

**ECO3152B: MACROECONOMIC THEORY III
FINAL EXAM**

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**12 December 2011
14:00 – 17:00**

TBT 333

1. The exam is marked out of **130 points**.
2. The exam consists of two parts. You are required to answer:
 - a. **Thirty three** multiple-choice questions in part A (**50 points total**).
 - b. **Five** questions in part B (**80 points total**).
3. Answer the multiple choice questions on the Scantron answer sheet. Answer all other questions in the exam booklets.
4. Make sure to indicate your student number on the answer booklets and on the Scantron answer sheet.
5. The use of books, notes, mathematical tables or other study aides is **not** allowed. You **can** use a calculator. However, you must not have in your possession cameras, radios, tape recorders, pagers, cellular phones or any other communication devices.
6. Budget your time wisely!

	MC	B1	B2	B3	B4	B5	Total grade	Grade in %
Student's grade								
Maximum possible	50	20	20	10	20	10	150	100

GOOD LUCK!!!

PART A: MULTIPLE CHOICE.

Choose the one alternative that best completes the statement or answers the question. Write your answer on the scantron answer sheet. Each question carries an equal weight, with the total of 50 points allocated to this section.

- 1) Which of the following topics is a primary concern of macro economists? 1) _____
- A) relative wages of skilled and unskilled workers
 - B) choices of individual consumers and firms
 - C) standards of living of individuals
 - D) short-run growth models
 - E) fluctuations in the level of aggregate economic activity
- 2) Why is forecasting GDP in the long run so difficult? 2) _____
- A) there is an absence of data that provides any information on future trends
 - B) structural and statistical forecasting provide differing results
 - C) there is no regularity in the frequency and amplitude of fluctuations in real GDP
 - D) there is no expertise in forecasting the long run trend in real GDP
 - E) current models are not sophisticated enough to conduct this exercise
- 3) Comovement relates to 3) _____
- A) the movement of business cycles over time.
 - B) the frequency of the business cycles.
 - C) the relationship between real and nominal interest rates.
 - D) the movement between price levels and real GDP over time.
 - E) macroeconomic variables fluctuating together in patterns that exhibit strong regularities.
- 4) The principle that consumers and firms optimize 4) _____
- A) is helpful because it allows us to analyze how economic agents respond to changes in their environment.
 - B) only applies to perfectly competitive markets.
 - C) is explained by their work-leisure choices.
 - D) is helpful because it determines the available technology.
 - E) is not helpful because some economic agents may behave irrationally.
- 5) We assume that the representative consumer's preferences exhibit the properties that 5) _____
- A) the consumer likes diversity and that more is sometimes preferred to less.
 - B) more is sometimes preferred to less and that consumption and leisure are both normal goods.
 - C) more is preferred to less and that the consumer prefers diversity.
 - D) they evolve over time and that more is always preferred to less.
 - E) less consumption is preferred to more leisure and that consumption and leisure are both normal goods.

- 6) The marginal rate of substitution is defined as 6) _____
- A) the amount of good Y that a consumer is willing to substitute for good X and stay at a given level of satisfaction.
 - B) the convexity of the indifference curve.
 - C) the amount of good Y substituted for good X by a consumer.
 - D) the feasible rate of substitution given prices.
 - E) the slope of the utility function.
- 7) A lump-sum tax is a tax that 7) _____
- A) does not depend on the actions of the economic agent being taxed.
 - B) does not depend on the actions of the government.
 - C) depends on the quantity of taxable goods consumers purchase.
 - D) distorts economic decisions.
 - E) can be avoided by strategic behaviour.
- 8) A defense for the assumption that consumers maximize is that 8) _____
- A) consumers never make mistakes.
 - B) mistaken consumers may receive counseling from the government.
 - C) it allows for many possible outcomes.
 - D) mistakes by the consumer are not likely to last for a long time.
 - E) mistakes by consumers only last for two periods.
- 9) An increase in the real wage 9) _____
- A) represents a pure income effect.
 - B) leads to no change in labour supply.
 - C) causes a parallel shift in the consumer's budget line.
 - D) .represents a combination of income and substitution effects.
 - E) represents a pure substitution effect.
- 10) Constant returns to scale means that, given any constant $x > 0$ 10) _____
- A) $xY = Z^x F(K, N^d)$.
 - B) $xY = zF(xK, xN^d)$.
 - C) $xY = xzF(xF, xN^d)$.
 - D) $xY > zF(xK, xN^d)$.
 - E) $xY < zF(xK, xN^d)$.
- 11) As the quantity of capital increases, the marginal product of labour 11) _____
- A) is constant.
 - B) increases.
 - C) decreases.
 - D) may either increase or decrease.
 - E) gets more expensive.

- 12) Fiscal policy refers to a government's choices over its 12) _____
A) expenditures, taxes, transfers, and borrowing.
B) changing the money supply, defense, and borrowing.
C) issuance of money, taxes, environmental regulations, and foreign affairs.
D) expenditures, taxes, issuance of money, and borrowing.
E) expenditures, foreign affairs, issuance of money, and borrowing.
- 13) Consumption smoothing refers to 13) _____
A) consumer's concerns about going heavily into debt.
B) the tendency of all consumers to choose the same amount of current consumption.
C) balance savings with consumption over time.
D) the tendency of consumers to seek a consumption path over time that is smoother than income.
E) the tendency of consumers to seek an income path over time that is smoother than consumption.
- 14) A one-period bond is a promise to repay 14) _____
A) r units of goods in the second period.
B) the original amount lent.
C) $\frac{1}{(1+r)}$ units of goods in the second period.
D) the real interest rate.
E) $(1+r)$ units of goods in the second period.
- 15) The Ricardian Equivalent Theorem implies that a change in the timing of taxes 15) _____
A) has no effect on consumption or the real interest rate.
B) affects consumption negatively and the real interest rate positively.
C) has a negative effect on both consumption and the real interest rate.
D) affects consumption positively and the real interest rate negatively.
E) has a positive effect on both consumption and the real interest rate.
- 16) According to Friedman, a primary determinant of a consumer's current consumption is 16) _____
A) current levels of GDP.
B) current employment.
C) rate of expected savings in the second period.
D) temporary income.
E) permanent income.

- 17) When there are credit market imperfections, an increase in government debt may be advantageous because it 17) _____
- A) eliminates the problems that cause credit market imperfections.
 - B) borrow at higher interest rates than consumers.
 - C) allows credit-constrained consumers to borrow more.
 - D) discourages credit-constrained consumers from borrowing too much.
 - E) encourages more private saving.
- 18) For the economy as a whole, investment represents a tradeoff between 18) _____
- A) savings and investment.
 - B) interest rates and taxes.
 - C) real interest rates and GDP.
 - D) present and future consumption.
 - E) government spending and issuing debt.
- 19) A consumer may increase his or her saving by 19) _____
- A) working fewer hours and consuming more goods in the present period.
 - B) working fewer hours and consuming fewer goods in the present period.
 - C) working more hours and paying less taxes in the present period.
 - D) working more hours and consuming fewer goods in the present period.
 - E) working more hours and consuming more goods in the present period.
- 20) The intertemporal substitution of leisure effect is used to justify the assumption that current labor supply increases when the 20) _____
- A) current real wage increases.
 - B) current real wage and real investment rate decreases.
 - C) real interest rate decreases.
 - D) current real wage decreases.
 - E) real interest rate increases.
- 21) Next period's capital is equal to current-period investment 21) _____
- A) minus the amount of current capital left over after depreciation.
 - B) plus the amount of current period depreciation.
 - C) minus the amount of current period depreciation.
 - D) plus the amount of current capital left over.
 - E) plus the amount of current capital left over after depreciation.
- 22) The marginal cost of investment for the firm is equal to 22) _____
- A) 1. B) $1/MP'_K$ C) $-MP'_K$ D) -1. E) MP'_K .

- 23) The marginal benefit from investment is 23) _____
- A) is what one unit of investment costs when funds are borrowed.
 - B) is related to economic activity and the real interest rate.
 - C) is what one unit of investment adds to the current capital stock.
 - D) the ratio of investment to expected future profits.
 - E) is what one unit of investment in the current period adds to the present value of profits.
- 24) When drawn against current income, the slope of the $C^d(r) + I^d(r) + G$ curve is equal to the 24) _____
 marginal
- A) propensity to consume.
 - B) product of capital.
 - C) benefit from investment.
 - D) product of labour.
 - E) propensity to save.
- 25) How many of the following business cycle facts can be explained if the primary cause of 25) _____
 business cycles is temporary changes in total factor productivity: procyclical consumption,
 procyclical investment, procyclical employment, and procyclical real wages?
- A) one B) two C) three D) four E) none
- 26) Neutrality of money refers to 26) _____
- A) a one-time change in the money supply has no real consequence for the economy.
 - B) a certain percentage change in the money supply has the same percentage change in economic activity.
 - C) money being a medium of exchange for everyone.
 - D) a one-time change in the money supply has a one-time change in economic activity.
 - E) a one-time change in the money supply affects consumption and investment decisions only.
- 27) Money is useful in exchange when 27) _____
- A) there is a single coincidence of wants.
 - B) there are several monetary aggregates.
 - C) inflation is rising.
 - D) credit transactions are difficult.
 - E) interest rates are high.
- 28) An open-market operation refers to 28) _____
- A) changing the money supply by changing taxes.
 - B) changing the money supply by changing government spending.
 - C) an exchange of domestic money for foreign money by the monetary authority.
 - D) seigniorage.
 - E) an exchange of money for interest-bearing debt by the monetary authority.

- 29) The Fisher relationship may be described by the following equation in which R is the nominal rate of interest, r is the real rate of interest, and i is the inflation rate. 29) _____
- A) $1 + i = \frac{1 + r}{1 + R}$
- B) $1 + r = \frac{1 + R}{1 + i}$
- C) $r = R + i + ir.$
- D) $i = r + R$
- E) $1 + r = \frac{1 + i}{1 + R}$
- 30) The behavior of the Solow residual suggests that when current total factor productivity increases 30) _____
- A) such increases are temporary, so we can draw no conclusions about the likely behavior of future total factor productivity.
- B) are typically temporary and have no influence on future levels of aggregate real GDP.
- C) future total factor productivity is also likely to increase.
- D) future total factor productivity is likely to decrease.
- E) it becomes more difficult to predict future total factor productivity.
- 31) An important critique of real business cycle theory is the belief that cyclical movements in total factor productivity 31) _____
- A) may, in part, be an artifact of measurement error.
- B) rarely occur.
- C) does not explain the overall fluctuations in the business cycle.
- D) are too small to account for the size of fluctuations in real GDP.
- E) lead to imperceptible changes in labour demand.
- 32) For the coordination failure model to work, it must be the case that the aggregate labour demand curve must be 32) _____
- A) upward sloping and steeper than the labour supply curve.
- B) downward sloping and steeper than the labour supply curve.
- C) upward sloping and flatter than the labour supply curve.
- D) downward sloping and the labour supply curve upward sloping.
- E) downward sloping and flatter than the labour supply curve.
- 33) In the coordination failure, the most likely explanation of business cycles are 33) _____
- A) money supply shocks.
- B) fluctuations between 'good' and 'bad' equilibria.
- C) government spending shocks.
- D) labour market shocks.
- E) total factor productivity shocks.

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PART B

Instructions. Answer **all** questions in part B.

1. (20 points) Competitive Equilibrium and Pareto Optimality

Consider a one-period closed economy. The representative consumer has preferences over consumption C and leisure l . The utility function is

$$u(C, l) = 2C^{0.5} + b \ln l,$$

where b is a positive constant. The consumer allocates the h available units of time between leisure and work, so that $N^s + l = h$ represents the consumer's time constraint. The consumer earns the wage w for every hour worked N^s , receives dividends π and pays lump-sum taxes T . *In addition*, the consumer pays a *consumption tax* τ per every unit of consumption good.

The representative firm produces output with the Cobb-Douglas technology

$$Y = zK^a (N^d)^{1-a}, \quad 0 < a < 1.$$

The government takes the level of public good provision G as exogenous. The government finances its purchases by lump-sum taxes and consumption taxes. Assume that the government must run a balanced budget.

- (a) (10 points) Define a competitive equilibrium for this economy. Be precise about the endogenous variables that characterize the equilibrium and about the exogenous variables of the model. State explicitly all conditions that define the competitive equilibrium and provide their economic interpretation.
 - (b) (10 points) Is the competitive equilibrium Pareto optimal? Explain your answer.
- ### 2. (20 points) Consumption-saving problem

Consider a consumption-saving problem of a consumer with the following preferences

$$U(c, c') = \ln c + \beta \ln c', \quad 0 < \beta \leq 1,$$

where c is the consumption in the current period, and c' is the consumption in the future period. The consumer receives exogenous endowments y and y' . The consumer can borrow and lend freely at the rate $r \geq 0$. There are no taxes.

- (a) (10 points) State the consumer's optimization problem. Find the optimal levels of consumption in the current and future periods as well as optimal saving, in terms of the life-time wealth we , the discount factor β and the interest rate r .

- (b) **(5 points)** Assume that $y = 200$, $y' = 132$, $\beta = 0.9$ and $r = 0.1$. Using the results from (1), determine the consumer's optimal consumption in two periods and optimal saving. Is the consumer a lender or a borrower? Explain. Show the optimal choice in a diagram with the consumer's budget constraint and indifference curves. Carefully indicate the endowment point and the optimal point. Label the axes and the vertical and horizontal intercepts.
- (c) **(5 points)** Consider an increase in the real interest rate to $r = 0.2$. What are the effects of an increase in the real interest rate on consumption in each period, and on savings? How does this depend on income and substitution effects for the given preferences? Illustrate your answer graphically.

3. (10 points) The macroeconomic effects of the 1998 ice storm in Eastern Canada.

"An unusually severe ice storm hit eastern Canada January 5-10, 1998.... This storm represented an important shock to the Canadian economy, with the damage to the aggregate capital stock being quite significant.... In spite of the widespread damage, there appear to have been no effects on aggregate economic activity. Aggregate output and employment seem not to have been affected."

Explain how the real intertemporal model with investment can help us understand the behaviour of the Canadian economy following the 1998 ice storm. In particular, link the predictions of this model to the empirical effects of the ice storm on output and employment. Illustrate your answer graphically. Be precise about the adjustment mechanisms of the model.

4. (20 points) Bank runs

A default of the Greek government on its debt and a fully fledged run on Greek banks were a real possibility in early November 2011, before the Greeks voted 'yes' in the referendum on the latest bailout.

- (a) **(10 points)** Use the monetary intertemporal model from Chapter 10 to evaluate the effects of bank runs on output, consumption, investment, employment, the real interest rate, the nominal interest rate and the price level.
- (b) **(10 points)** Suppose that the goal of the central bank is price stability; that is the central bank would like to keep the price level at a constant level. Suppose also that the central uses a nominal interest rate policy rule. How should the central respond to the run on private banks? Will the central bank be able to achieve its objective of the price stability? Explain with the aid of diagrams.

5. (10 points) Stabilization policy Compare the real business cycle model and the market segmentation models with respect to their implications for active stabilization policy. That is, explain whether or not the government should act to stabilize output in each model.