

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER I EXAMINATION 2011-2012

HE9091 – PRINCIPLES OF ECONOMICS

Nov/Dec 2011

Time Allowed: 2½ hours

INSTRUCTIONS

- 1 This paper contains 3 sections and comprises 11 pages.
- 2 Answer all 3 sections.
- 3 This is a **CLOSED BOOK** examination.
- 4 Begin your answer to each question on a separate page of the answer book for Section B and Section C.
- 5 Answers will be graded for content and appropriate presentation.

Section A

1. Which of the following is a normative statement?
 - (a) The taxes paid by the poor should be reduced in order to improve the income distribution in Singapore.
 - (b) Government ought not subsidize corporations by training welfare recipients.
 - (c) Presidential candidates should not be given funds from the government to run campaigns.
 - (d) The sea otter should not be allowed to spread into coastal waters, because it will reduce the value of fisheries.
 - (e) All of the above.

2. Which of the following would cause a shift to the right of the supply curve for gasoline?
 - I. A large increase in the price of public transportation.
 - II. A large decrease in the price of automobiles.
 - III. A large reduction in the costs of producing gasoline.
 - (a) I only.
 - (b) II only.
 - (c) III only.
 - (d) II and III only.
3. Assume that the current market price is below the market clearing level. We would expect
 - (a) a surplus to accumulate.
 - (b) downward pressure on the current market price.
 - (c) upward pressure on the current market price.
 - (d) lower production during the next time period.
4. Which of the following represents the price elasticity of demand?
 - (a) $\left(\frac{\Delta Q}{P}\right) \left(\frac{\Delta P}{Q}\right)$
 - (b) $\left(\frac{\Delta Q}{P}\right) + \left(\frac{\Delta P}{Q}\right)$
 - (c) $\left(\frac{\Delta Q}{\Delta P}\right) \times \left(\frac{P}{Q}\right)$
 - (d) $\left(\frac{\Delta Q}{P}\right) - \left(\frac{\Delta P}{Q}\right)$
5. The expected value is a measure of
 - (a) risk.
 - (b) variability.
 - (c) uncertainty.
 - (d) central tendency.

6. The weighted average of all possible outcomes of a project, with the probabilities of the outcomes used as weights, is known as the
- variance.
 - standard deviation.
 - expected value
 - coefficient of variation.
7. The total cost (TC) of producing computer software diskettes (Q) is given as: $TC = 200 + 5Q$. What is the variable cost?
- 200
 - $5Q$
 - 5
 - $5 + (200/Q)$
 - none of the above
8. A strategy A is "dominant" for a player X if
- strategy A contains among its outcomes the highest possible payoff in the game.
 - irrespective of any of the possible strategies chosen by the other players, strategy A generates a higher payoff than any other strategy available to player X.
 - strategy A is the best response to every strategy of the other player.
 - strategy A is the best response to the best strategy of the other player.
 - every outcome under strategy A generates positive payoffs.
9. Boeing Corporation and Airbus Industries are the only two producers of long-range commercial aircraft. This market is not perfectly competitive because:
- Each company has annual sales over \$10 billion.
 - Each company can significantly affect prices.
 - Airbus receives subsidies from the European Union.
 - Airbus cannot sell aircraft to the United States government.
 - All of the above.
10. The demand curve facing a perfectly competitive firm is
- the same as its average revenue curve, but not the same as its marginal revenue curve.
 - the same as its average revenue curve and its marginal revenue curve.
 - the same as its marginal revenue curve, but not its average revenue curve.
 - not the same as either its marginal revenue curve or its average revenue curve.
 - not defined in terms of average or marginal revenue.

11. Given the following data for an economy, compute the investment component of GDP.
- | | |
|--|----|
| Consumption expenditure | 50 |
| Imports | 40 |
| Government purchases of goods and services | 20 |
| Construction of new homes and apartments | 30 |
| Sales of existing homes and apartments | 40 |
| Exports | 50 |
| Government payments to retirees | 10 |
| Household purchases of durable goods | 20 |
| Beginning-of-year inventory | 10 |
| End-of-year inventory | 20 |
| Business fixed investment | 30 |
- 30
 - 40
 - 60
 - 70
12. A college graduate in 1972 found a job paying \$7,200. The CPI was 0.418 in 1972. A college graduate in 2000 found a job paying \$30,000. The CPI was 1.68 in 2005. The 1972 graduate's job paid _____ in nominal terms and _____ in real terms than the 2005 graduate's job.
- more; less
 - more; more
 - less; the same
 - less; less
13. You are given the following information about the economy:
- | | |
|--|------|
| Consumption | 8000 |
| Investment | 1000 |
| Government purchases | 1000 |
| Net exports | 0 |
| Government transfers and interest payments | 500 |
| Government tax collections | 1700 |
- Private saving is _____; public saving is _____; and national saving is _____.
- 800; 200; 600
 - 800; 200; 1,000
 - 1,000; 800; 1,000
 - 1,500; 700; 2,700

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14. Based on the following information, the value of the M1 measure of the money supply is _____ and the value of the M2 measure of the money supply is _____.

Assets	Billions of dollars
Currency	20
Demand deposits	300
Money market mutual funds	800
Travelers' checks	10
Savings deposits	1800
Other checkable deposits	200
Small denomination time deposits	1100

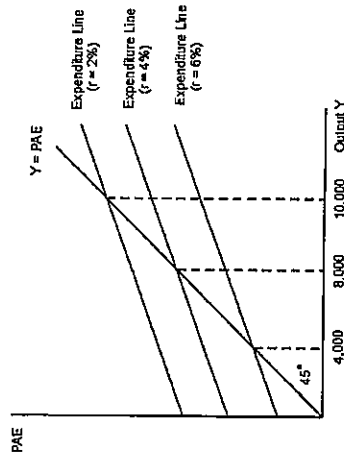
- (a) \$530 billion; \$3,700 billion
 (b) \$330 billion; \$4,230 billion
 (c) \$520 billion; \$4,320 billion
 (d) \$530 billion; \$4,230 billion
15. For policymakers the problem with a recessionary gap is _____ and the problem with an expansionary gap is _____.
- (a) a tendency for inflation to develop; wasted resources
 (b) wasted resources; a tendency for inflation to develop
 (c) an increase in cyclical unemployment; an increase in structural unemployment
 (d) an increase in structural unemployment; an increase in cyclical unemployment
16. According to Okun's Law, when cyclical unemployment increases from 1 to 2 percent, the recessionary gap increases from _____ percent.
- (a) -2 to -4
 (b) -1 to -2
 (c) 2 to 4
 (d) 1 to 2
17. If firms sell less than expected, actual investment increases because _____, which is counted as investment.
- (a) the unsold goods are added to inventory
 (b) the government buys the unsold goods
 (c) the unsold goods are distributed to poor households
 (d) households buy the unsold goods at bargain prices

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18. In Macroland autonomous consumption equals 100, the marginal propensity to consume equals 0.75, net taxes are fixed at 40, planned investment is fixed at 50, government purchases are fixed at 150, and net exports are fixed at 20. Short-run equilibrium output in this economy equals:

- (a) 387
 (b) 1000
 (c) 1150
 (d) 1160

19. Refer to the figure below. Based on the diagram, if potential output equals 8,000 and the real interest rate is 6%, then there is _____ gap and the central bank must _____ the real interest rate so that output will equal potential output.



- (a) a recessionary; raise
 (b) a recessionary; lower
 (c) no output; not change
 (d) an expansionary; raise
20. When a currency is undervalued, international reserves _____ and the country has a balance-of-payments _____.
- (a) increase; deficit
 (b) increase; surplus
 (c) decrease; surplus
 (d) decrease; deficit

(TOTAL: 30 marks)

Section B

- Suppose the weekly demand for a certain good, in thousand of units, is given by the equation $P = 8 - Q$ and the weekly supply of the good, also in thousand of units, is given by the equation $P = 2 + Q$, where P is price in dollars.
 - Calculate the total weekly economic surplus (i.e. consumer surplus plus producer surplus) generated in the market equilibrium. (4 marks)
 - Suppose a tax of \$2, to be collected from sellers, is imposed in this market. Calculate the direct loss in economic surplus experienced by participants in this market as a result of the tax. (4 marks)
 - How much government revenue will this tax generate each week? If the revenue is used to offset other taxes paid by participants in the market, what will be their net reduction in total economic surplus? (4 marks)

(TOTAL: 12 marks)

2. Two firms at the St. Louis airport have franchises to carry passengers to and from hotels in downtown St. Louis. These two firms are Metro Limo and United Limo. These duopolists cannot compete with price, but they can compete through advertising. Their payoff matrix is below:

		United Limo	
		Increase advertising	Don't increase advertising
Metro Limo	Increase advertising	25, 15	30, 0
	Don't increase advertising	15, 20	40, 5

- Does each firm have a dominant strategy? If so, explain. What is the dominant strategy? (2 marks)
 - What is the Nash equilibrium? Explain where the Nash equilibrium occurs in the payoff matrix. (3 marks)
- (TOTAL: 5 marks)

- The city of Econoville has 100 residents who each have the identical demand function for park area, $P = 10 - Q$. The marginal cost of providing parks is $MC = 10 + 10Q$. Park area is a public good. That is, if the city of Econoville provides park area, all of the residents can enjoy the area.
 - If the city of Econoville does not offer public park area, how much area of parks will each individual resident maintain on their own? (2 marks)
 - What is the optimal level of public parks in Econoville? (2 marks)
 - How much each resident is willing to contribute towards the public park. (2 marks)

(TOTAL: 6 marks)

4. The market for used cars in a particular region includes both high quality and low quality cars. High quality cars are sold primarily to quality sensitive customers, while low quality cars are sold to price sensitive buyers. The submarkets for high quality and low quality cars can be described by the supply and demand curve:

$$\begin{aligned}
 Q_D^H &= 160,000 - 12.5P^H \\
 Q_S^H &= -48,000 + 13.5P^H \\
 Q_D^L &= 110,000 - 12.5P^L \\
 Q_S^L &= 20,000 + 10P^L
 \end{aligned}$$

where Q_D^H, Q_S^H refer to the quantities demanded and supplied of high quality cars, Q_D^L, Q_S^L refer to the quantities demanded and supplied of low quality cars, P^H and P^L refer to the prices of high quality and low quality cars. All quantities are measured in cars per month, prices are measured in dollars.

- Assuming that buyers and sellers are both able to distinguish low quality and high quality cars, determine the price and quantity that will prevail in each submarket. (4 marks)
- Examine the case where sellers are able to accurately determine used car quality but buyers are not. You may assume that buyers assume that all cars are of average quality so that an average demand curve is appropriate. Determine the price and quantity in each submarket. (4 marks)

Note: Question No. 4 continues on page 9

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Question 4 (continued)

- (c) Using diagrams, analyze the additional developments in the market until final long run equilibrium is reached. You must describe the eventual outcome, but no calculations are required for this part of the problem.

(4 marks)

(TOTAL: 12 marks)

Section C

1. Below are some data from the land of milk and honey.

Year	Price of milk	Quantity of milk (liters)	Price of honey	Quantity of honey (liters)
2007	\$1	100	\$2	50
2008	\$1	200	\$2	100
2009	\$2	200	\$4	100

- (a) Compute nominal GDP, real GDP and the GDP deflator for each year, using 2007 as the base year. (2 marks)
- (b) Compute the percentage change in nominal GDP, real GDP and the GDP deflator in 2008 and 2009 from the preceding year. For each year, identify the variable that does not change. Explain in words why your answer makes sense. (2 marks)
- (c) Did economic well-being rise more in 2008 or 2009? Explain. (1 mark)

(TOTAL: 5 marks)

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2. In an economy, the components of planned spending are given by:

$$C = 640 + 0.8(Y - T) - 400r$$

$$I = 250 - 600r$$

$$G = 300$$

$$NX = 20$$

$$T = 250$$

where r is the real interest rate.

- (a) Suppose the central bank sets the real interest rate at 3 percent. Find the short-run equilibrium output in this economy. (5 marks)
- (b) Suppose that the potential output is 4,850. By how much should the central bank change the real interest rate to restore full employment? (5 marks)
- (TOTAL: 10 marks)
3. Suppose that a permanent increase in oil prices both creates an inflationary shock and reduces potential output.
- (a) Use an AD-AS diagram to show the effects of the oil price increase on output and inflation in the short run and the long run, assuming that there is no policy response. (5 marks)
- (b) What happens if the central bank responds to the oil price increase by adopting a tighter monetary policy? (5 marks)
- (TOTAL: 10 marks)

4. Answer each of the followings:

(a) For given real interest rate and riskiness in the home country, how would you expect net capital inflows to be affected by an increase in real interest rates abroad? Show your answer graphically.
(5 marks)

(b) Show the effects on the real interest rate and capital investment of a country that is a net borrower from abroad when foreign investors believe that the riskiness of lending to the country has increased.
(5 marks)

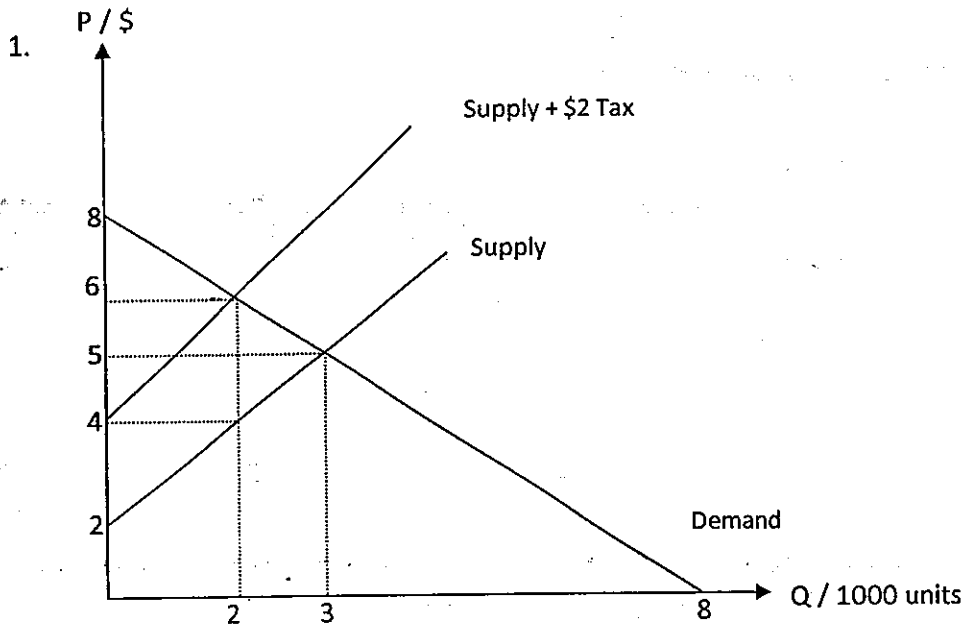
(TOTAL: 10 marks)

- END OF PAPER -

Section A

- | | |
|-------|-------|
| 1. E | 11. D |
| 2. C | 12. D |
| 3. C | 13. B |
| 4. C | 14. D |
| 5. D | 15. B |
| 6. C | 16. C |
| 7. B | 17. A |
| 8. C | 18. D |
| 9. B | 19. B |
| 10. B | 20. B |

Section B



- a. Total weekly economic surplus = $0.5 * (8 - 2) * 3000$
 = \$ 9000
- b. New economic surplus = $0.5 * (8 - 4) * 2000$
 = \$ 4000
 Direct loss in economic surplus = $\$ 9000 - \$ 4000 = \$ 5000$
- c. Tax revenue = $2 * 2000 = \$ 4000$
 Net reduction in total economic surplus = $\$ 5000 - \$ 4000 = \$ 1000$

2.

- a. Metro Limo has no dominant strategy since the best outcome depends on the actions of United Limo.
 United Limo has a dominant strategy which gives the best outcome regardless of the actions of Metro Limo. The dominant strategy is to increase advertising.
- b. Nash equilibrium is a set of strategies (or actions) such that each player is doing the best it can given the actions of its opponents.
 The Nash equilibrium occurs at (25, 15).

3.

- a. For individuals,
- $$P = MC$$
- $$10 - Q = 10 + 10Q$$
- $$Q = 0$$

Each Individual will maintain zero area of parks.

b. Optimal demand function for public parks = $100 * (10 - Q) = 1000 - 100Q$

Using $P = MC$, $1000 - 100Q = 10 + 10Q$

$$Q = 9$$

Optimal level of public parks = 9.

c. When $Q = 9$, $P = 10 - 9 = 1$.

Each resident is willing to contribute 1 towards the public park.

4.

a. For high quality cars, $Q_D^H = Q_S^H$

$$160000 - 12.5P^H = -48000 + 13.5 P^H$$

$$P^H = 8000$$

$$Q^H = 160000 - 12.5 * 8000$$

$$= 60000$$

For low quality cars, $Q_D^L = Q_S^L$

$$110000 - 12.5 P^L = 20000 + 10 P^L$$

$$P^L = 4000$$

$$Q^L = 110000 - 12.5 * 4000$$

$$= 60000$$

For high quality cars, price is \$ 8000 and quantity is 60000 cars per month.

For low quality cars, price is \$ 4000 and quantity is 60000 cars per month.

b. Let Q_D^A represent average demand curve

$$Q_D^A = (Q_D^H + Q_D^L) / 2$$

$$= [(160000 - 12.5P) + (110000 - 12.5P)] / 2$$

$$= 135000 - 12.5P$$

For high quality cars, $Q_D^A = Q_S^H$

$$135000 - 12.5P^H = -48000 + 13.5 P^H$$

$$P^H = 7038.46$$

$$Q^H = -48000 + 13.5 * 7038.46$$

$$= 47019$$

For low quality cars, $Q_D^A = Q_S^L$

$$135000 - 12.5 P^L = 20000 + 10 P^L$$

$$P^L = 5111.11$$

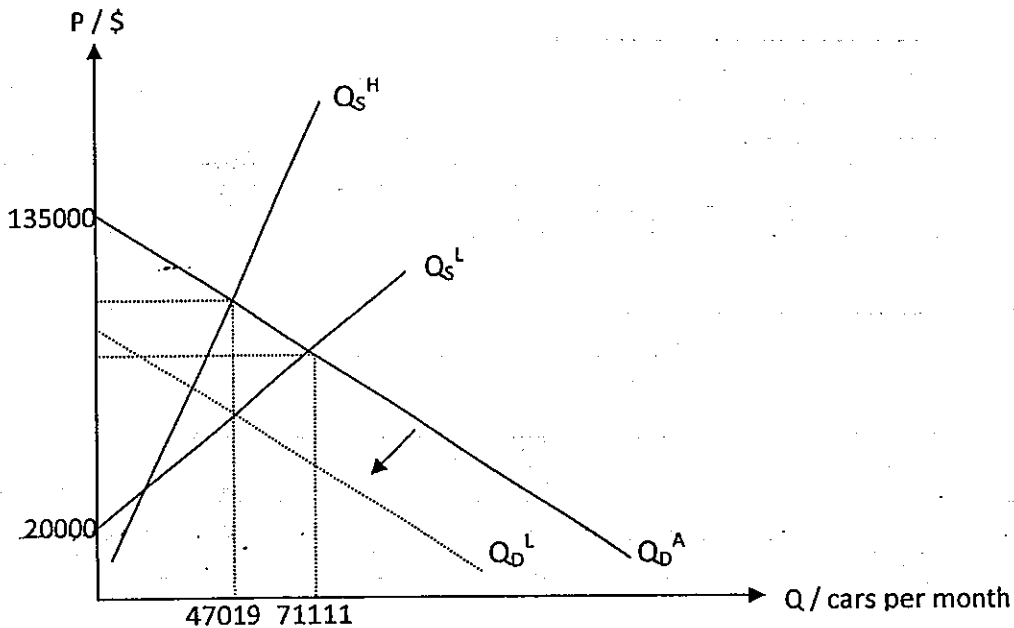
$$Q^L = 20000 + 10 * 5111.11$$

$$= 71111$$

For high quality cars, price is \$ 7038.46 and quantity is 47019 cars per month.

For low quality cars, price is \$ 5111.11 and quantity is 71111 cars per month.

c.



Initially buyers may think that the numbers of high and low quality cars are equal. Hence the demand curve differs for each submarket. However, as the sellers are able to accurately determine the quality of used cars, there exists imperfect information between buyers and sellers. Subsequently, buyers will expect that all cars have average quality, represented by demand curve Q_D^A . At this demand curve, fewer high quality cars (47019) and more low quality cars (71111) will now be sold.

As high quality cars sell at a reduced price (\$ 8000 to \$ 7038.46), the low profit margin reduces the supply of high quality cars. Similarly, the supply of low quality cars increases due to the higher price of low quality cars. The market will experience an influx of low quality cars and so buyers will expect that all cars have even lower than average quality. This effect will continue until the market is filled with only low quality cars. The demand curve for used cars will eventually resemble Q_D^L .

Section C

1.

a.

Year	Milk		Honey		Nominal GDP	Real GDP	GDP deflator
	Price	Quantity	Price	Quantity			
2007	\$ 1	100	\$ 2	50	\$ 200	\$ 200	100
2008	\$ 1	200	\$ 2	100	\$ 400	\$ 400	100
2009	\$ 2	200	\$ 4	100	\$ 800	\$ 400	200

b.

Year	Percentage Change			Variable that does not change
	Nominal GDP	Real GDP	GDP deflator	
2008	100	100	0	GDP deflator, because there is no change in price level between 2007 and 2008.
2009	100	0	100	Real GDP, because there is no change in the quantity of goods produced between 2008 and 2009.

c. Economic well-being rises more in 2008 because real GDP does not increase in 2009.

2.

a. $Y = AE$

$Y = C + I + G + NX$

$Y = (640 + 0.8(Y - T) - 400r) + (250 - 600r) + 300 + 20$

For $r = 0.03$ and $T = 250$,

$Y = (640 + 0.8(Y - 250) - 400(0.03)) + (250 - 600(0.03)) + 300 + 20$

$Y = 980 + 0.8Y$

$Y = 4900$

Short-run equilibrium output = 4900.

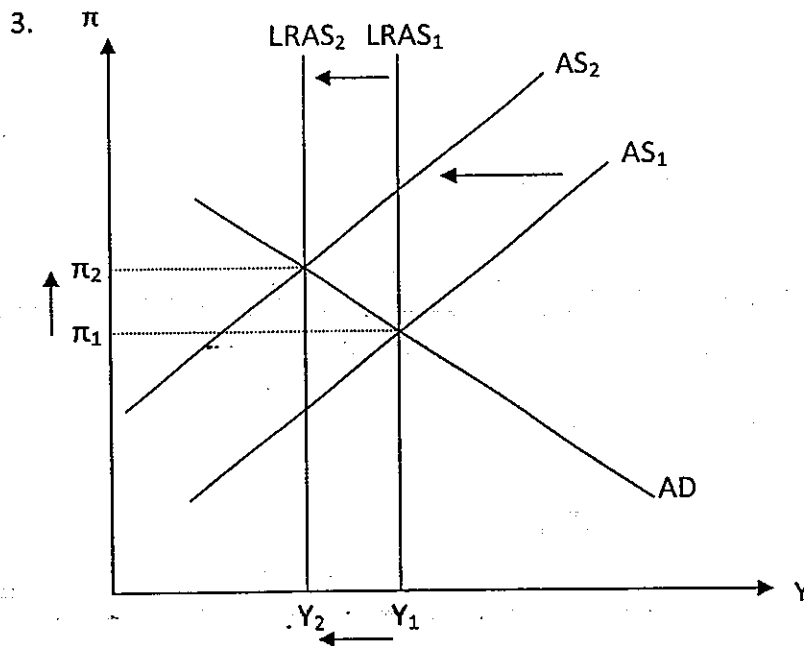
b. For $Y = 4850$,

$4850 = (640 + 0.8(4850 - 250) - 400r) + (250 - 600r) + 300 + 20$

$1000r = 980 + 0.8Y$

$r = 0.04$

The central bank should increase the interest rate by 1 percent, from 3 percent to 4 percent, to restore full employment.



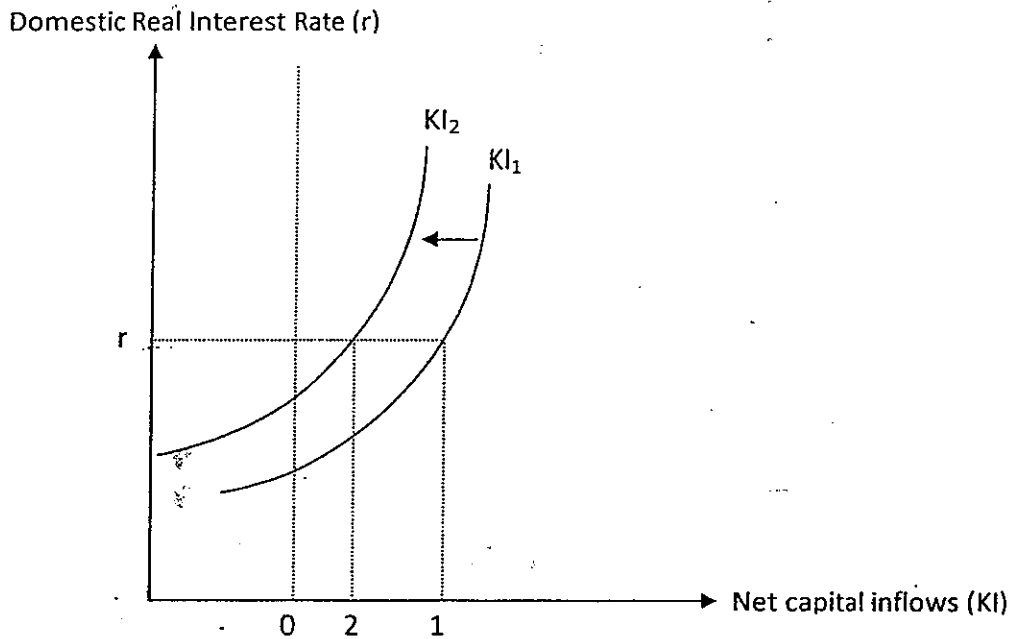
- a. AD curve does not change since there is no change in monetary policy and no exogenous change in spending.

In the short run, the inflationary shock due to the increase in oil price results in a shift in AS curve from AS_1 towards AS_2 . The expansionary gap causes an increase in expected inflation. Hence the actual inflation increases and output decreases.

In the long run, the reduction in potential output shifts the LRAS curve to the left. The expansionary gap between Y_1 and Y_2 leads to even lower output and higher inflation.

- b. A tighter monetary policy results in each interest rate being associated with a lower rate of inflation. Hence the interest rate will increase. The increase in interest rate decreases the planned aggregate expenditure, shifting the AD curve to the left. As a result, output will decrease but inflation will decrease, reducing the impact of high oil price to the rising inflation.

4.



- For a given real interest rate and riskiness in the home country, an increase in real interest rates abroad reduces the willingness of investors to purchase domestic assets since domestic assets have a lower return compared to foreign assets. The KI curve shifts to the left from KI_1 to KI_2 and the net capital inflows decrease from point 1 to point 2.
- By being a net borrower from abroad, the level of national saving is probably low and net capital inflows contribute significantly to the supply of capital investment of the country.

When foreign investors believe that the riskiness of lending to the country has increased, they are less willing to purchase domestic assets due to their perceived higher risk. The net capital inflows decrease and the supply curve of capital investment shifts to left as a result. Assuming there is no change in the demand curve, at the new equilibrium, the real interest rate increases while capital investment of the country decreases.

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER 2 EXAMINATION 2015-2016

HE9091 PRINCIPLES OF ECONOMICS

April/May 2016

Time Allowed: 2½ hours

INSTRUCTIONS

- 1 This paper contains 4 questions and comprises 6 pages.
 - 2 Answer all 4 questions.
 - 3 This is a **CLOSED-BOOK** examination.
 - 4 All questions carry equal marks.
-

- 1 (a) You are taking two courses, Economics and Mathematics and both the examinations coming up. The table below shows your grade on each examination for different numbers of hours spent studying for each course:

Hours of Study	Economics	Mathematics
0	70	60
1	77	68
2	82	74
3	85	78

Your goal is to maximize your average grade on the two examinations. If you had three hours in total to prepare for the two examinations, how much time would you spend studying for each examination? Note: you can only choose to study in increments of one hour.

(4 marks)

- (b) Discuss how shifts in demand and/or supply curves could explain the equilibrium price of houses increases but the equilibrium quantity remains unchanged. You should consider three different situations and support your answers with three suitable house market diagrams.

(6 marks)

Note: Question No. 1 continues on page 2

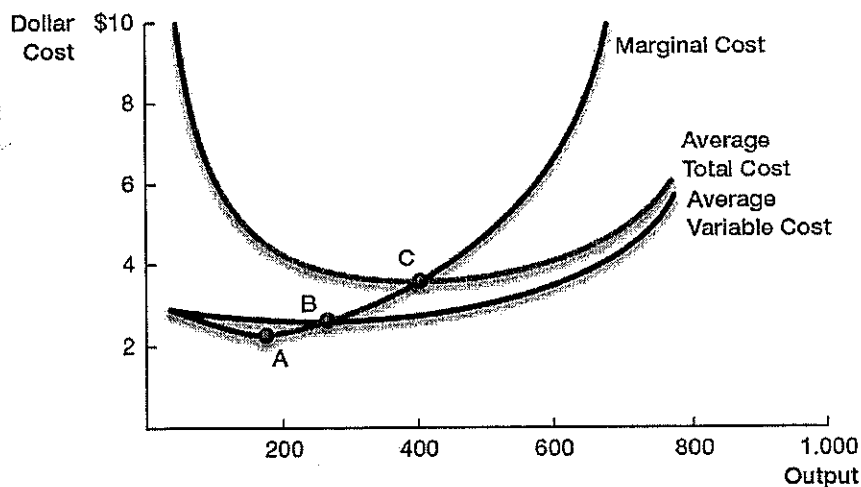
- (c) When Adam graduated from university and got a job, his income rose from \$15,000 to \$60,000. His consumption habits also changed drastically. For instant noodle, his consumption falls from 7 packs a week to zero. For movies, his consumption rises from 1 per year to 11 per year. Use the midpoint formula to determine his income elasticity of demand and state whether the 2 goods are normal or inferior. (4 marks)
- (d) You have decided to spend \$40 this month on Fish and Bread. The total utility you receive from different quantities of fish and bread are shown in the table below. The prices of fish and bread are both \$10 per unit.

Quantity	Total Utility of Fish	Total Utility of Bread
0	0	0
1	200	140
2	360	260
3	500	360
4	620	440

What combination of fish and bread maximizes your total utility? Explain using the rational spending rule.

(5 marks)

- (e) The following graph shows the cost curves of a perfectly competitive firm.



- (i) Consider three market prices at \$6, \$3 and \$2 respectively. Explain the optimal output and state whether the firm makes profit or incur losses at the three prices. (3 marks)
- (ii) Consider the three points, A, B, and C marked on the graph. At which point will the firm be in the long run equilibrium? Explain your answers. (3 marks)

(3 marks)

(TOTAL: 25 marks)

- 2 (a) Consider a monopolist with a demand function $P = 60 - 10Q$, where P is price and Q is quantity demanded and it operates under a constant marginal cost function at \$10.
- (i) Identify the profit-maximizing price and quantity for this monopolist. (4 marks)
- (ii) What is the value of the consumer surplus, producer surplus, and deadweight loss in the market? Support your answers with a suitable diagram. (4 marks)
- (iii) How would your answers in (ii) change if this market were competitive? (3 marks)
- (b) John Tan and Mary Lee live next to each other in the same flat and Mary Lee loves to play music CD so loudly that John Tan can hear them. John Tan prefers a quiet environment when he is resting at home. Assume that Mary Lee receives \$100 of benefits from her music and John Tan suffers \$60 of damages.
- (i) Suppose the flat does not have any rules about noise. John Tan and Mary Lee can bargain at zero cost. What will be the outcome? Is the outcome socially efficient? (2 marks)
- (ii) Now suppose the flat passes a rule that says residents are not allowed to play music their neighbors can hear if any of the neighbors object. As before, John Tan and Mary Lee can bargain at zero cost. What will be the outcome? Is it socially efficient? (2 marks)
- (c) Suppose that Honda is contemplating entering the market for driverless cars. Another company, Toyota, also wants to enter this market. If Honda enters the market but Toyota does not, then Honda earns \$20 million profits and Toyota earns 0. Similarly, if Toyota enters the market but Honda does not, then Toyota earns \$20 million profits and Honda earns 0. If both enter the market, then each suffers \$10 million losses. If neither enters, each earns 0. Construct the pay-off matrix for Honda and Toyota indicating the strategies they may choose. Find the Nash equilibrium for this game. (5 marks)

Note: Question No. 2 continues on page 4

- (d) The government of many countries, including Singapore which is not a welfare state, provides generous subsidies to private and public education. The reason is that education provides positive externality which benefits the society besides the consumers. Use a suitable diagram to show the social efficient quantity of education, the market equilibrium quantity of education without subsidy and the amount of efficiency loss. Does it matter whether the subsidy is given to the consumers or producers of education?

(5 marks)

(TOTAL: 25 marks)

- 3 (a) The final outputs produced by an economy in 2014 and 2015 and their respective market prices are reflected in the following table

	2014		2015	
	Quantity	Unit Price (\$)	Quantity	Unit Price (\$)
Rice	50	7.00	65	7.50
Fruits	54	1.50	60	1.75
Cars	10	800.00	15	900.00
Fish	12	3.50	14	6.50

Find the nominal GDP growth rate between 2014 and 2015. Using 2014 as the base year, compute the real GDP growth rate between 2014 and 2015. Why are the two growth rates different?

(4 marks)

- (b) Consider a family consists of father, mother, older sister and younger son. They are comparing their starting salaries in their first jobs. The year which each started their first job, the CPI (with 1990 as the base year) in that year and their starting salary are given below.

Member	Year	CPI	Starting Salary
Father	1965	0.83	\$24,900
Mother	1975	0.91	\$26,000
Older Sister	1990	1.00	\$29,120
Younger Son	2000	1.10	\$32,000

Which of the family member started the first job with the highest real income?

(4 marks)

- (c) Evaluate whether the following statements are true or false. Justify your answers.

(i) If real GDP increases then nominal GDP must also increase.

(2 marks)

(ii) Import can be larger than GDP.

(2 marks)

Note: Question No. 3 continues on page 5

- (d) Suppose you own and manage a fruit stand and you hire workers in a competitive labour market. The non-labour cost of each kg of fruit is \$0.50. Your fruit sales vary with the number of workers hired, as shown below.

Number of Workers	kg of Fruits Sold Per Day
1	45
2	85
3	115
4	135
5	150
6	160
7	165

- (i) If fruit sells for \$1.50 per kg and the competitive market wage is \$20 per day, how many workers should you hire?
(3 marks)
- (ii) Suppose a fruit workers' union is established and the minimum acceptable wage becomes \$30 per day, how many workers will you hire?
(2 marks)
- (e) Suppose the government borrows \$20 billion more next year than this year.
- (i) Using a saving-investment diagram, analyze the effect on interest rate with this increase in government borrowing.
(4 marks)
- (ii) Explain the effects on investment, private saving, public saving and national saving with this increase in government borrowing.
(4 marks)
- (TOTAL: 25 marks)

- 4 (a) Consider an economy Alpha with the following information:

$$C = 500 + 0.8Y_d$$

$$I^P = 200$$

$$G = 300$$

$$NX = 50$$

$$T = 200$$

$$Y^* = \$5000$$

where C is the consumption, Y_d is the disposable income, I^P is the planned investment, G is the government spending, NX is the net export, T is the lump sum taxes and Y^* is the potential output.

Note: Question No. 4 continues on page 6

- (i) Solve for the equilibrium real GDP of Alpha. Determine the type and magnitude of the output gap. (5 marks)
- (ii) How could Alpha close this gap using government spending and taxes? (4 marks)
- (b) For each of the following, using an AD-AS diagram, show the short run and long run effects on output and inflation. Assume the economy starts in long run equilibrium.
- (i) A decrease in consumer confidence (4 marks)
- (ii) A sharp drop in oil prices (4 marks)
- (c) A trader is contemplating buying coconuts from Papua New Guinea (domestic currency is Kina) or US Hawaii (domestic currency is US dollars (US\$)). The price of coconut in Papua New Guinea is 2 Kina per kg. Comparable coconut is selling in Hawaii at US\$2.60 per kg. One Kina is currently exchanging for US\$0.8 in the foreign exchange market. Compute the real exchange rate for a kg of coconut from the perspective of the US and Papua New Guinea and determine where should the trader buy the coconuts. (4 marks)
- (d) The demand for and supply of Somali Shillings in the foreign exchange market with US dollars are given as follows. The nominal exchange rate is expressed as U.S. dollars per Somali Shilling.

$$\text{Demand: } 10,000 - 2e$$

$$\text{Supply: } 500 + 2e$$

Establish the equilibrium value of the Somali Shilling. If the Somali Shilling is fixed at 3,000, what will be its trade position? What will happen to Somali foreign reserves over time if it maintains the fixed exchange rate?

(4 marks)

(TOTAL: 25 marks)

- END OF PAPER-

April / May 2016

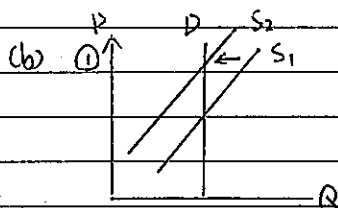
HE9091 - Principles of Economics

Question 1:

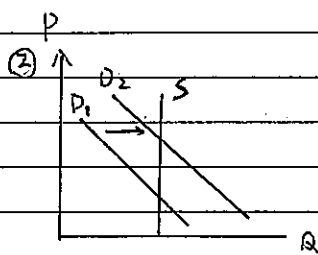
(a). 4 possible combinations are:

	Economics	Mathematics	Total grade
0		3	148
1		2	151
2		1	150
3		0	145

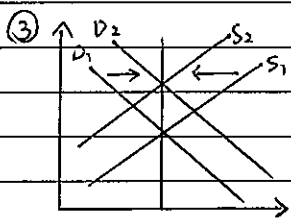
So, the best choice is to spend 1 hour studying for economics and 2 hours studying for math.



When demand is inelastic, the demand curve has infinite slope. If the supply of houses decreases, the supply curve shifts to the left. The equilibrium price increases but quantity remains the same.



When supply is inelastic, the supply curve has infinite slope. If the demand of houses increases, the demand curve will shift to the right, thus the equilibrium quantity remains the same but price increases.



When the supply decreases and demand increases and the change in quantities equals, the supply curve will shift to the left and the demand curve will shift to the right but the equilibrium quantity will remain the same. In this case, price will also increase.

(c). Percentage change in income: $\frac{60000 - 15000}{(60000 + 15000)/2} \times 100\% = 120\%$

Percentage change in quantity of instant noodles: $\frac{0 - 1}{(0 + 1)/2} \times 100\% = -200\%$

Percentage change in quantity of movies: $\frac{11 - 1}{(11 + 1)/2} \times 100\% = 167\%$

Income elasticity of demand for instant noodles = $\frac{-200\%}{120\%} = -1.67$

Since income elasticity is negative, instant noodles are inferior goods.

Income elasticity of demand for movies: $\frac{167\%}{120\%} = 1.39$

Since income elasticity is positive, movies are normal goods.

(d). Quantity	MU of fish	MU _F /P _F	MU of Bread	MU _B /P _B
0	0	0	0	0
1	200	20	140	14
2	160	16	120	12
3	140	14	100	10
4	120	12	80	8

The rational rule suggests that the optimal combination occurs when $MU_F/P_F = MU_B/P_B$ within the Budget of \$40

① when $MU_F/P_F = MU_B/P_B = 14$; Total P = \$40;

② when $MU_F/P_F = MU_B/P_B = 12$; Total P = \$60 = \$40.

Therefore, the combination of 3 fish and 1 bread is the best.

(e) (i) When market price is at \$6, the marginal cost equals market price and is higher than the average total cost. In this case, the firm makes profit.

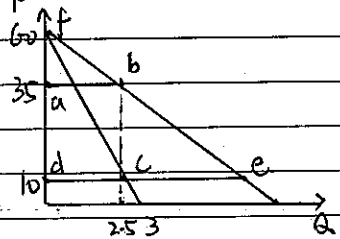
- When market price is at \$4, the marginal cost equals average total cost. The firm does not make profit or suffer loss.

- When market price is at \$2, the firm suffers great loss and should shut down.

(ii) At point C, If the price is higher than C, the positive economic profit will attract more firms, thus price goes down till $P = P_C$. If the price is lower, some firms will quit the market, supply curve will shift to the left and price will increase till $P = P_C$. Therefore, point C is the equilibrium point.

Question 2.

(a). (i)



The Marginal revenue function is $P = 60 - 20Q$. The profit maximizing price occurs when $MC = MR$, thus

$$10 = 60 - 20Q, \quad Q = 2.5; \quad P = 60 - 10 \times 2.5 = 35$$



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April / May 2016. (Continued)

(ii) consumer surplus: area 'abf' = $\frac{1}{2}(60-35) \times 2.5 = 31.25$

producer surplus: area 'adc'b' = $(35-10) \times 2.5 = 62.5$

deadweight loss: area 'bce' = $\frac{1}{2}(35-10) \times (2.5)$

When $P=10$, $10=60-10Q$, $Q=5$

deadweight loss = $\frac{1}{2} \times 25 \times (5-2.5) = 31.25$

(iii) If the market is competitive, $P=MC$.

consumer surplus: area 'fde' = $\frac{1}{2}(60-10) \times 5 = 125$

producer surplus: 0

deadweight loss: 0

(b) (i) In this case, John Tan will try to negotiate with Mary Lee. He can choose to pay Mary \$100 or tolerate the noise, where he will suffer \$60 of damage. Absolutely he will choose to tolerate. The outcome is $\$100 - \$60 = \$40$ and is socially efficient.

(ii) In this case, Mary has to negotiate with John. She will pay John \$60 or more to ask him to tolerate. Mary will receive \$0 to \$40 of benefits and John will receive \$40 to \$0. The outcome is still \$40.

		Honda	
		Enter	Does not enter
Toyota	Enter	Toyota: -10 Honda: -10	Toyota: 20 Honda: 0
	Does not enter	Toyota: 0 Honda: 20	Toyota: 0 Honda: 0

• Suppose Toyota moved first.

If Toyota enters, Honda will not enter.

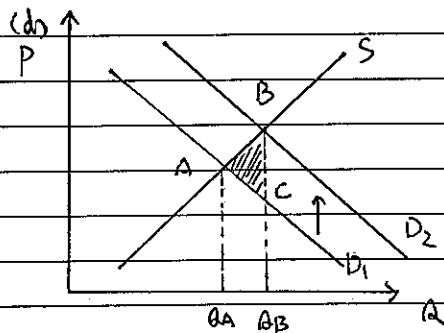
If Toyota does not enter, Honda will enter.

Suppose Honda moved first.

If Honda enters, Toyota will not enter.

If Honda does not enter, Toyota will enter.

Therefore, the nash equilibrium is at the upper right corner or lower left corner, where one of them will enter the market.



Since education provide positive externality, the market equilibrium quantity QA is lower than the social optimal quantity QB . The amount of efficiency loss is indicated by area 'ABC'.

- If subsidy is given to producers, the producers will be willing to lower the price. Supply curve will shift downwards and market equilibrium quantity increases while price decrease.
- If subsidy is given to consumer, the consumer will accept higher price. The demand curve will shift upwards and market equilibrium quantity increases as well as price. Therefore, the difference is between the equilibrium price in two cases.

Question 3.

(a) Nominal GDP [2014: $50 \times 7 + 54 \times 1.5 + 10 \times 500 + 12 \times 35 = 8473$
 2015: $65 \times 7.5 + 60 \times 1.75 + 15 \times 900 + 14 \times 6.5 = 14183.5$

Nominal GDP growth rate: $(14183.5 - 8473) \div 8473 \times 100\% = 67.40\%$

Real GDP [2014: 8473

2015: $65 \times 7 + 60 \times 1.5 + 15 \times 500 + 14 \times 3.5 = 12594$

Real GDP growth rate: $(12594 - 8473) \div 8473 \times 100\% = 48.64\%$

Since nominal GDP uses the price from the current year and real GDP uses the price from the base year, when there is inflation, nominal GDP is higher than real GDP.

(b). In this case, real income = starting salary \div CPI

Father: $24900 \div 0.83 = 30000$

Mother: $26000 \div 0.91 = 28571$

Older sister: $29120 \div 1 = 29120$

Younger son: $32000 \div 1.1 = 29090$

Therefore, father got the highest real salary.



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April / May 2016 (continued)

Question 3. (c)

(i) False. When deflation occurs, nominal GDP will decrease if the percentage increase in productivity is smaller than the percentage decrease in price.

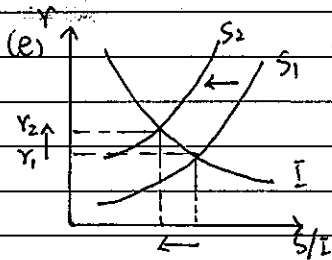
(ii) True. When import and export are both very high, the NX, which equals export minus import, is still smaller than GDP, but import and export can be several times bigger than GDP.

(d). (i)

Number of workers	1	2	3	4	5	6	7
kg of fruit	45	85	115	135	150	160	165
Marginal benefit	45	40	30	20	15	10	5

• Hire as many workers as possible till $MB = \text{market wage}$.
Therefore, 4 workers should be hired.

(ii) In this case, $MB = \text{lowest wage} = 30$. Therefore, 3 workers should be hired.



(i) There will be a larger deficit next year, thus national saving will decrease. The saving curve will shift to the left. The real interest rate will go higher and investment level will go lower.

(ii) Since interest rate increase, people would like to spend less, so private saving will increase.

Since 'public saving = national saving - private saving', when national saving decreases and private saving increases, public saving will definitely decrease.

Investment level will decrease. (analysed in (i))

Question 4.

$$(a) (i) Y = C + IP + G + NX = 1050 + 0.8(Y - 200) \quad ; \quad Y = 4450$$

Since $Y = 4450 < Y^* = 5000$, there is a recessionary gap.

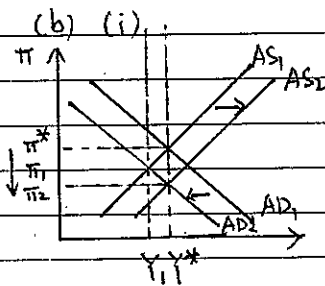
Question 4 (a) (ii)

Assume the new tax is T' .

$$5000 = 500 + 0.8(5000 - T') + 550.$$

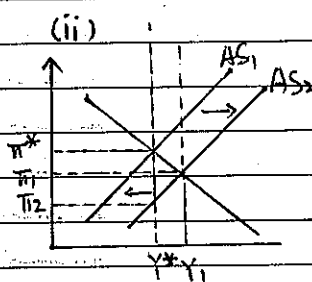
Solve for T' we have: $T' = 62.5$ and $\Delta T = T - T' = 137.5$

Therefore, the government can reduce tax by \$137.5 to close the gap.



When a decrease in consumer confidence occurs, people are less willing to spend money, so the spending decreases and the AD curve shifts to the left. A short-run equilibrium is established at Y_1, π_1 .

Long-run: Since the actual π_1 is lower than the expected π^* , both π_1 and π^* will decrease and AS curve will shift to the right until the recessionary gap is closed. A new long-run equilibrium occurs at Y^*, π_2 , where π_2 is lower than π^* .



The sharp drop in oil prices will increase the supply, thus AS curve will shift to the right. A short-run equilibrium occurs at (Y_1, π_1) .

Long-run: Since the actual π_1 is lower than the new expected inflation rate π_2 , both π_1 and π_2 will increase and AS curve will shift to the left until the expansionary gap is closed. The long-run equilibrium is the same as the initial one.

(c) Real exchange rate = $\frac{P_e}{P_f}$

From the perspective of the US: $rate_{us} = 2.6 \times \frac{1}{0.8} \div 2 = 1.625$

From the perspective of Papua New Guinea:

$$rate_p = 2 \times 0.8 \div 2.6 = 0.615$$

Since $rate_{us} > 1$ and $rate_p < 1$, the price of coconut in America is higher than that in Papua New Guinea.

Therefore, the trader should buy the coconuts.

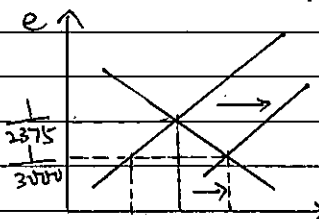
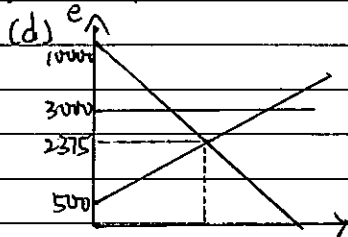


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April / May 2016 (continued)

Question 4



• Solve for the equation.

$$10000 - 2e = 500 + 2e, \quad e = 2375.$$

Since the exchange rate is fixed at 3000, the value of shilling is underestimated.

Therefore, the purchase power of shilling is decreased. More export and less import will occur and NX will increase.

• To maintain the exchange rate, the somali government should increase the supply of shilling to meet the demand. Therefore, the foreign reserves increases.

End of Solutions.

HE9091

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER 1 EXAMINATION 2016-2017

HE9091 PRINCIPLES OF ECONOMICS

Nov/Dec 2016

Time Allowed: 2½ hours

INSTRUCTIONS

- 1 This paper contains 4 questions and comprises 5 pages.
 - 2 Answer **ALL 4** questions.
 - 3 This is a **closed-book** examination.
 - 4 All questions carry equal marks.
 - 5 Begin your answer to each question on a separate page of the answer book.
-

Question 1

- (a) There are many private education institutions in Singapore and a large number of foreign students have enrolled into these institutions. Recently two incidents affect the private education market in Singapore. One incident is the Council of Private Education, the governing body of private education in Singapore, has tighten the requirements of private education institutions to boost their quality. It is expected that many private education institutions are not able to meet the requirements and have to cease operations. The other incident is that foreign students, upon graduation, will encounter more restrictions to work in Singapore and this has reduced the attractiveness of studying in Singapore. Analyse with suitable diagrams the effects on the equilibrium price and quantity in the private education market in Singapore. (8 marks)
- (b) Consider the demand for a particular brand of car, Toyota. When the price of a Toyota car is \$10,000, the quantity demanded is 1500 units and when the price increases to \$12,000, the quantity demanded decreases to 1125 units. Compute the price elasticity of demand for Toyota car using the mid-point formula. What should the seller do to increase revenue? Is the demand for Toyota, likely to be more or less elastic than the demand for all cars? Justify your answers. (5 marks)
- (c) Consider an individual with an income of \$24 to spend on 3 goods, A, B and C with prices \$2, \$3 and \$1 respectively. The marginal utility of the first 5 units of the 3 goods are shown in the table below.

Note: Question No. 1 continues on page 2

Question 1 (continued)

Unit of A	MU of A	Unit of B	MU of B	Unit of C	MU of C
1	50	1	75	1	25
2	40	2	60	2	20
3	30	3	40	3	15
4	20	4	30	4	10
5	15	5	20	5	7.5

Determine his optimal consumption combination of the 3 goods.

(4 marks)

- (d) Consider a perfectly competitive market with market demand equation as $P = 40 - 0.2Q$ and market supply equation as $P = 20 + 0.3Q$, where P is price in dollars and Q is quantity in units. With the help of a diagram, establish the equilibrium price and quantity and compute the consumer surplus and producer surplus. What is the deadweight loss when the government imposes a price ceiling of \$29 in the market?

(8 marks)

Question 2

- (a) A government is considering building a bridge across a river. The bridge will cost \$2 million to build and nothing to maintain. It has two financing options. One is to finance the bridge using tax revenue. The other is to allow one company to collect toll charges for people who cross the bridge to cover the cost of the bridge. The following table shows the company's anticipated demand over lifetime of the bridge

Price per Crossing (\$)	Number of Crossings (\$'000)
\$8	0
\$7	100
\$6	200
\$5	300
\$4	400
\$3	500
\$2	600
\$1	700
\$0	800

- (i) If the profit-maximizing company were to build the bridge, what would be its optimal price and quantity? Is the quantity socially efficient? Should the company build the bridge? Explain.
- (ii) If the government were to build the bridge, what price should it charge to achieve social efficiency? What is the economic surplus at this price? Should the government build the bridge?

(5 marks)

(5 marks)

Note: Question No. 2 continues on page 3

HE9091

Question 2 (continued)

- (b) Consider trade relations between Asia and Europe which is affected by tariff (tax on imports). Assume that the leaders of the two regions believe the payoffs to alternate trade policies are as follows:

		Europe	
		Low Tariff	High Tariff
Asia	Low Tariff	Asia = \$25 billion Europe = \$25 billion	Asia = \$10 billion Europe = \$30 billion
	High Tariff	Asia = \$30 billion Europe = \$10 billion	Asia = \$20 billion Europe = \$20 billion

Solve for the Nash equilibrium in this game. Does prisoner's dilemma apply here? Explain.

(5 marks)

- (c) Aaron is contemplating quitting his current job of monthly salary \$3000 to produce and sell shoes. He estimates that for a year he will require \$24,000 to buy raw materials, \$2000 to pay for utilities, \$8000 to employ helpers and \$1000 for miscellaneous expenses. He will convert a room in his house to be the production site. This room is currently rented out at \$500 per month. He believes that he can produce 5000 pairs of shoes and sell each pair at \$10 in a year. Calculate his accounting profit and economic profit and explain whether he should quit his job to sell shoes.
- (d) Mr Tan and Mr Lim are neighbours. Mr Tan operates a small workshop producing furniture in his house. The noise affects Mr Lim who is a teaching and need a quiet environment to mark the students' assignment. Economy efficiency requires Mr Lim to have the right to a quiet environment and Mr Tan has to compensate Mr Lim for affecting his work. Do you agree? Explain.

(5 marks)

(5 marks)

Question 3

- (a) State whether the following statements are true or false. Justify your answers.
- (i) When an individual sell his house, the profit he made is included in the calculation of GDP (2 marks)
- (ii) When average labour productivity increases, output per person and hence standard of living must increase (2 marks)
- (iii) With deflation, nominal GDP is higher than real GDP (2 marks)

Note: Question No. 3 continues on page 4

Question 3 (continued)

- (b) Monthly household spending in 2014 and 2015 are reflected in the table below:

Item	2014		2015	
	Quantity	Unit Price	Quantity	Unit Price
Rice	50	\$7	48	\$9.50
MRT Rides	54	\$1.50	30	\$2.00
Apartment rental	1	\$800	1	\$900
Movie Tickets	12	\$3.50	8	\$4.80

Find the consumer price index in 2015 using 2014 as the base year. Determine the inflation rate in 2015 and explain whether the computed CPI represents a true and complete general price increase between 2014 and 2015.

(5 marks)

- (c) A Ministry of Manpower survey of people aged 15 years (legal working age) and above reveals the following information:

- 1,900,000 working full time for pay
- 100,000 working part time or temporary jobs for pay
- 80,000 not working but looking for jobs
- 100,000 full time students and home-makers
- 20,000 not working and not looking for jobs

Compute the labour force participation rate and the unemployment rate. What can be done to reduce unemployment if most of the unemployment are structural unemployment?

(6 marks)

- (d) A commercial bank receives new deposits of \$200,000 and the reserve-deposit ratio is 18%. Assume no cash leakage, explain the money creation process and determine the money supply in the economy eventually.

(4 marks)

- (e) The availability of ATMs may have a favourable effect on the long term growth of an economy. Explain the validity of this statement using a money market diagram.

(4 marks)

Question 4

- (a) The information of a closed economy is given as follows:

$$C = 1000 + 0.75Y_d$$

$$I = 2500$$

$$G = 5500$$

$$Y^* = 28000$$

Where C is consumption, Y_d is disposable income, I is investment, G is government spending and Y^* is the potential output.

Note: Question No. 4 continues on page 5

HE9091

Question 4 (continued)

Given that the lump sum tax is 1000, determine the short run equilibrium real GDP of the economy. Is there an expansionary gap or a recessionary gap at the short run equilibrium? By how much should the government change the tax in order to close the output gap?

(5 marks)

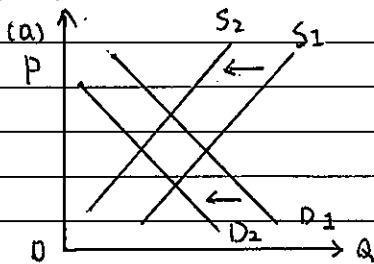
- (b) Use the aggregate demand-aggregate supply (AD-AS) model to evaluate both the short run and the long run effects on an economy when the following incidents occur. Analyze each incident separately and begin your analysis with the long run equilibrium.
- (i) The central bank sells government bonds in the open market (4 marks)
- (ii) A strong earthquake destroy many production facilities permanently in the economy (4 marks)
- (c) Consider Singapore dollar (S\$) as the domestic currency and Thai Baht (Bht) as the foreign currency and define exchange rate (e) as the number of Thai Baht for one Singapore dollar (Bht/S\$). Explain with a suitable diagram the effect on the exchange rate when the following incidents occur. Analyze each incident separately.
- (i) A recession occurs in Singapore. (3 marks)
- (ii) The Bank of Thailand, Thailand central bank, decides to reduce the reserve-deposit ratio in Thailand. (3 marks)
- (d) How will the reduction of corporate tax rate (tax on profits) and the offering of tax concessions to foreign companies affect the interest rate, savings and investment in an open economy? Explain with the aid of a suitable diagram. (6 marks)

- END OF PAPER-

Nov/Dec 2016

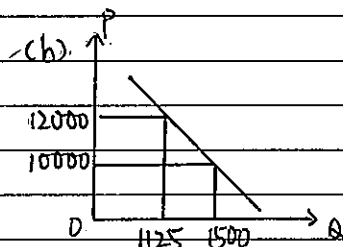
HE9091 - Principles of Economics.

Question One



• Cease of operations will lead to the decrease in supply of private education. Supply curve switches to the left.
 • Restriction to work will reduce the demand for private education (foreign students). Demand curve shifts to the left.

• The equilibrium quantity will definitely decrease, but the change of price depends on the magnitude of change in supply and demand. The price will increase, decrease or remain the same.



• Mid-point formula: $\frac{\Delta Q}{\frac{1}{2}(Q_1+Q_2)} \div \frac{\Delta P}{\frac{1}{2}(P_1+P_2)}$

$$\epsilon = \frac{375}{\frac{1}{2}(1125+1500)} \div \frac{-2000}{\frac{1}{2}(12000+10000)}$$

$$= -1.57$$

• When ϵ is higher than 1, the seller should lower price till ϵ equals 1, where $P \times Q$ is maximized.

• The demand for Toyota car is more elastic than the cars in general since a particular brand of car has more substitute than cars in general.

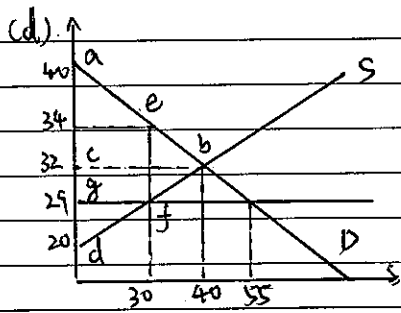
(c). Using rational spending rule, the optimal consumption satisfies the condition: ① $MU_A/P_A = MU_B/P_B = MU_C/P_C$;

② The budget of \$24 are all used.

A#	MU _A	MU _A /P _A	B#	MU _B	MU _B /P _B	C#	MU _C	MU _C /P _C
1	50	25	1	75	25	1	25	25
2	40	20	2	60	20	2	20	20
3	30	15	3	40	13.33	3	15	15
4	20	10	4	30	10	4	10	10
5	15	7.5	5	20	6.67	5	7.5	7.5

- When $MU_A/P_A = MU_B/P_B = MU_C/P_C$, 1°: 1A, 1B, 1C, cost \$6
 2°: 2A, 2B, 2C, cost \$12
 3°: 4A, 4B, 4C, cost \$24

So, the optimal consumption combination is 4A, 4B and 4C.



Solving for equilibrium, we can have:

$$40 - 0.2Q = 20 + 0.3Q$$

$$P = 32, Q = 40$$

The consumer surplus is area 'abc':

$$\frac{1}{2} (40 - 32) \times 40 = 160$$

The producer surplus is area 'bcd':

$$\frac{1}{2} \times (32 - 20) \times 40 = 240$$

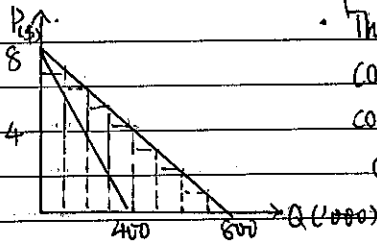
When $P = \$29$, Q_S (at f) = $\frac{29 - 20}{0.3} = 30$

Q_D (at e) = $\frac{29 - 40}{-0.2} = 34$

Deadweight loss is area 'ebf', $\frac{1}{2} \times (34 - 29) \times (40 - 30) = 25$

Question 2:

(a) (i)



The bridge costs nothing to maintain means marginal cost equals \$0. According to the diagram, the company should charge \$4 and number of crossing is 400,000.

Since marginal cost = \$0, charging will lead to socially inefficiency.

Suppose this company built the bridge. Total revenue = $4 \times 400,000 = 1,600,000 < 2,000,000$. Therefore, The company should not build the bridge.

(ii) To achieve social efficiency, \$0 should be charged.

The economic surplus = consumer surplus = $(7+6+5+4+3+2+1) \times 100 = 280,000 > 200,000$

Since $280,000 > 200,000$, the government should build the bridge.

(b) Suppose Asia moved first.

If Asia charge low tariff, Europe will charge high tariff ($30 > 25$)

If Asia charge high tariff, Europe will charge high tariff ($20 > 10$)

The dominant strategy for Europe is charging high tariff.

Suppose Europe moved first:



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Nov/Dec 2016 (Continued)

If Europe charge low tariff, Asia will charge high tariff ($30 > 25$)

If Europe charge high tariff, Asia will charge high tariff ($20 > 10$)

The dominant strategy for Asia is changing high tariff.

The final outcome is both Asia and Europe will charge high tariff, where the payoffs are smaller than 'both low tariff'. Therefore, the prisoner's dilemma applies here.

(c) Accounting profit (a year) = $5000 \times 10 - 24000 - 2000 - 8000 - 1000 = 15000$

economic profit (a year) = $15000 - (3000 + 500) \times 12 = -27000$

The economic profit is -27000 , which means he will earn less if he quitted his job and produced shoes. He should not quit his job to sell shoes.

(d) I do not agree.

Suppose Mr Tan could earn A and Mr Lim could earn B.

If $A > B$, Mr Tan can negotiate with Mr Lim and pay him some amount of money, which is higher than B (equaled to B) but lower than A. In this case, both Mr Tan and Mr Lim will make profit and the economy outcome is A. Economy efficiency requires Mr Lim to tolerate Mr Tan and noise is legal.

Question 3:

(a) (i) False. The profit he made is just the transfer of asset. The value of the house had been added to GDP in the year when construction was completed.

(ii) False. $\frac{Y}{pop} = \frac{Y}{N} \times \frac{N}{pop}$. $\frac{Y}{pop}$ refers to the output per person and $\frac{Y}{N}$ refers to labor productivity. It's possible that $\frac{Y}{pop}$ decreases when $\frac{Y}{N}$ increases but $\frac{N}{pop}$, which is the proportion of people employed, decreases in a larger magnitude.

(iii) False. With deflation, price decreases and nominal GDP is lower than real GDP. In condition of inflation, nominal GDP is higher than real GDP.

(b) The cost of basket in base year 2014 is:

$$50 \times 7 + 54 \times 1.5 + 1 \times 800 + 12 \times 3.5 = \$1273$$

The cost of the same basket in 2015 is:

$$50 \times 9.5 + 54 \times 2 + 1 \times 900 + 12 \times 4.8 = \$1540.6$$

$$\text{CPI is } 1540.6 \div 1273 = 1.2102$$

The inflation rate is 21.02%

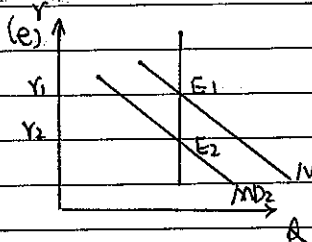
- CPI tends to overstate actual price increases due to substitution bias and quality adjustment bias that may occur.

$$\text{(c) Participation rate} = \frac{(190000 + 100000 + 80000)}{(190000 + 100000 + 80000 + 100000 + 200000)} \times 100\% = 94.55\%$$

$$\text{Unemployment rate} = \frac{80000}{(190000 + 80000 + 100000)} = 3.85\%$$

- Help the unemployed to obtain some skills and enhance education;
- Lower the minimum wage;
- Provide less unemployment insurance.

(d). In the first round, commercial bank will keep 18% of \$200000 = \$36000 as required reserves and lend out the balance \$164000. Without cash leakage, the \$164000 will return to the bank as deposits. In the second round, the bank will keep 18% of \$(200000 + 164000) = \$364000, which is \$65200, as required reserve and lend out the balance \$134480. In the end, when the \$200000 are all reserved, the total deposit become: $\$200000 \div 18\% = \1111111



The availability of ATMs reduces the need to hold money for transactions. Hence money demand decreases and MD curve shifts to the left. With lower interest rate, firms will increase investment and increase the long term growth of a country.



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NOV/DEC 2016 (continued)

Question 4.

$$(a) \cdot Y = C + I + G + NX$$

$$= 1000 + 0.75 \times (Y - 1000) + 2500 + 5500 + 0$$

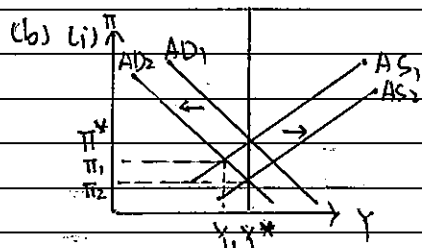
$$Y = 33000$$

• The short run equilibrium real GDP Y is 33000. Since $33000 > 28000$, there is an expansionary gap.

$$\cdot 28000 = 1000 + 0.75 \times (28000 - T_2) + 2500 + 5500$$

$$T_2 = 2666.7$$

$$\Delta T = T_2 - T_1 = 1666.7$$



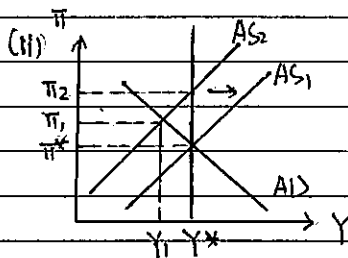
Long run: The equilibrium is initially at Y^* and π^*

Short run: When central bank sells bonds, money supply decreases. This will lead to the increase in interest rate and decrease of spending.

The AD curve shifts to the left and the

short run equilibrium is at (Y_1, π_1)

In the long run, since the expected interest rate π is higher than actual interest rate π_1 , both π_1 and π^* will decrease. The AS curve will shift to the right and new equilibrium is established at (Y^*, π_2) where π_2 is lower than initial π^* .

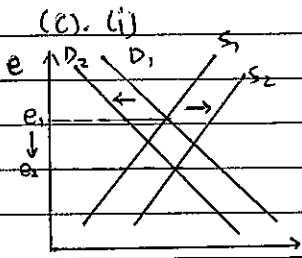


Long run: The equilibrium is initially at Y^* and π^* .

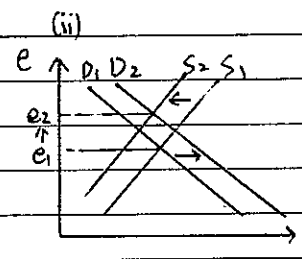
Short run: The supply will decrease due to the destruction. The AS_1 curve will shift to the left, where a short run equilibrium occurs

at (Y_1, π_1) .

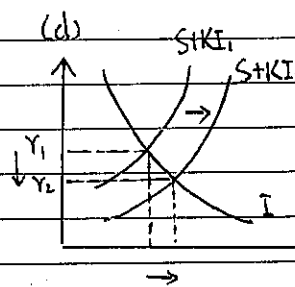
In the long run, since the new expected inflation rate π_2 is higher than actual inflation rate π_1 , both π_1 and π_2 will decrease and AS_2 curve will shift to the right. The long-run equilibrium is the same as the initial one.



When a recession occurs, spending levels drops, thus interest rate becomes lower. Assets in Singapore is less attractive thus demands for Singapore dollar decrease while supply increase. The demand curve shifts to the left and supply curve shifts to the right. The exchange rate will decrease.



If the reserve-deposit ratio in Thailand is reduced, money supply in Thailand will increase and interest rate will decrease. Assets in Thailand becomes less attractive and supply of Singapore dollar decreases, while demand increases. The supply curve shifts to the left and demand curve shifts to the right. This will increase the exchange rate.



Reduction of corporate tax will increase inflows, which is ICI. The 'S+KI' curve will shift to the right, leading to the decrease of interest rate and increase of saving and investment

End Of Solutions.



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November/December 2017

Time Allowed: 2½ hours

INSTRUCTIONS

- 1 This paper contains **FOUR(4)** questions and comprises **SEVEN(7)** pages.
- 2 Answer **ALL FOUR(4)** questions.
- 3 This is a **CLOSED-BOOK** examination.
- 4 All questions carry equal marks.
- 5 Begin your answer to each question on a **SEPARATE** page of the answer book.

Question 1 [25 marks]

$$0.2Q = 140$$

$$Q = 700$$

- (a) The demand equation for mobile phone is $P = 150 - 0.1Q$ while the supply equation for mobile phone is $P = 10 + 0.1Q$, where P is the market price and Q is the market quantity.
- (i) Solve for the equilibrium price and quantity of mobile phone. (2 marks)
 - (ii) Compute the price elasticity of demand for mobile phone when the price increases from \$60 to \$70 using the mid-point method. At this price range, what should the sellers of mobile phone do to increase revenue? (3 marks)
 - (iii) If a tax of \$20 per mobile phone is imposed on sellers of mobile phone, determine the new equilibrium price and quantity in the mobile phone market after the tax. Support your answers with a suitable diagram. (4 marks)
 - (iv) Compute the tax revenue, the consumer surplus, the producer surplus and also the deadweight loss after the tax is imposed. (4 marks)

Note: Question 1 continues on page 2

$$60 \times 300$$

1

$$20 \times 1000$$

Question 2 [25 marks]

- (a) Hendry is a “super tutor” in Economics who has the reputation of all his students scored A in Economics in the GCE “A” level examination. He is heavily sought after and there are 9 students interested to engage him as the Economics tutor on a daily basis. His costs incurred are the rental cost of a tuition room which is \$50 per day and his time and effort, which is assumed to be worth \$60 to teach each student. The reservation prices of the 9 students are shown in the table below:

Student	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th
Reservation Price (\$)	120	110	100	90	80	70	60	50	40

- (i) If Hendry has to charge a single price to each student, how many students should he teach per day? Determine his profit, the producer surplus and the consumer surplus.



(60 + 50 + 40 + 30)

(4 marks)

- (ii) If Hendry wishes to maximize economic surplus, how many students should he teach per day? Determine his profit, the producer surplus and the consumer surplus.

(4 marks)

- (iii) If Hendry knows the reservation price of all his students, how many students should he teach per day? Determine his profit, the producer surplus and the consumer surplus.

(4 marks)

- (b) Consider the market for fire extinguishers. For homeowners in housing flats that own fire extinguishers, what type of externality occurs? Draw a market diagram for fire extinguishers and explain why the market equilibrium quantity and social optimal quantity differs.

(5 marks)

Note: Question 2 continues on page 4

Question 1 (Continued)

- (b) The sale of chicken products in an economy decreases due to bird flu. The government would like to take action to increase the consumption of chicken. There are two options. One is to provide subsidy to chicken farmer and the other is to try to influence consumer tastes through an advertising campaign. Given that the demand for chicken is relatively price inelastic and the supply of chicken is relatively price elastic, which option is more effective in increasing the consumption of chicken? Justify your answers with a relevant chicken market diagram.

(6 marks)

- (c) Assume that the car battery market is perfectly competitive with many firms selling identical batteries. John is one of the firms in the market with fixed cost \$30 and marginal cost as shown in the table below:

Quantity	MC (\$)
1	1
2	2
3	3
4	4
5	12
6	24

- (i) If the market price of a car battery is \$15, what is the optimal quantity that John's company will produce? At this quantity, compute the profit or loss for John.

(3 marks)

- (ii) In the long run, what can you comment on the market price of car battery, John's output and his profit or loss?

(3 marks)

QUESTION 2 (20 marks)

- (a) A self-sufficient economy called Delta produces three types of products, rice, meat and vegetables. The table below shows the prices and quantities of the three products in 2014, 2015 and 2016.

Product	2014		2015		2016	
	Price	Quantity	Price	Quantity	Price	Quantity
Rice	\$4	500	\$5	550	\$7	600
Meat	\$3	400	\$5	420	\$6	450
Vegetables	\$5	200	\$6	250	\$8	280

- (i) Calculate the nominal GDP and the real GDP for Delta in 2014, 2015 and 2016, taking 2014 as the base year. (3 marks)
- (ii) Compute the nominal GDP and the real GDP growth rate for Delta in 2015 and 2016. Which of the growth rate better represents the well-being of the people in Delta? Explain. (3 marks)

- (b) The table below shows the consumption pattern of a typical household in Delta in 2014, 2015 and 2016.

Product	2014		2015		2016	
	Price	Quantity	Price	Quantity	Price	Quantity
Rice	\$4	6	\$5	5	\$7	5
Meat	\$3	5	\$5	3	\$6	3
Vegetables	\$5	5	\$6	4	\$8	3

82
42 + 30 + 40
112

- (i) Using 2014 as the base year, compute the CPI for 2015 and 2016. Use the CPI to compute the inflation rate in 2015 and 2016. (2 marks)
- (ii) What is a possible problem when workers used CPI as the basis to negotiate for wage increase to counter higher cost of living? (3 marks)

- (c) Consider an economy Alpha with 2000 people of whom 240 of them are below the working age of 16 years. There are 1160 full time workers, 200 part-time workers, 160 housewives, 120 full time students, 40 retirees, 60 actively searching for jobs and the rest are discouraged workers. Calculate the labour force participation rate and the unemployment rate. (5 marks)

Note: Question 3 continues on page 6

Question 2 (continued)

- (c) Four students Aaron, Bob, Charles and Donny share a hostel room in NTU. They plan to spend the weekend in their hostel room watching DVDs. Their willingness to pay for each DVD is shown in the table below:

	Aaron	Bob	Charles	Donny
First DVD	\$7	\$5	\$3	\$2
Second DVD	\$6	\$4	\$2	\$1
Third DVD	\$5	\$3	\$1	\$0
Fourth DVD	\$4	\$2	\$0	\$0
Fifth DVD	\$3	\$1	\$0	\$0

- (i) From your understanding of private good, collective good, common good and public good, within the hostel room how would you classify the showing of a DVD? Justify your answers. (2 marks)
- (ii) If it costs \$8 to rent a DVD, how many DVD should the roommates rent to maximize total surplus? (2 marks)
- (iii) By splitting the cost of renting the DVD equally among the 4 roommates, how much surplus does each person obtain from watching the DVDs? (4 marks)

Question 4 [25 Marks]

(a) Consider a three-sector economy that consists of households, firms and the government.

- (i) Use the Keynesian Cross model to analyze diagrammatically the effect of an increase in government spending. (3 marks)
- (ii) How will your answer be affected if there is crowding out effect in the economy? Illustrate the effect using the Keynesian Cross model diagram (2 marks)

(b) Consider the following open economy:

$$C = 3,500 + 0.9(Y-T) - 1,600i, \quad I = 5,500 - 800i$$

$$G = 4,600 \quad X = 6,500 \quad M = 7,800 \quad T = 1,200 \quad Y_p = 12,000$$

Handwritten notes:
 $Y = 12180 + 0.9Y - 1080$
 $0.1Y =$

where C = Consumption, Y = Income, i = Nominal interest rate, I = Investment, G = Government spending, X = Export, M = Import, T = Lump sum taxes and Y_p = Potential output.

- (i) Given that the nominal interest rate $i = 0.05$, find the short run equilibrium output of the economy. What type of output gap occurs in the economy? Explain. (4 marks)
- (ii) If the government intends to close the output gap using government spending, by how much should the government spending change? (2 marks)
- (iii) If the government intends to close the output gap using lump sum taxes, by how much should the taxes change? (2 marks)

Handwritten calculation:
 $\frac{0.9}{0.1} \times 9$

(c) Consider a small open economy Beta which imports oil for its own consumption and also production. Recently oil price has increased due to instability in the major oil producing economies. Assume this increase in oil price will not affect the potential output of Beta.

- (i) Using the aggregate demand and aggregate supply (AD-AS) framework, explain the short run and the long run effects on the inflation rate and the real GDP of Beta with the oil price increases. (4 marks)
- (ii) How will your answer be different from (i) if the central bank is always prepared to implement monetary policy to maintain full employment in the economy? Is it a better outcome for the central bank to intervene? (4 marks)

(d) During the Asian currency crisis in 1998, many Asian investors consider Singapore assets as the safe haven and are keen to acquire Singapore assets. How will this affect the interest rate and investment in Singapore? Explain with a suitable saving-investment diagram. (4 marks)

END OF PAPER

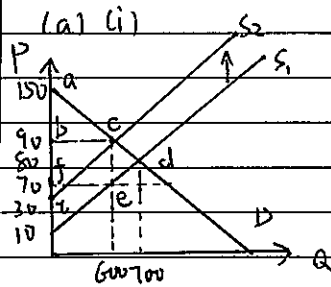
Question 3 (Continued)

- (d) Consider a small economy Gamma with currency dollars (\$). The central bank decides to print \$10,000 and distribute to the residents of Gamma. There is only one commercial bank in the economy and the central bank sets the required reserve ratio to be 8% . Assume that the commercial bank did not keep excess reserves. The residents of Gamma pay for all transactions using cheque and did not keep cash with them.
- (i) Explain the first three rounds of the money creation process when the \$10,000 are deposited into the commercial bank. Compute the money multiplier and determine the total amount of deposits eventually in the commercial bank. (5 marks)
- (ii) When the central bank decreases the required reserve ratio, how would it affect money supply and the interest rate? Explain with a money market diagram. (4 marks)

Nov / Dec 2017

HE9091 - Principles of Economics

Question 1.



At equilibrium:

$$150 - 0.1Q = 10 + 0.1Q$$

$$Q = 700, P = 80$$

(ii) When $P = \$60, Q = 900$

$$P = \$70, Q = 800$$

$$\text{Price elasticity: } \frac{(800-900)/850}{(70-60)/65} = -0.76$$

Since $|E| = 0.76 < 1$, demand is still inelastic. Therefore, the sellers should increase the price to increase total revenue.

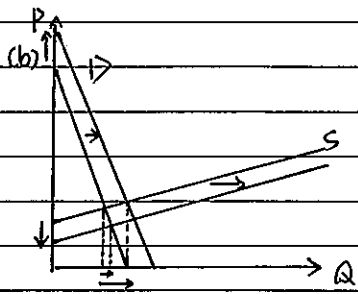
(iii) If a tax of \$20 is imposed on sellers, the sellers will increase price, thus the supply curve will shift upwards. The new supply curve becomes $S_2: P = 30 + 0.1Q$. At new equilibrium, $30 + 0.1Q = 150 - 0.1Q, Q = 600, P = \90 .

(iv) The consumer surplus is area 'abc': $(150-90) \times 600 \times \frac{1}{2} = 18000$

The producer surplus is area 'bcd': $(90-30) \times 600 \times \frac{1}{2} = 18000$

The tax revenue is area 'bcdf': $(90-70) \times 600 = 12000$

The deadweight loss is: $(90-70) \times (700-600) \times \frac{1}{2} = 10000$



Since the demand for chicken is relatively price inelastic and the supply of chicken is relatively price elastic, the slope is big for demand curve and small for supply curve. Assume that the supply curve and demand curve shift by the same magnitude. It's clear from the diagram

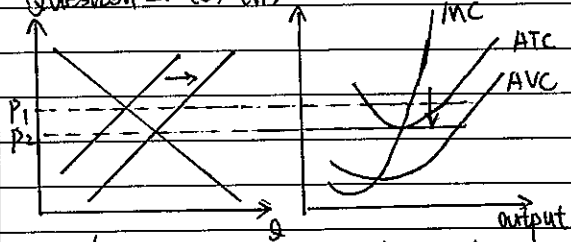
that the change in Q for D curve is larger than that for S curve.

Therefore, an advertising campaign is more effective!

(c) (i) John's company will produce until $MC = P$. In this case, 5 is the optimal quantity. Total revenue = $15 \times 5 = \$75$

$$\text{Profit} = 75 - 30 - (1+2+3+4+12) = \$23$$

Question 1. (c) (ii)



Since John's company is still making economic profit, the market will attract more resources and companies. The supply curve will shift to the right and equilibrium price will decrease as a result. The price will decrease until MC equals ATC. John's output will also decrease and he will earn zero economic profit in the long run.

Question 2.

(a) (i) Student	1	2	3	4	5	6	7
revenue	120	220	300	360	400	420	420
Marginal revenue	120	100	80	60	40	20	0

He should increase the number of students until $MR = MC$.

Therefore, in this case, he should teach 4 students per day.

His profit: $360 - 4 \times 60 - 50 = \70

producer surplus: $(90 - 60) \times 4 = \$120$

consumer surplus: $120 + 110 + 100 + 90 - 4 \times 90 = \60

(ii) To maximize economic surplus, which equals 'consumer surplus + producer surplus', Henry should teach 7 students, where $MC = 60 = P$.

His profit: $420 - 420 - 50 = -\$50$

producer surplus: 0

consumer surplus: $(120 + 110 + \dots + 60) - 7 \times 60 = \210

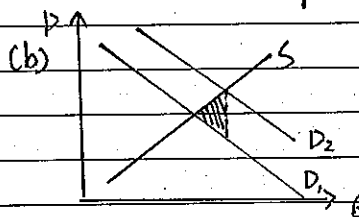
(iii) In this case, he can charge different student different price.

He should teach 7 students and charge them from \$120 to \$60.

His profit: $(120 + 110 + \dots + 60) - 7 \times 60 - 50 = \160

producer surplus: $120 + 110 + \dots + 60 - 7 \times 60 = \210

consumer surplus: 0



(b) Since other people who didn't pay for the extinguishers can benefit from them, positive externality occurs. The actual benefit received by all people, which is at social optimal, is higher than that



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NOV/DEC 2017

Question 2. (b)

received by consumers, which is at the equilibrium point. More extinguishers should have been consumed to have the same effect. Therefore, market equilibrium quantity and social optimal quantity differs.

(c)(i) The showing of a DVD can be shared by many people and its availability does not diminish, so it is a public good.

(ii) Number of DVD	1	2	3	4	5
MR	17	13	9	6	4

They should rent DVD until $MR=MC$. In this case, they should rent 3 DVDs to maximize total surplus.

(iii) Aaron: $7+6+5 - 3 \times (8/2) = \12

Bob: $5+4+3 - 3 \times (8/2) = \6

Charles: $3+2+1 - 3 \times (8/2) = \0

Donny: $2+1 - 3 \times (8/2) = -\3

Question 3

(a) (i) Nominal GDP: 2014: $4 \times 500 + 3 \times 400 + 5 \times 200 = \4200

2015: $5 \times 550 + 5 \times 420 + 6 \times 250 = \6350

2016: $7 \times 600 + 6 \times 450 + 8 \times 280 = \9140

Real GDP: 2014: $4 \times 500 + 3 \times 400 + 5 \times 200 = \4200

2015: $4 \times 550 + 3 \times 420 + 5 \times 250 = \4710

2016: $4 \times 600 + 3 \times 450 + 5 \times 280 = \5150

(ii) Nominal GDP growth rate: 2014-2015: $(6350-4200)/4200 \times 100\% = 51.19\%$

2015-2016: $(9140-6350)/6350 \times 100\% = 43.94\%$

Real GDP growth rate: 2014-2015: $(4710-4200)/4200 \times 100\% = 12.14\%$

2015-2016: $(5150-4710)/4710 \times 100\% = 9.34\%$

Real GDP represents the well-being of people better. Nominal GDP is the current dollar value of production, which also includes inflation or deflation. Real GDP take the price from the base year and is measuring the physical volume of production, which can represent people's well-being.

Question 3. (b) (i)

CPI for 2015: $(5 \times 6 + 5 \times 5 + 6 \times 5 - 4 \times 6 - 3 \times 5 - 5 \times 5) / (4 \times 6 + 3 \times 5 + 5 \times 5) \times 100\% = 32.81\%$

2016: $(7 \times 6 + 6 \times 5 + 8 \times 5 - 64) / 64 \times 100\% = 75\%$

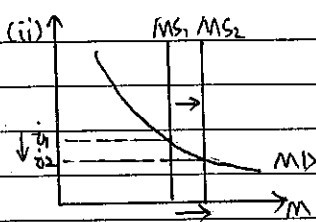
Inflation rate: $(75\% - 32.81\%) / 32.81\% = 128.59\%$

(ii) Due to quality adjustment, bias and substitution bias, CPI does not measure the real increase in the cost of the same basket of goods. Therefore, CPI actually should not be the increase in workers' salary.

(c) Participation rate = $(1160 + 60 + 200) / (2000 - 240) \times 100\% = 80.68\%$

unemployment rate = $60 / (1160 + 60 + 200) \times 100\% = 4.23\%$

(d). (i) In the first round, commercial bank will keep 8% of \$10000, which is \$800, as required reserves and lend out the balance \$9200. Without cash leakage, the \$9200 will return to the bank as deposits. In the second round, the bank will keep 8% of \$9200 and lend out the balance \$8464. Then the \$8464 will return to the bank. In the third round, the bank will keep 8% of $(\$9200 + \$8464) = \$27664$ and lend out the balance \$786.88.



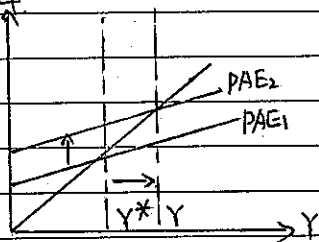
When the central bank decreases the required reserve ratio, due to formula:

$$\text{Money supply} = \frac{\text{Currency} + \text{Bank reserves}}{\text{Reserve ratio}}$$

money supply will increase. MS curve will shift to the right and the interest rate will decrease.

Question 4

(a) (i)



If government increases spending, the PAE, which equals 'C + IP + G + NX' will increase. The PAE line will shift upwards and expansionary gap will occur.

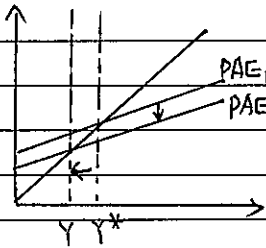


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Nov/Dec 2017

Question 4. (a) (ii)



Crowd out effect suggests that when government increases spending, the interest rate will increase and private spending and investment will decrease. A high magnitude of crowd out effect will lead to the decrease in total spending, which is PAE. Therefore, a recessionary gap will occur.

(b) (Assume that the numbers in the question are correct.)

(i) $Y = PAE = C + G + IP + NX$
 $= 3500 + 0.9(Y - 1200) - 1600 \times 0.05 + 5500 - 800 \times 0.05 + 4600 + 6500 - 7800$
 $Y = 111000 > Y_p = 12000$

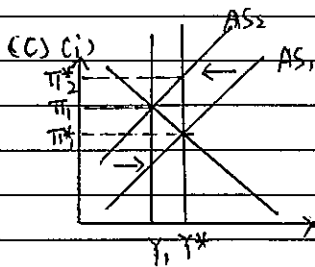
Therefore, there is an expansionary gap.

(ii) $Y = 12000 = 3500 + 0.9(12000 - T) - 1600 \times 0.05 + 5500 - 800 \times 0.05 + G + 6500 - 7800$
 $G = -5300, \Delta G = -9900$

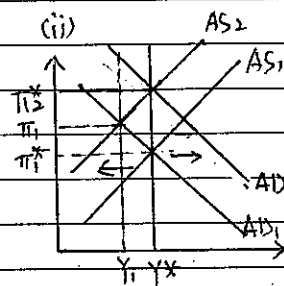
In this case, even though the government does not spend, the expansionary gap cannot be closed.

(iii) $12000 = 3500 + 0.9(12000 - T) - 1600 \times 0.05 + 5500 - 800 \times 0.05 + 4600 + 6500 - 7800$
 $T = 12200, \Delta T = 11000$

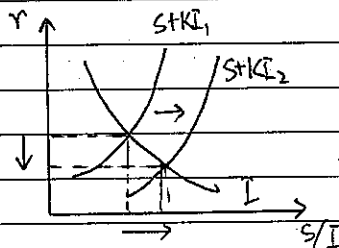
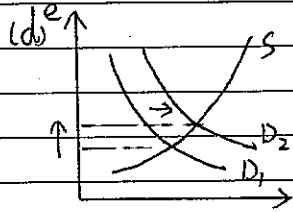
Therefore, the government should increase tax by 11000.



(c) (i) The increase in oil price will lead to an adverse inflation shock, which means the aggregate supply curve will shift to the left. The short run equilibrium is established at (Y_1, π_1) . In the long run, since the new expected inflation rate π_2^* is higher than the actual one: π_1 , both actual and expected inflation rate will decrease until π equals π^* . It means that the AS curve will shift back to the origin position and the origin equilibrium is at (Y^*, π^*) .



The short run equilibrium is the same as that in question (c)(i), which is established at (Y_1, π_1) . However, in this case, the central bank will increase money supply to reduce interest rate, so that the spending will increase and the AD curve will shift to the right. In the long run, the recessionary gap is closed, but the expected inflation rate increases to π_2^* . The equilibrium is at (Y^*, π_2^*) .



In this case, Singapore assets become more attractive, leading to the increase in demand. D curve will shift to the right and lead to the increase in exchange rate, which is appreciation. With appreciation, the purchase power of SGD will increase, so there will be more import and less export. As a result, inflows, which is represented by KI, will increase. According to SI diagram, 'S+KI' curve will shift to the right. The interest rate will decrease and the investment level will increase.

End Of Solutions.



DISCLAIMER: The solutions are done by students who scored A or above in this subject. MAE Club and Campus supplies are not liable or responsible for any errors in the contents of these solutions. Students are advised to take the solutions as a guide rather than absolute answers to exam paper.

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