

time : 50 minutes

Do all 3 questions. All count equally.

1. Derive the efficient allocations in an economy with two people, each of whom consumes a single private good and a single public good, if their preferences can be represented by the utility functions

$$U^1(x_1, Z) = x_1 + 2\sqrt{Z}$$

$$U^2(x_2, Z) = x_2 + 4\sqrt{Z}$$

where  $x_i$  is person  $i$ 's consumption of the private good, and  $Z$  is the level of provision of the public good, and if the equation of the economy's production possibility frontier is

$$X + Z = 15$$

where  $X$  is the aggregate quantity produced of the private good.

2. True, false or uncertain? : "Self-interested people would never contribute to a voluntary campaign to pay for some public good."

Explain briefly.

3. Would government intervention be needed to achieve efficiency if there were a *positive externality* between firms? Explain briefly.