Economics

Paper 1

Microeconomics

Imperial Secondary Examinations Authority
January 1920 examinations

Answer questions in the space provided. *If maths are required, show your working.* If you require more space, attach with Treasury tag a piece of paper to this examination, clearly number where you left off, and provide cross-reference to the page where further work is located.

Do not write on the back of examination materials.

You will receive no marks if you interfere with the scoring box at the bottom of this page.

Institution: _____

Examinations code: _____

Do not make marks in this table.

Page	1	2	3	4	5	6	7	8	Total
Marks	2	6	8	5	6	12	6	5	50
Score									

1. *In this question, report quantities in natural numbers.*

   (a) (1 mark) If Jupiter Optimus Maximus receives 3 utils for each bull sacrificed in his name, how many bulls would be needed to give him 1 500 utils?

   (b) (1 mark) If Jupiter receives 1 util for each *chicken* sacrificed in his name, how many chickens would be needed to give him 1 500 utils?

(c) (4 marks) The price of bulls and the price of chickens are denoted as P_b and P_c respectively. If $P_b = 16Q_b$ and $P_c = 3Q_c$, find the combination of Q_b and Q_c with the least cost that, if sacrificed, would render unto Jupiter 1 500 utils.

(d) (2 marks) If it costs 10 denarii for the priests to sacrifice one animal, regardless of type, how would this change the optimal combination of bulls and chickens satisfying the conditions in the part above?

(e) (8 marks) A new supply line has opened up in the livestock business. Suppose that the inverse demand equations for bulls and chickens have changed to the following: $P_b = 16\sqrt{Q_b}$ and $P_c = 3\sqrt{Q_c}$. Determine the maximum amount of utility that could be rendered unto Jupiter when expending the same amount budgeted above.

(f) (4 marks) How much could be saved, if instead of maximising the amount of utility rendered unto Jupiter, only 1 500 utils were so rendered?

2. Assume that Mars derives utility with the following function $U = b^\alpha c^\beta$, where g and d are the quantity of goats and ducks respectively. The supply of both goats and ducks is perfectly elastic. If $\alpha = 1/3$ and $\beta = 2/3$:

(a) (1 mark) What is the effect on utility of doubling the amount of bulls and chickens sacrificed to Mars?

(b) (6 marks) If some budget I has been established for sacrifices to Mars, find the state's inverse demand function for ducks in terms of parameters and prices.

3. Assume that every legionnaire optimises as follows—

$$\max_{C,L} U = C^\alpha L^\beta$$

$$\text{st } C = w(T - L) + V$$

where U is utility, C is consumption, L is leisure, w is the wage rate, T is the available time, and V is the soldier's endowment.

(a) (12 marks) Find an expression for labour provided in terms of parameters and the wage rate.

(b) (2 marks) For this legionnaire, if $T = 24$, $\alpha = 1/3$, $\beta = 2/3$, and $V = 100$, determine the labour supply function.

(c) (2 marks) Interpret the response of labour supply as V approaches 0.

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(d) (2 marks) If the wage rate is 100 denarii, how much labour will be supplied to the legion?

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4. (5 marks) Explain how the incidence of an indirect tax depends on the price elasticity of demand and the price elasticity of supply. Make figures in the empty space at the bottom of this page.

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