Faculty of Economics and Business
Universitas Indonesia

Mid-Term Exam
Odd 2019/2020

Course	: Mathematics for Economics and Business
Lecturer	: Team
Day/Date	: Wednesday/October 23, 2019
Waktu	: 3 jam
Instruction	: Closed book, using calculator is permitted

Question 1 (25 points)

Market model of R-Jordan basketball shoes in Depok is given by:

$$Qd = 100 - P;$$

$$Qs = 2P - 20,$$

where $Qd, Qs,$ and P are demand quantity, supply quantity, and price of R-Jordan shoes respectively.

a. Find the equilibrium price and quantity of R-Jordan basketball shoes in Depok. **(6 points)**

b. If price is currently at 50, how big is the excess supply/demand in the market of R-Jordan? Show and explain what has happened in a diagram. **(9 points)**

c. Because of the success of R-Jordan, producer of Under-Amor shoes now also enters the basketball shoes market in Depok. As a consequence, markets for both basketball shoes in Depok are now:

$$Q_d^R = 150 - 3P_R + 5P_U$$

$$Q_S^R = -100 + 2P_R$$

$$Q_d^U = 100 + P_R - 3P_U$$

$$Q_s^U = -50 + 2P_U$$

(Q^R: demand for R-Jordan, Q^R: supply of R-Jordan, P_R : price of R-Jordan; Q^U: demand for Under-Amor, Q^U: supply of Under-Amowr, P_U : price of Under-Amor)

Find equilibrium price and quantity for R-Jordan and Under-Amor basketball shoes in Depok market. **(10 points)**

Question 2 (25 points)

One closed economy involves the following equations:

$$Y = C + I_0 + G_0$$

$$C = a + b(Y - T) \qquad (a > 0,\ 0 < b < 1)$$

$$T = tY \qquad (0 < t < 1)$$

(Y: national income, C: household consumption, T: tax, t: tariff, I_0: private investment, G_0: government spending, a: autonomous consumption, and b: marginal propensity to consume)

a. Determine endogenous variable, exogenous variable, and parameter from the equation system above. **(3 points)**

b. Write the equation system in matrix form: $Ax = d$. **(6 points)**

c. Does the equation system have a solution? Explain. **(6 points)**
(Hint: Check non-singularity condition of the coefficient matrix)

d. Use matrix invers or cramers rule solution to determine national income, household consumption, and tax in equilibrium condition if $I_0 = 400;\ G_0 = 200; a = 140; b = 0{,}7;\ t = 0.1$. **(10 points)**

Question 3 (25 points)

Dreamland economy has the following national income model:

$$Y = C + I_0 + G_0$$
$$C = C_0 + b(Y - T)$$
$$T = T_0 + tY$$

(Y: national income, C: household consumption, T: tax, I_0: private investment, G_0: government spending, C_o: autonomous consumption, T_0: lump-sum tax, b: marginal propensity to consume, and t: tariff).

a. Find national income equilibrium of Dreamland economy. **(7 points)**

b. Given $C_0 = 500; I_0 = 3{,}200; G_0 = 3{,}000; T_0 = 400; b = 0.75; t = 20\%$, calculate the impact of tariff tax change to national income equilibrium. Interpret your result. **(10 poin)**

c. If tariff decreases to 10%, compare the national income equilibrium before and after the policy is implemented. Does it give consistent direction of change to that in point (b)? Explain. **(8 poin)**

Question 4 (25 points)

a. Given the following dimand function

$$Q_d = 50\ P^{-0.5}$$

where Q_d is demand for good and P is price of good:

1) Calculate price elasticity of demand. Interpret your result. **(5 points)**

2) Does price elasticity of demand change along the demand curve? Explain. **(5 points)**

b. Demand for car is given by:

$$Q_d = 5000 - 50P + 0.5\ Y - 0{,}05\ r$$

(Q_d: demand for car, P: price of car, Y: income, dan r: interest rate)

1) Find the change in demand for car when only interest rate changes (*ceteris paribus*). Explain. **(5 points)**

2) Find the change in demand for car when interest rate changes, but allowing other factors change too. Explain. **(5 points)**

3) Compare your result in point (1) and (2). What can you conclude? **(5 points)**