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1. Is the following logical statement a tautology?

[(P→ Q ) ˄ ( (Q˄R)→ S) ]→( P →S)

2. When the following statement is consistent

3. Give an example of binary relation satisfying completeness and not reflexivity and not transitivity

4. Give an example of individual preference relation over the alternatives {x, y, z, u} such that the choice set is non-empty and it violates property α.

5. Find the Pareto optimal state for the following profile of individual preferences of three individuals. The left option is the most preferred and right option is least preferred. The ranking of preference is from left to right.

Individual 1: z y t x

Individual 2: z x y t

Individual 3: t y x z

6. Suppose there are six individuals and five alternatives. Give an example of profile of individual preference ordering or ranking that generates a cycle in social preference relation when simple majority rule is used.

7. Taking four alternatives and four individuals construct an example of individual preference ordering or ranking profile such that the alternatives which rank first ( first position) based on Plurality method is in the third position ( third rank) when Borda count is used.

8. Find a dictator in the following profile of individual preferences. Left most option is most preferred and the right most option is least preferred. The ranking of preference is from left to right.

Individual 1: x z y t

Individual 2: z y x t

Individual 3: x z t y

9. Suppose there are four individuals and four alternatives. Suppose Individual 2 is decisive over x against y and Individual 3 is decisive over u against v. Give an example of individual preference profile so that the social choice set is non-empty.

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