C

1. Same as previous set

2. $(P \leftrightarrow Q)$; $(Q \rightarrow R)$; $(\sim R \vee S)$; $\sim S$

S must be false. ~~so~~ so that $\sim S$ is true.

R ~~is~~ also must be false for $\sim R \vee S$ to be true when S is false.

Since R is false, so Q must be false, for $Q \rightarrow R$ to be true.

When Q is false, P must be false ~~when~~ for $P \leftrightarrow Q$ to be true when Q is false.

So, S, R, Q, P must be false for these statements to be consistent.

3. Same as set B.

4(a)

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

~~$x I y$, $z P y$, $x I z$, $x I u$~~

~~$x P y$, $y P z$, $x I z$,~~

x x,

4. If choice set is non-empty then property α is always satisfied.

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

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

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

Paretó optimális állapotok

$\{z, t, y, x\}$

z

G_2 $\{x, y, z, u, v\}$

$x\ y\ z\ u\ v\ -2$

$y\ z\ x\ u\ v\ -2$

$z\ x\ y\ u\ v\ -2.$

$N(xP_2y) = 4 > N(yP_2x) = 2$
$\rightarrow xPy.$

$N(yP_2z) = 4 > N(zP_2y) = 2$
$\rightarrow yPz.$

$N(xP_2z) = 2 < N(zP_2x) = 4$
$\rightarrow zPx.$

we get a cycle.

7.

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

$xyzu$: 1

$yzux$: 2

$zuxy$: 3

$uxyz$: $\cancel{3}$4

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

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

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

$N(xP_2u) = 1 < N(uP_2x) = 3 \rightarrow \underline{uPx}$.

It is a cycle.

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

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

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

Individual 2 can be almost decisive over y against x. Suppose we assume it. It implies $yP_2x \rightarrow yPx$.

Using Pareto principle we get.

xPt. and zPy.

From transitivity, we have.

zPy, and $yPx \rightarrow zPx$.

and $yPx \wedge xPt \rightarrow yPt$.

So: $z\ y\ x\ t$. can be the social ~~seat~~ ordering. Thus, Individual 2 is decisive over all ordered pairs. So it is dictator.

9. $xP_2y \rightarrow xPy$, since Individual 2 is decisive over (x, y).

$uP_3v \rightarrow uPv$, since Individual 3 is decisive over (u, v).

Individual 1	Individual 2
v	v
u	u
y	x
x	y.

Individual 3	Individual 4
u	$(u\,v)$
v	$(x\,y)$
x	
y.	

We have, xPy, uPv.

From Pareto principle we get

uPy, uPx, vPx, vPy.

$\rightarrow$ So we have $u \in$ social choice set.

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

$x \; y \; z \; t$: – Individual 1

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

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

~~x: (yz) t – (Indifferent between y & z)~~

$x \; y \; z \; t$: Individual 4

Plurality method scores:

x	y	z	t
2	1	1	0.

So social relation is $\begin{pmatrix} x \\ (y\,z) \\ t \end{pmatrix}$.

Borda Count scores:

x: $3+3+0+0 = 6$

y: $3+6 = 9$

z: $3+2+1+1 = 7$.

t: $1+1 = 2$.

social preference relation is $\begin{pmatrix} y \\ z \\ x \\ t \end{pmatrix}$