

## Group B

Please answer all questions in this group.

1. Denitza Corner wants to open its operation in a particular city. Denitza Corner undertakes survey regarding consumer demand for its product. The daily quantity demanded is given in the following table.

Price in Rupees	Demand
50	10
75	9
100	8
125	7
150	6
175	5
200	4
225	3
250	2
275	1

- Find the elasticity of the market demand curve at the price of Rs. 200.
- What is the marginal revenue if the quantity sold increases from 5 to 6?
- If Denitza corner is a monopoly and marginal cost of preparation of its product is zero, what is the optimal quantity to be sold by Denitza Corner?

[2 + 2 + 3 = 7]

2. For several months not a drop of rain has fallen in the kingdom of Bombagarh, and the farmers are facing steep problem of possible starvation. All classic methods of solving the problem have failed, and the king of Bombagarh, Habuchandra, is searching for drastic and imaginative solutions. The king's chief councilor, Gabuchandra, tells him about a sorcerer who is able to make it rain. Naturally, the king is unconvinced that the sorcerer is real, and is afraid that he will turn out to be a fake. *Therefore, the king is trying to find a contract to offer the sorcerer such that he will accept only if he is for real.*

Everybody knows that a phony sorcerer has no power over the rain. If the king contracted a fake, the probability of rain would remain unchanged. It is currently estimated that the probability of rain in the next week (which is the time required to adequately test the powers of a sorcerer) is 0.02. On the other hand, an authentic sorcerer, in spite of having power, is not infallible, and will increase the probability of rain within a week to 0.20.

Both authentic and fakes are risk averse, their utility function being of the form  $u(w) = \sqrt{w}$ . The sorcerers do an expected utility maximization, meaning, the utility of a sorcerer is the probability-weighted average of utilities to be received in the two circumstances of rain and no-rain. For example, if the probability of rain is  $p$  for a sorcerer (authentic or not) and he receives 400 in case of rain and 900 in case of no rain, the expected utility for this sorcerer is given by,  $p\sqrt{400} + (1-p)\sqrt{900} = 20p + 30(1-p)$ .

No authentic sorcerer will work unless the utility he receives from the contract is at least 10. Fakes, on the other hand, are willing to charge less and will enter in a contract giving them a utility of 5.

The king's treasurer gives an idea about a scheme that the king likes. The king says to a potential sorcerer, "If it rains, you get 'A'; otherwise, you get 'B'." The king's advisors are considering three schemes:

1.  $A = B = 100$
2.  $A = 3025 = 55^2$ ;  $B = 9$ .
3.  $A = 2500 = 50^2$ ,  $B = 0$ .

- a. Evaluate the appropriateness of all the schemes for the king with arguments.
- b. All the above three schemes, which one would you suggest for the king, if the king is risk neutral in nature, meaning, he wants to pay out the least amount of money in the expected sense? Justify.

$$[(3 + 3 + 3) + 2 = 11]$$

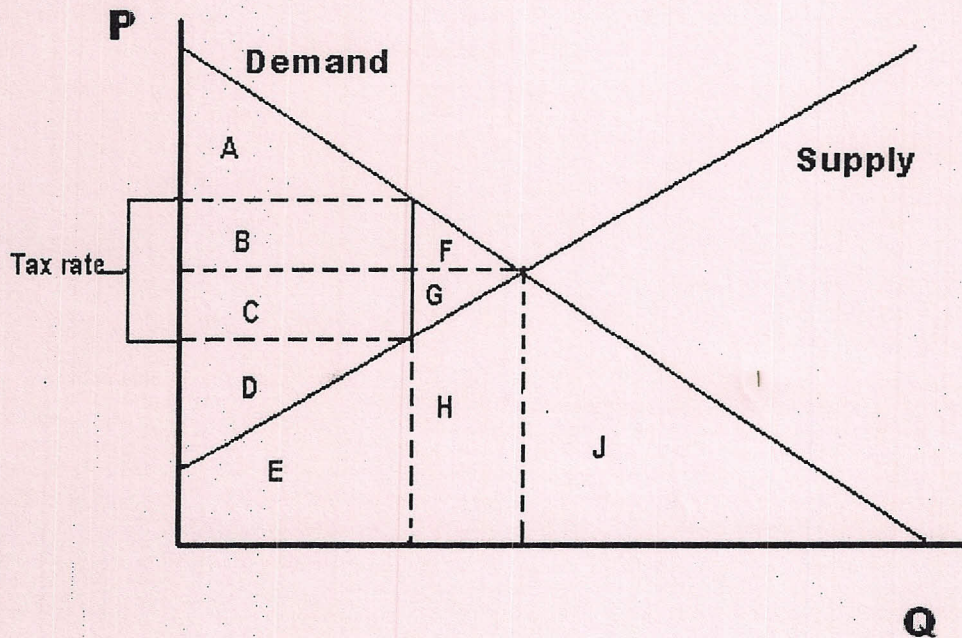
3. You are given the following table for a production process which has two variable outputs.

Capital Investment	Labor Input				
	1	2	3	4	5
1	35	60	70	85	95
2	60	70	85	95	105
3	70	85	95	105	115
4	85	95	105	115	125
5	95	105	115	125	135

- a. Make a rough sketch depicting the isoquants corresponding to the following output levels: 70 and 105.
- b. Find the marginal productivity of labor for all levels if capital is fixed at 2.
- c. Suppose the firm wants to produce 105 units of goods using any combination of labor and capital. If the wage rate of labor is rupees 100 and rental rate of capital is rupees 300, what is the cost minimizing input combination choice?

$$[3 + 2 + 2 = 7]$$

4. Study the following diagram indicating the incidence of per unit tax on the trade in a perfectly competitive market.



Indicate the area(s) for

- Pre tax consumer surplus
- Pre tax producer surplus
- After tax, consumer surplus
- After tax, producer surplus
- Deadweight loss due to tax