

M.A. Examination, 2023
Semester-1
Economics
Course: C1
(Microeconomics-1)

Time: Three Hours

Full Marks: 40

Questions are of value as indicated in the margin.
Answer *any four* questions.

1. (a) Consider a setting with 3 goods and a consumer who consumes all the 3 goods.
Suppose that the consumer's demand $x(p, w)$ is given by: -

$$x_1(p, w) = \frac{P_2}{P_3}$$

$$x_2(p, w) = -\frac{P_1}{P_3}$$

$$x_3(p, w) = \frac{w}{P_3}$$

- (i) Show that $x(p, w)$ is homogeneous of degree zero in (p, w) and satisfies Walras' law.
(ii) Show that $x(p, w)$ violates the weak axiom.
- (b) Compare between the choice-based approach and preference-based approach.
(c) Explain the theory of local non-satiation. 5+3+2=10
2. (a) Mention the properties of the profit function and prove at least two of the properties.
(b) Given the production function

$$f(z_1, z_2) = z_1^\alpha z_2^\beta$$

w_1, w_2 are the unit prices of the inputs z_1 and z_2 respectively and $0 < \alpha, \beta < 1$

Derive the cost function for the firm.

5+5=10

3. (a) Show that a preference relation can be represented by a utility function only if it is rational.
(b) Explain under what condition a choice structure satisfies the weak axiom of revealed preference.
(c) State and prove Roy's identity 2+3+5=10
4. (a) State and prove Hotelling's lemma.
(b) Explain the following concepts in production theory:
(i) No free lunch
(ii) Irreversibility 5+5=10

5. (a) Give the conditions under which an allocation is said to be competitive.
 (b) Consider a market with demand function $x(p) = A - Bp$ in which every potential firm has cost function $c(q) = K + \alpha q + \beta q^2$, where $\alpha > 0$ and $\beta > 0$. Calculate the long-run competitive price, output per firm, aggregate output, and number of firms. 5+5=10
6. (a) State and prove the Slutsky equation.
 (b) Compare between Hicksian notion and Slutsky notion of compensation. 5+5=10
7. (a) If $u(\cdot)$ is a continuous utility function representing a locally non-satiated preference relation, how would you represent the indirect utility function? In this context, mention the properties of the indirect utility function and prove at least two of the properties.
 (b) Explain the relation between the Expenditure Minimization Problem (EMP) and the Utility Maximization Problem (UMP).
 (c) Draw two diagrams to illustrate a situation where demand satisfies the weak axiom and, where demand does not satisfy the weak axiom. 5+3+2=10
8. (a) Explain through a diagram or otherwise the failure of aggregate demand to satisfy the weak axiom. In this context explain the conditions under which aggregate demand may satisfy the weak axiom.
 (b) Explain what you understand by additivity in production. 5+5 = 10
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