NATIONAL UNIVERSITY OF LESOTHO

B.A SUPPLEMENTARY EXAMINATIONS

EC4309: PUBLIC SECTOR ECONOMICS

AUGUST 2023 **100 MARKS** **3 HOURS**

INSTRUCTION:
Answer **Question 1** and ***any*** other **3 questions**

Question 1 (Compulsory)

Suppose that demand and supply for Mohalalitoe Soap from NUL Innovation Hub are given by the following functions:

$$Q^d = 100 - 4P$$
$$Q^s = -20 + 2P$$

a. Compute the equilibrium price and quantity. Compute the equilibrium consumer surplus, producer surplus, and social surplus. **[7]**
b. If there were no externalities present from the production of soap, explain why the unregulated market would maximize social surplus. **[8]**
c. Now, suppose further that each soap produced causes a M10 negative externality. Compute the external costs that Mohalalitoe produce imposes on the NUL community in the unregulated market. **[5]**
d. Show graphically the deadweight loss incurred in the unregulated Mohalalitoe market. Compute this deadweight loss. **[12]**
e. How would a tax on Mohalalitoe produce eliminate this deadweight loss? **[4]**
f. How large should marginal external cost have to be in order for it to be socially desirable such that no output is produced? **[4]**

Question 2

a. State and briefly explain the first theorem of welfare economics **[7]**
b. For each of the following goods, explain whether it possesses the nonexclusive property, the non-rival property, or both. If the good does not have the characteristics of a public good but is nevertheless produced by the government, can you explain why?
   i. Free primary education **[2]**
   ii. College education **[2]**
   iii. Public road **[2]**
   iv. National defence **[2]**
c. Explain how information asymmetries can cause market failure. **[5]**

Question 3

Consider a situation where there are just two people, Moroka (M) and Ts'oanelo (T), who derive utility (U) from the consumption of a private good, bread (b), and a public good, parks (z)

$$U_M = u_M(z;\, b_M) = b_M + 10z$$
$$U_T = u_T(z;\, b_T) = (b_T)^{\frac{1}{2}} z^{\frac{1}{2}}$$

b_M and b_T represent the quantities of bread (number of loaves) consumed by Moroka and Ts'oanelo, respectively, and z is the quantity of parkland (in terms of the number of acres). Assume that Parks are non-excludable, implying that Moroka and Ts'oanelo consume the same quantity of parkland. The land endowment in the economy is $\bar{s}$ acres. Each acre of land could be used for farming or serve as parkland. On one acre of land, enough wheat can be grown to

make $\boldsymbol{k}$ number of loaves of bread. The number of loaves of bread manufactured in the economy is consumed by either Moroka or Ts'oanelo, such that:

$$b = b_M + b_T$$

Assume further that the economy is endowed with one acre of land, and that one acre of land allocated to farming produces 50 loaves of bread.

a. What is the Pareto optimal allocation in which Moroka's utility is $\bar{u}$ (where $\bar{u}$ is less than 50)? **[12]**
b. By assuming that the Samuelson rule is known, prove the Pareto optimal allocation obtained in (a.) above. **[8]**

Question 4

a. Naha and Likotsi are citizens of Lesotho, with the following characteristics;
   - ✓ *Naha owns a business, where he earns fifty Maloti per hour. When taxed at the rate of 0%, Naha works 20 hours, at a 25% tax rate he works only 16 hours, and at a 40% tax rate, he works only 8 hours per week.*
   - ✓ *On the other hand, Likotsi works at Thetsane Industries for 20 hours per week, and earns six Maloti per hour, regardless of the tax rate.*

   The government is considering imposing an income tax of either 25% or 40% on Naha and decides to use the tax revenues to make transfer payments to Likotsi.
   i. Does either of the tax policies raise social welfare? **[5]**
   ii. Are either of the policies obviously less than optimal? Explain your answers. **[5]**

b. Why does redistribution cause efficiency losses? Why might society choose to redistribute resources from one group to another when doing so reduces the overall size of the economic pie? **[10]**

Question 5

The market can fail and the government can also fail.

a. Describe the difference between market failure and government failure. **[4]**
b. By using specific examples from Lesotho (or any SSA), discuss four ways in which the government has failed. **[8]**
c. By using specific examples, explain four market failure issues in Lesotho. **[8]**