Answer all questions in the space provided on the exam.
Total of 80 points (and worth 45% of final grade).
Read each question carefully, so that you answer the question.

Short Answer (6 points each)

1. Consider consumer demand for electricity in California. For simplicity, assume that there are no blackouts and suppliers provide all the electricity demanded at the regulated price.

(a) In summer the demand for electricity is higher in the afternoon than in the morning, due to use of air-conditioners. Show the effect of this on market quantities and prices using an appropriate diagram.

(b) One suggested reform is that electricity prices should vary by time of day, being higher in summer in the afternoon than in the morning. Show the effect of this on market quantities and prices using an appropriate diagram.

(c) What will be the overall effect on society well-being of such a switch to time of day pricing? **Explain your answer.**

2. Costco is a store that offers its members lower prices, though membership is not free. For simplicity say prices are 10 percent lower than at competitive stores (which are the same distance from Fed as the Costco store), that we consider just purchase of food, and that membership costs $40 per year. Fred is considering becoming a member.

(a) On an appropriate diagram compare Fred's food consumption with membership and without membership.

(b) For your diagram will Fred be better off if he joins Costco? **Explain your answer.**

(c) Suppose that in the absence of Costco Fred spent exactly $400 per year on food. Would he be better off, worse off or indifferent about joining Costco given the information provided earlier? **Explain your answer.**

3. Suppose the computer hard disk drive industry is a decreasing costs industry, with many firms each a small part of the market. Suppose that there is a large increase in demand for hard disk drives, due to increased demand for computers.

(a) On an appropriate diagram show the effect of the demand increase on output of individual hard disk drive manufacturers in the **short-run**.

(b) On an appropriate diagram show the effect of the demand increase on market equilibrium in the **long-run** in the market for hard disk drives.

(c) In a competitive industry with heterogeneous producers is the long-run industry supply curve likely to be upward-sloping or downward-sloping? **Explain your answer.**

4. Consider the following production function for the manufacture of tables:

$$Q = K^{0.25}L^{0.75}$$

where Q, K and L are respectively units of output, capital and labor.

At the moment K = 625 and L = 10,000, so $K^{0.25} = 5$, $L^{0.75} = 1000$, and Q = 5,000. Labor costs $100 per unit and capital costs $300 per unit.

(a) Obtain the marginal product of labor at current K and L.

(b) Hence obtain the short-run marginal cost of producing a table, when only labor is free to vary in the short-run.

(c) The firm wishes to produce 5,000 tables. Is the current mix of capital and labor the optimal mix to do this in the long-run? **Explain your answer.**
(Hint: You will need to use some algebra).

5. Ian and Fiona are trading Pokemon and Digimon cards. For simplicity, assume that all Pokemon cards are viewed as identical and all Pokemon cards are viewed as identical, though Pokemon cards are viewed as different from Digimon cards. Initially Ian has only Pokemon cards and Fiona has only Digimon cards.

(a) On an appropriate diagram (with Pokemon cards on the vertical axis) show the initial allocation of cards and the levels of happiness that Ian and Fiona receive.

(b) On the same diagram show a Pareto-efficient allocation of cards between Ian and Fiona. Your picture should make it clear that this is Pareto-efficient. [If you feel they cannot do better than the initial allocation then state this and explain].

(c) Suppose that trade leads to a Pareto efficient allocation under which Ian is on the indifference curve $P = 100/D$, where P = Pokeman cards and D = Digimon cards, while Fiona is on the indifference curve $P = 25/D$. What is the relationship between the number of Digimon cards consumed by Ian and the number consumed by Fiona?
(Hint: You will need to use some algebra).

6.(a) Give a verbal definition of Pareto efficiency.

(b) A necessary condition for Pareto efficiency is that the marginal rate of substitution is equated across consumers. Explain how this condition is satisfied under perfect competition.

(c) Should government intervene in the economy only when there is Pareto inefficiency? **Explain your answer.**

7.(a) On an appropriate diagram explain the output and pricing decision of an unregulated profit-maximizing monopolist.

(b) According to the Sydney Morning Herald (March 7, 2001), "Sydney motorists are deserting the city's three main freeways in their thousands every day because of big toll increases. On the M4 daily traffic on the 13-kilometre road dropped almost 5,000 a day last month - more than 5 per cent - compared with the same period last year. The drop follows the decision last November to increase the toll by 37 per cent, from $1.60 to $2.20."

What is the price elasticity of demand being faced by the owners of the M4 freeway?

(c) Given the information in part (a), are the (private) owners of the M4 freeway pricing the toll road in the way that an unregulated profit-maximizing monopolist would price the freeway? **Explain your answer.**

8. Consider the use of autos. Experts calculate that the marginal cost of driving a car (including gasoline and marginal wear-and-tear on the car) to be 20 cents per mile. The marginal damage to the environment (including pollution and global warming) is calculated to be 10 cents per mile. The demand for driving a car in the U.S. has been calculated to be

$Q = 2000 - 20\,P$ where Q is billions of miles driven and P is price in cents per mile.

[Hint: In answering the following it may be helpful to draw a relevant diagram].

(a) If market forces are left to their own what will be the total number of miles driven in the U.S.?

(b) What is the socially optimal total number of miles driven in the U.S.?

(c) Given the above information, what, if anything, is the size of the social cost to society that arises because driving damages the environment.

9. Consider provision of hospital beds in a national health system, where hospitals are treated as a public good and are provided free to the public. The total cost of providing Q hospital beds is \$500,000×Q. For a city of one million people it has been calculated that the marginal benefit of the Q-th hospital bed is \$(4,000,000 – 1,000×Q).

(a) On an appropriate diagram show the determinants of the provision of hospital beds in the city of one million people.
(Hint: Before proceeding think of the general model for provision of a public good).

(b) Hence calculate the equilibrium number of hospital beds for the city of one million people.

(c) Using standard economic theory, does the government need to treat hospital beds as a public good? **Explain your answer.**

Multiple Choice (2 points each)

1. If leisure is a normal good, then economic theory indicates that when the wage rate is increased

a. income effect decreases leisure and substitution effect increases leisure

b. income effect decreases leisure and substitution effect decreases leisure

c. income effect increases leisure and substitution effect increases leisure

d. income effect increases leisure and substitution effect decreases leisure

2. Suppose that over two periods a consumer will consume all of her income. At current interest rates she would be a borrower in the first period (and hence a saver in the second period). If the interest rate increases then the income effect of the interest rate increase is to

a. definitely borrow more in the first period

b. definitely borrow less in the first period

c. possibly borrow more or save less.

3. The equivalent variation of a price increase is

a. the change in utility due to the price increase

b. the change in income that would give the new utility at initial prices

c. the change in income that would give the initial utility at the new prices

d. none of the above

4. If the price of labor increases then in the long-run the demand for capital

a. definitely increases

b. definitely decreases

c. possibly increases or decreases.

5. If all producers and consumers are price-takers and there is a market for every commodity then

a. market clearing prices exist

b. the allocation of resources is Pareto efficient

c. both a. and b.

d. neither a. nor b.

6. Bill and Chris have spent the day beachcombing. Chris was more successful than Bill, finding both more agates and more shells. Given their respective finds, Bill's marginal rate of substitution of agate for shells is 5, while Chris's marginal rate of substitution of agate for shells is 3. It follows that

a. Bill will give Chris shells in exchange for agates

b. Bill will give Chris agates in exchange for shells

c. Trade will occur, but more information is needed.

d. Trade will not occur.

7. If a firm sells its output at different prices to different consumers then it is behaving like

a. a monopolist

b. a competitive firm

c. neither a. nor b

d. both a. and b.

8. In theory the best way for the government to regulate a monopolist is to insist that they sell at

a. average cost at a point where zero profit is made

b. average cost at a point where average costs are minimized

c. marginal cost, at a point where price equals marginal cost

d. none of the above.

9. Monopoly leads to Pareto inefficiency due to

a. consumption inefficiency

b. production inefficiency

c. allocation inefficiency

d. none of the above

e. all of the above

10. Economists view externalities as a problem because they lead to

a. Pareto inefficiency

b. A loss of total surplus

c. neither a. nor b

d. both a. and b.

11. According to the Coase theorem the welfare loss due to a negative externality in production

a. will disappear if property rights are assigned to the producer

b. will disappear if property rights are assigned to the party impacted by the externality

c. both a. and b.

d. neither a. nor b.

12. The tragedy of the commons is

a. a problem of externalities

b. a public goods problem

c. both a. and b.

d. neither a. nor b.

13. The problem of free-ridership is most likely to arise with

a. an excludable public good

b. a nonexcludable public good

c. any good provided by the government

d. none of the above