1) Each definition worth .5 points

- **Hypothetical bias:** People respond differently in their valuations of hypothetical situations than if they actually had to pay. This is one of the criticisms of stated preference methods.

- **Scope bias:** People report being willing to pay no more for large than for small projects.

b) Mention of each part of a contingent valuation worth .5 points each and .5 points for the explanation of each. Name at least four parts.

1. Discussion of other uses of public money (like foreign aid) and attitudes to policy goals (like drug treatment). In order to ensure that the respondent is thinking about uses of money rather than for example stopping oil spills; this way the respondent is more likely to keep budget tradeoffs in mind when answering the WTP question.

2. The problem itself (e.g. oil spills and the oil business) so that the respondent is well informed about the problem at hand.

3. The proposal that we want to evaluate (e.g. escort ships) again so that the respondent is clear about the proposal.

4. Payment method (tax on corps and people): for example if the method of payment is taxes the respondent is more likely to believe she is going to pay for it.

5. Reminder that there are good reasons for and against: to reduce the influence of the interviewer’s manner on the respondent’s answers.

6. The WTP question. (e.g. would you be willing to pay $60...): find the WTP for the project.

7. Debriefing. Did the respondent understand the questions?

8. Other questions such as involvement with nature generally to see if the responses are different for those who like/don't like nature, male/female, rich/poor, old/young etc.
a) 1 point for showing the cost minimizing technique; 1 point for showing the choice of technique with effluent standard.
b) 1 point for explaining how the diagram shows that the effluent standard costs more than the other technique.
c) 2 points for showing how an increase in price for effluent could lead to the same technique as was chosen under the effluent standard.
d) 1 point for explaining whether pricing effluent costs more than regulating the effluent.

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a) The cost minimizing technique is at point B; the isocost is tangent to the isoquant showing the minimum expenditure required to produce Q units of output. Under the effluent standard the choice of technique is at point A. The prices have not changed and since the slope of the isocost is \(-\frac{P_{air}}{P_{stuff}}\), the slope does not change. Draw the isocost line that is parallel to the original one and intersects with A.

b) Remember that the stuff intercept is Expenditures/\(P_{stuff}\). Assume the price of stuff is $1. Since the price of stuff has not changed the cost under the effluent standard is $5, higher than with no regulation, which was $4. Hence the technique chosen under the effluent standard costs more than the other technique.

c) Pricing the effluent causes \(P_{air}\) to increase; hence the slope of the isocost \(-\frac{P_{air}}{P_{stuff}}\) increases. Draw the isocost line that has a tangency point with the isoquant curve at A.

d) Pricing the effluent costs more since as can be seen from the figure the stuff intercept is higher when the price of the effluent increases than when with the technology based effluent standard. Since in both cases the \(P_{stuff}\) does not change, expenditures must
necessarily be higher under the increase in price of effluent versus simply regulating the effluent. In this example, when increasing the price of effluent the costs are $8, as compared to $5 with the technology based effluent standard.

3)

a) 1 point for defining the cost function

**Cost function C(Q):** the minimum cost to produce output Q

b) 1 point for the quantity that the firm chooses and 2 points for explanation

The firm chooses the quantity where \( p = mc \)

![Graph showing Cost Function](image)

If at the left of where \( p = mc \), \( p > mc \) hence increasing output will lead to an increase in profits since the price received for the additional unit is higher than the increase in costs. If at the right of when \( p = mc \), decreasing output will lead to an increase in profits.

4)

a) 3 points

The New Source Review was part of the 1977 Clean Air Act Amendments. The purpose of which was to make older firms transition to cleaner technology and new firms to adopt cleaner technology. It required firms to undergo a review if planning to build new facilities or undergo reconstruction. It allowed older firms to make minor changes/repairs only if they constituted minor “routine maintenance”; for older firms if there was a major modification they had to adopt new cleaner technology. What constituted reconstruction versus routine maintenance was often ambiguous. Investigations by the EPA found that firms had made major modifications without complying, which led to many lawsuits. The Bush administration instituted new rules, making 20% of the value of the generating unit be the threshold for what constituted a major modification versus a routine maintenance instead of the .75% suggested by the EPA; with this threshold, in practice most plants were
able to do whatever upgrades they wanted without having to conform to the EPA standards. After the new rules were adopted, most of the lawsuits were dropped.

b) 1 point for each definition
- **Irreversibility**: Environmental damages that cannot be reversed.
- **Existence value**: The value that arm chair environmentalist attach to environmental amenities. That is, the value that people place on environmental resources just for their existence even if there is no active use of the resource.