MASTER OF ARTS EXAMINATION, 2023

(1st Year, 2nd Semester)

ECONOMICS

[GENERAL EQUILIBRIUM AND WELFARE]

Time : Two Hours | Full Marks : 30

Group A

Answer any one.

1. a. Prove that if aggregate demand satisfies Weak Axiom of Revealed Preference, the Walrasian General Equilibrium Solution is always unique. 4

   b. Prove that local non satiation (LNS) implies that Walrasian General Equilibrium prices cannot be zero. 4

   c. Prove that the time path of the price vectors p(t) will not converge to a price vector other than equilibrium price vector (p*) when $\frac{dD}{dt}<0$ for $p(t)\neq p^*$ where
   $D(p(t),p^*)= [p_1(t) - p_1^*]^2 + [p_2(t) - p_2^*]^2$, in a two commodity world. 7

2. a. Explain Arrow's requirements of social welfare function. Then prove Arrow's impossibility theorem and critically analyse the result. 2 + 8

   b. Explain the role of Hammond Equity in explaining the shape of Rawlsian form of social indifference curves. 5

Group B

Answer any three

3. Suppose there are two individuals in the economy with the following expenditure functions:

   $E^1 = \left(\frac{27}{4}p_1^2 p_2 e^{u^1}\right)^{1/3}$ with endowment bundle $e^1 = (10, 0)$

   $E^2 = \left(\frac{27}{4}p_2^2 p_1 e^{u^2}\right)^{1/3}$ with endowment bundle $e^2 = (0, 10)$

   Find out the general equilibrium price level for the economy. 5

4. Consider a three good economy. The excess demand functions for good 1 and good 2 are given as

   $$E^1 = -\frac{p_2}{(p_1+p_2)} + \frac{p_3}{(p_1+p_3)} \qquad E^2 = \frac{p_1}{(p_1+p_2)} - \frac{p_3}{(p_2+p_3)}$$

Find out the excess demand for good 3. Does the system satisfy the properties of excess demand functions? Is it stable? 1+4

5. Consider a twofold replica economy with 4 consumers (1,2,3,4). We assume each consumer have same utility function
$U^i = logx_{1i} + logx_{2i}$ for i=1, 2, 3,4
The endowments are:

$e^1 = e^2 = (10,10)$ $e^3 = e^4 = (10,30)$

Find out if the following allocations are in the core of the economy with suitable relative prices. xplain with reasons.

a) $x^1 = x^2 = (7.5, 15)$ and $x^3 = x^4 = (12.5, 25)$
b) $x^1 = x^2 = (\sqrt{50}, 2\sqrt{50})$ and $x^3 = x^4 = (20 - \sqrt{50}, 40 - 2\sqrt{50})$
c) $x^1 = (8,12)$ $x^2 = (9,11)$ and $x^3 = (12,23)$ $x^4 = (11,29)$ 2+2+1

6. Consider a Robinson Crusoe Economy, with three commodities and a single firm and a single consumer. The firm uses commodity 1 as an input and produces commodities 2 and 3. The production plan of the firm is given as
$2y_2^2 + 2y_3^2 = y_1^2$ where y_2, y_3 are output of 2nd and 3rd commodities and y_1 is the part of first commodity used as input of production.
The endowment vector is $e = (12,0,0)$
Utility function of the consumer is
$U = ln\, x_1 + lnx_2 + lnx_3$ where x_i is the consumption of ith good with i=1,2,3.
   a. Find out the equilibrium consumption and output bundle. How much of first good is used as input.
   b. What price vector is a Walrasian Equilibrium price vector for this economy?
   c. What is the maximized profit of the firm at these prices? 3+1+1

7, State whether following statements are true or false with proper reasons.

a. Equal division of endowments among the individuals always constitutes a point in the core.

b. Consider the following 3×3 pure exchange economy. The goods are; x, y and z. Individual utility functions are:

$u_1 = 3x_1 + 2y_1 + z_1$
$u_2 = 2x_2 + y_2 + 3z_2$
$u_1 = x_3 + 3y_3 + 2z_2$
Initial endowments are $e_1 = e_2 = e_3 = (1, 1, 1)$ is a pareto optimal solution.

c. IIA is strictly weaker condition than Welfarism. 1.5+2+1.5