Question 1.

Consumer has Cobb-Douglas preferences: $U(x_{1,}x_2) = x_1^a x_2^b$,
where x_1 and x_2 are the amounts of consumed goods 1 and 2.

The price of good 1 is p_1 and the price of good 2 is p_2. Consumer's income is m.

a) Write down the budget constraint. What is the slope of the budget line? *(2p)*

b) What does the marginal rate of substitution (MRS) measure?
Calculate the marginal rate of substitution for the consumer. *(2p)*

c) Solve the optimal consumption bundle (x_1^*, x_2^*). *(2p)*

Question 2.

a) What is meant by (an own) price elasticity of demand? Calculate the elasticity of demand ε when the demand function is: D(p)=a - bp, where p is price, D(p) is the quantity demanded and a and b are constants. *(2p)*

b) What is meant by an externality in economics? Give one example of positive externality and one example of negative externality. *(2p)*

c) Define an equilibrium concept in a Cournot game (i.e. What do the players decide? How do they make their decisions?). How does it differ from a Stackelberg game? *(2p)*

Question 3.

A competitive firm has the following production cost function: $c(y) = \frac{1}{3}y^3 - 2y^2 + 10y$.

a) What is the marginal cost function $MC(y)$? *(1p)*

b) What is the average variable cost function $AVC(y)$? *(1p)*

c) At what output *y* does marginal cost equal average variable costs? *(1p)*

d) Below what price, will the firm produce zero output? Explain. *(2p)*

e) At what price would the firm produce 4 units of output? *(1p)*

Question 4.

Suppose the demand curve *D(p)* and the supply curve *S(p)* for the market are given by the following equations:

$$D(p) = 200 - p$$
$$S(p) = \frac{1}{2}p - 10$$

a) What is the market equilibrium (price and quantity) in this market? Calculate the producer and consumer surpluses. *(2p)*

b) Suppose that the government imposes a quantity tax *t = 15* on firms. Solve the new market equilibrium. What happens to the producer and consumer surplus? *(2p)*

c) Calculate the tax revenue. Is there any deadweight loss? If yes, how much? *(2p)*

Question 5.

Demand for paper is given by equation: $q = 300 - 3p$, where *q* is quantity and *p* is price.
The total cost of production is given by the equation: $c(q) = \frac{1}{2}q^2 + 300$.
Paper is produced by one firm only.

a) Write down the inverse demand function $p(q)$? *(1p)*

b) Write down the monopoly's profit function $\pi(q)$. *(1p)*

c) What is the profit maximizing output q^m for the monopoly?
What is the profit maximizing price $p(q^m)$?
At what level are the marginal costs $MC(q^m)$? *(2p)*

d) Is this monopoly market outcome Pareto-optimal?
Use the result in part c) and explain your answer. *(2p)*