

**MASTER OF ARTS EXAMINATION, 2025**

**DEPARTMENT OF ECONOMICS**

**1st Year, 2nd Semester**

**Subject Code : ECO/A/C 8.1**

**GENERAL EQUILIBRIUM AND WELFARE**

**Time : Two Hours**

**Full Marks : 30**

Answer **any two** :

15×2=30

1. (a) Suppose the consumer's preference is Locally Non Satiabile in a production economy with private ownership. Prove that the equilibrium price if exists must be strictly positive.
- (b) 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,  $\frac{dp}{dt} < 0$  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.

- (c) All the allocations that are in the core of a basic economy with 2 individuals will remain in the core when the economy is replicated. True or False ?
- (d) Consider the following endowment economy.

$$U^1 = \log x_{11} + \log x_{12}$$

$$U^2 = \log x_{21} + \log x_{22}$$

The endowment are :

$$e^1 = (8, 2) \quad e^2 = (2, 8)$$

- (i) Show that (4,4) and (6,6) are in the core of the economy.
- (ii) Now Economy is replicated twice. Will  $\{(4,4), (4,4)\}$  and  $\{(6,6), (6,6)\}$  will still be in the core?

3+5+4+3

2. (a) Explain Arrow's requirements of Social welfare function. Then prove Arrow's impossibility theorem and critically analyse the result.
- (b) What is Quasi-price equilibrium ?
- (c) Consider the following endowment economy.

$$U^1 = \log x_{11} + 2 \log x_{12}$$

$$U^2 = 2 \log x_{21} + \log x_{22}$$

The endowment are :

$$e^1 = (10, 10) \quad e^2 = (10, 30)$$

How the initial equilibrium solutions are changed if individual 2 transfers T of second good from his endowment to individual 1.

2+6+2+5

3. (a) Critically explain the implication of following assumption for existence of at least one price vector  $\mathbf{p}^* \gg \mathbf{0}$  such that  $\mathbf{z}(\mathbf{p}^*) = \mathbf{0}$  :

If  $\{\mathbf{p}^m\}$  is a sequence of price vectors in  $R_+^n$  converging to  $\bar{\mathbf{p}} \neq \mathbf{0}$  and  $\bar{p}_k = 0$  for some good k then for some good  $k'$  with  $\bar{p}_{k'} = 0$  the associated sequence of excess demand in the market for good  $k'$ ,  $\{z_{k'}(\mathbf{p}^m)\}$  is unbounded above.

- (b) Explain the role of Hammond Equity in explaining the shape of Rawlsian form of social indifference curves.
- (c) Suppose the economy has four possible social outcomes [A, B, C, D].

There are 4 four groups of individuals with following preference rankings

	Number of persons in each group			
Rankings Best to worst	Group 1 10	Group 2 9	Group 3 12	Group 4 15
A		C	C	B
C		B	A	A
B		A	D	D
D		D	B	C

Which social outcome will be chosen according to BORDA Rule. Does it satisfy all the Arrow's properties of social welfare function ? Critically explain . [3+5+4+3]

4. (a) Give an example of a situation other than externality problem where Pareto optimal solution cannot be sustained.
- (b) Consider the following 3x3 pure exchange economy. The goods are; x, y and z. Individual utility functions are :

$$u_1 = 6x_1 + 4y_1 + z_1$$

$$u_2 = 4x_2 + y_2 + 6z_2$$

$$u_3 = x_3 + 6y_3 + 4z_3$$

Do the initial endowments  $e_1 = e_2 = e_3 = (3,3,3)$  is a pareto optimal solution.

- (c) State and prove second welfare theorem for the endowment economy.
- (d) Consider a three good economy. The excess demand functions for good 1 and good 2 are given as:

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

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

- (e) Consider the following “Robinson Crusoe” economics with two-goods, one consumer and one firm. Comment on WE solution and allocations.

$$U = \log x_1 + \log x_2$$

$$\text{Endowment} = (24, 0)$$

$$Y = \{(-x_1, x_2) : x_2 \leq e^{x_1-1}, x_1 \geq 0\}, \text{ That is } x_1 \text{ is used to produce the second commodity } x_2.$$

[2+3+6+2+2]

5. Write short notes on the followings :

5+5+5

- (a) Ex ante and Ex post Pareto optimality condition under uncertainty and their relation.
- (b) Difference between Arrow-Debreu equilibrium and Radner equilibrium concept.
- (c) Utilitarian form of social welfare function.

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