = 3 > N(yP_2x) = 1 \Rightarrow xPy$

$N(yP_2z) = 3 > N(zP_2y) = 1 \Rightarrow yPz$

$N(zP_2u) = 3 > N(uP_2z) = 1 \Rightarrow zPu.$

$N(uP_2x) = 3 > N(xP_2u) = 1 \Rightarrow uPx.$

→ caculé a cycle.