

time : 50 minutes

Do all 3 questions. All count equally.

1. Suppose that for some people (but not for all people) there was some maximum amount \bar{Z} of a public good which they wished to consume. For quantities above \bar{Z} , these people receive no additional benefit.

Would it ever be efficient to provide a quantity of this public good which is greater than \bar{Z} ? Explain.

2. Describe briefly a tax mechanism which would induce people to reveal truthfully how much they are willing to pay for a single “all or nothing” public project.

3. Suppose that firms 1 and 2 both sell their outputs on competitive markets, at a price of \$1 per unit of output sold. Suppose as well that each firm could hire labour at a wage of \$10 per hour, and buy coal at \$10 per tonne.

Firm 1’s output, as a function of its use L_1 of labour and Z_1 of coal, is

$$F^1(L_1, Z_1) = \ln L_1 + 210Z_1 - (Z_1)^2$$

while firm 2’s output, as a function of its own labour use L_2 , and firm 1’s coal use Z_1 , is

$$F^2(L_2, Z_1) = \ln L_2 - (Z_1)^2$$

(where “ln” refers to the natural logarithm function).

How much coal would firm 1 use, if it had to compensate firm 2 for any damage its coal use imposed, **if the two firms were able to negotiate with each other?**