Department of Economics
Queen's University

ECON 222: Macroeconomic Theory I
Fall 2017

Sections: 001 and 002
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Final Exam
7 – 10 p.m. December 7, 2017

This exam is 3 hours long. Budget your time carefully. Hand calculators (Casio 991) are permitted for this exam. The exam consists of two sections with a total of 100 marks allocated:

Section A consists of multiple choice questions. You should answer all 25 of them. Each question is worth 1 mark for a total of 25 marks. A multiple choice answer card is provided for your answers. Please complete this answer card correctly using a soft lead HB pencil as described on the next page.

Section B consists of long questions. Do THREE (3) of the four questions. Each question is worth 25 marks for a total of 75 marks. Please read all the questions carefully. You are encouraged to draw diagrams to support your answers where appropriate. Please label the axis and lines or curves on your diagrams. Marks will be awarded on the basis of the logical arguments given to support your answers.

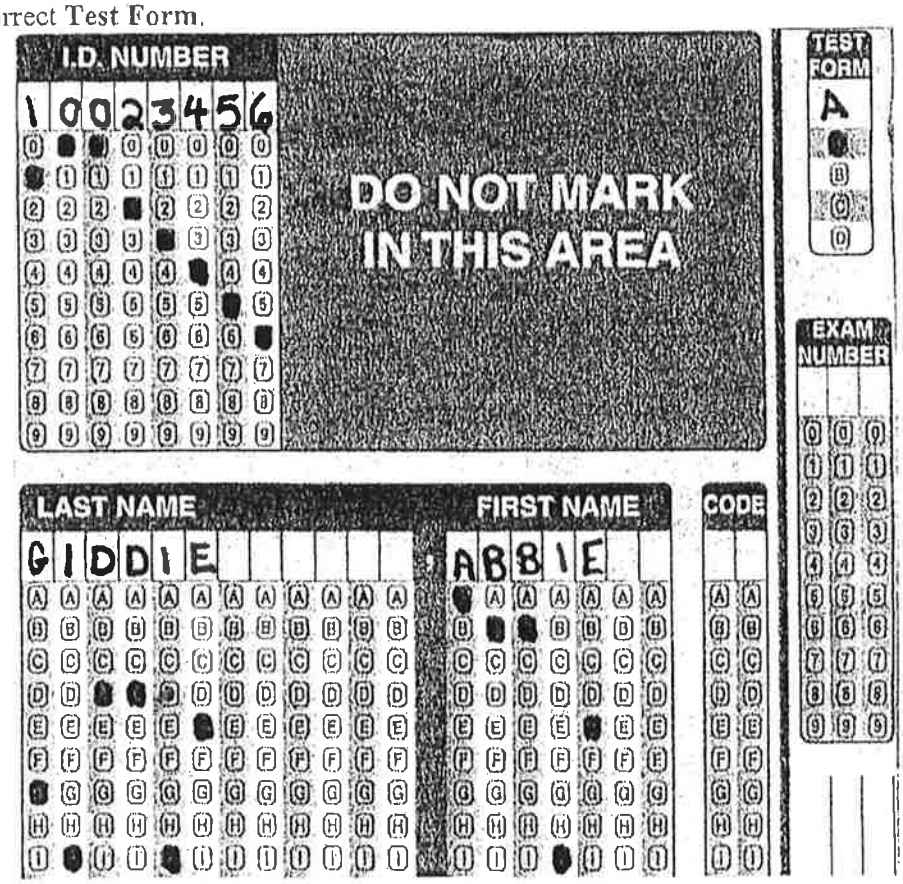
Please note: Proctors are unable to respond to queries about the interpretation of exam questions. Do your best to answer exam questions as written.

Upon completion of your exam, you MUST hand in the following three items:
The multiple choice card, completed correctly.
The answer booklet clearly labeled with your student number and class section
This exam question paper.

Multiple Choice Instructions. Multiple-choice answers on the answer sheet are marked by an optical scanner. It reads only what is in the rectangle. Fill it in completely and stay within its limits. **You must use a soft lead (e.g. "HB") pencil to fill in the Answer Sheet.** Remember, if you change your answer, COMPLETELY ERASE IT, and correct. For all questions there is only one best (correct) answer; if two or more choices are marked, the item will be graded incorrect.

Before you begin:

1. Write your Student # under **"ID Number"** on the Answer Sheet and fill in the appropriate rectangle below each number.. **See example below.**
2. Print your **Last Name** followed by first name in the appropriate space, and fill in the appropriate rectangle under each letter.
3. Under **"Test Form"**, fill in "A" as indicated at the top of this page *(see example below)*. Please ensure that you have entered the correct **Test Form**.



Section A (MULTIPLE CHOICE): Answer ALL of the following questions. Choose the one alternative that best completes the statement or answers the question.

1. Total factor productivity growth is that part of economic growth due to
(A) capital growth plus labour growth.
(B) capital growth less labour growth.
(C) capital growth times labour growth.
(D) neither capital growth nor labour growth.

2. In the basic Solow (neoclassical growth) model, if productivity does not grow
(A) output per worker will be constant.
(B) output will grow at the same rate as the population growth.
(C) consumption will be constant.
(D) both A and B are correct.

3. Steady-state investment per worker is positively related to the capital-labour ratio because the higher the capital-labour ratio
(A) the lower the capital depreciation rate.
(B) the greater the amount of resources available for capital investment.
(C) the more investment per worker is required to replace depreciating capital.
(D) the less the economy needs to equip new workers with the same high level of capital.

4. The Golden Rule of the capital stock is the level of capital stock that
(A) maximizes the output per worker in the steady state.
(B) maximizes the consumption per worker in the steady state.
(C) maximizes the investment per worker in the steady state.
(D) maximizes the saving per worker in the steady state.

5. The fact that countries' GDP per capita does not converge indicates that
(A) the neoclassical growth model fails to explain economic growth.
(B) the convergence takes a long time.
(C) the endogenous growth model can explain growth better than the neoclassical model.
(D) living standards will converge only within groups of countries with similar characteristics.

6. For something to satisfy the medium of exchange function of money, it must be
(A) backed by gold.
(B) readily exchangeable for other goods.
(C) issued by a Central Bank.
(D) an inherently valuable commodity.

7. Which of the following statements about M1 and M2 is not true?
(A) Current accounts are part of M1.
(B) M2 is more liquid than M1.
(C) M2 is larger than M1.
(D) Savings accounts are part of M2.

8. Suppose you read in the paper that the Central Bank of Canada plans to expand the money supply. The Central Bank is most likely to do this by
(A) printing more currency and distributing it.
(B) purchasing government bonds from the public.
(C) selling government bonds to the public.
(D) buying newly issued government bonds directly from the government itself.

9. Which of the following variables is procyclical?
(A) unemployment
(B) nominal interest rate
(C) real interest rate
(D) real wage

10. Industries that are extremely sensitive to the business cycle are the
(A) durable goods and service sectors.
(B) nondurable goods and service sectors.
(C) capital goods and nondurable goods sectors.
(D) capital goods and durable goods sectors.

11. Which of the following would shift the FE line to the right?
(A) an adverse supply shock
(B) a decrease in labour supply
(C) an increase in the capital stock
(D) an increase in the future marginal productivity of capital

12. Which of the following will shift IS curve down and to the left?
(A) an increase in expected future output
(B) a decrease in expected future marginal product of capital
(C) a fall in taxes
(D) an increase in wealth

13. Suppose Bank of Canada sells government bonds to the banks and public. This will cause
(A) the LM curve to shift up.
(B) the IS curve to shift up.
(C) the LM curve to shift down.
(D) the IS curve to shift down.

14. You have just read that Australia has suffered a drought, destroying its wheat crop for this year. The effect of this adverse supply shock on Australia would probably be
(A) an increase in prices and an increase in real interest rates.
(B) an increase in prices, an increase in nominal interest rates, but a decrease in real interest rates.
(C) a decrease in prices and an decrease in real interest rates.
(D) a decrease in prices, a decrease in nominal interest rates, but an increase in real interest rates.

15. Which of the following best describes the classical and the Keynesian views on the monetary neutrality?
(A) Classical economists believe that money is neutral, but Keynesians do not.
(B) Both classical and Keynesian economists believe in monetary neutrality, but they differ in the speed of price adjustment.
(C) Classical economists believe in slow adjustment of prices, but Keynesians argue that price adjustment does not take long.
(D) Keynesians believe that money affects employment and output in short run and long run, but classical economists argue that money is neutral only in the long run.

16. The real exchange rate is
(A) the amount of foreign goods obtained in exchange for one unit of the domestic good.
(B) the nominal exchange rate minus the rate of inflation.
(C) the amount of foreign currency.
(D) the amount of domestic currency obtained in exchange for one unit of foreign currency.

17. Relative purchasing power parity occurs only if
(A) purchasing power parity holds between two countries.
(B) real interest rates are equalized across countries.
(C) the nominal exchange rate is constant.
(D) the real exchange rate is constant.

18. In an open economy, an increase in net exports because of increased demand for domestic products by foreigners should cause the domestic real interest rate to _____ and should cause desired saving minus desired investment to _____.
(A) rise; rise
(B) rise; fall
(C) fall; rise
(D) fall; fall

19. Under a system of fixed exchange rates, what happens if a country's currency is overvalued?
(A) The Central Bank loses official reserve assets.
(B) The Central Bank gains official reserve assets.
(C) The currency appreciates.
(D) The exchange rate rises.

20. When the nominal exchange rate falls
(A) the domestic currency buys more units of foreign currency, and the domestic currency has depreciated.
(B) the domestic currency buys fewer units of foreign currency, and the domestic currency has depreciated.
(C) the domestic currency buys more units of foreign currency, and the domestic currency has appreciated.
(D) the domestic currency buys fewer units of foreign currency, and the domestic currency has appreciated.

21. In the Keynesian model
(A) the short-run aggregate supply slopes upward because of price misperception by firms.
(B) the short-run aggregate supply slopes upward because the actual price may be different from the expected price during the term of wage contract.
(C) the short-run aggregate supply is horizontal because of price misperception by firms.
(D) the short-run aggregate supply is horizontal because the actual price may be different from the expected price during the term of wage contract.

22. Consider the following short run aggregate supply equation: $Y = \bar{Y} + b(P - P^e)$, where Y is the real output, $\bar{Y}$ is the full employment output, P and P^e are the actual and expected price levels, respectively. Which of the following is correct?
(A) In the Keynesian model, P is always equal to P^e because of sticky-wage assumption.
(B) In the Keynesian model, P may be different than P^e because of sticky-wage assumption.
(C) In the Keynesian model, P is always greater than P^e because of sticky-wage assumption.
(D) In the Keynesian model, P is always less than P^e because of sticky-wage assumption.

23. In the Keynesian model of the business cycles
(A) unanticipated changes in government expenditures cause output to change by change in real wage.
(B) anticipated changes in government expenditures cause output to change by changes in real wage.
(C) anticipated changes in money supply cause output to change by changes in real wage.
(D) anticipated or unanticipated changes in money supply cause output to change by changes in real wage.

24. According to the menu cost theory, firms will be slow in changing their prices because
(A) if prices changed frequently, individuals would reduce their demand for that good because of uncertainty.
(B) frequent price changes would be a sign of monopolistic behaviour.
(C) the cost of changing the price might exceed the additional revenue the price change would generate.
(D) demand for their product would fall because consumers would purchase goods from firms that had not raised their prices.

25. In the long run in the Keynesian model, a beneficial supply shock would leave the economy with a higher level of output, but also a _____ real interest rate and a _____ price level.
(A) higher; lower
(B) lower; higher
(C) lower; lower
(D) higher; higher

Section B (LONG QUESTIONS): Answer any THREE (3) of the following four questions. Each question is worth 25 marks for a total of 75 marks.

B1. Solow (neoclassical) growth model: Consider the Solow (neoclassical) growth model seen in class where y denotes output per worker, k physical capital per worker, and A total factor productivity. Suppose that at any point in time the production function in per-worker terms is represented by

$$y = Af(k),$$

where $f(k)$ is increasing in k and there are diminishing returns to capital. Suppose that A is constant, labour N grows at rate n, the saving rate is s, and the rate of capital depreciation is d.

(a) With the aid of a diagram, explain how the steady state capital stock per worker, k^*, is determined.

(b) Suppose that there is a shock to households' preferences that increases the saving rate to s_G, the saving rate consistent with moving the economy to the Golden Rule steady state. Show graphically how the economy reaches the new steady state. Explain what happens to steady-state consumption per-worker, c^*, and to the steady state capital stock per worker, k^*, after the rise in s.

(c) At what rate do output per worker, y, and output, Y, grow at the new steady state? What about during the period of adjustment from the original steady steady to the new one?

(d) Suppose that before the shock to households' preferences, the saving rate was above s_G. What happens in this case to steady-state consumption per-worker, c^*, and the steady state capital stock per worker, k^*, after the rise in s.

(e) According to the Solow (neoclassical) growth model, what is the dominant factor determining the long-run growth of output per capita? Explain why.

B2. Closed Economy IS-LM-FE: The behaviour of households and firms in a closed economy is represented by the following equations:

$$\begin{aligned} Y &= 2(25N - 0.25N^2) \\ N^S &= 0.25w \\ C^d &= 40 + 0.8Y \\ I^d &= 80 - 500r \\ \frac{M^d}{P} &= 0.5Y - 250(r + \pi^e) \quad \text{where } \pi^e = 0.02 \end{aligned}$$

where Y is output, N is labour, w is the real wage, N^S is the amount of labour supplied, C^d is desired consumption, I^d is desired investment, $\frac{M^d}{P}$ is the real money demand, r is the real interest rate, and π^e is the expected inflation. Assume that the economy is initially in a general equilibrium with government expenditure G set to 20, the nominal money supply M set to 195 and the price level P equal to 1.

(a) What are the general equilibrium levels of the real wage, employment, and output?

(b) Derive the IS and LM equations writing the real interest rate on the left side of the equations. Find the implied long-run real interest rate and output.

(c) Suppose the government increases its expenditure to $G = 40$. What are the short-run output and real interest rate? Illustrate the transition from the general equilibrium to the short-run equilibrium using the IS-LM-FE diagram.

(d) Compute the crowding out effect in adjusting from the general equilibrium to the short-run equilibrium after the fiscal expansion.

(e) Explain the process that restores the economy to general equilibrium according to the Keynesian and classical view (no calculations necessary).

B3. Use the **open-economy IS-LM-FE model with flexible exchange rates** to explain the effects of each of the following on the values of output, Y, the real interest rate, r, the nominal exchange rate, e_{nom}, the price level, P, the real exchange rate, $e = (e_{nom} \times P)/P_{For}$, and net exports, NX, in the short-run and in general equilibrium. In each case, illustrate the effects on a diagram starting from an initial situation of general equilibrium.

(a) A reduction in the effective tax rate on capital that increases desired investment.

(b) A rise in the expected rate of inflation.

(c) An influx of working-age immigrants which increases the labour supply.

(d) An increase in the volatility of the stock market.

(e) A decrease in the world real interest rate.

B4. Keynesian model with nominal wage rigidity: Consider a simple economy in which all workers are identical and only one type of good is produced. The production function is

$$Y = 4N^{\frac{1}{2}},$$

where Y is output and N is the number of workers (in millions). The supply curve for labour is given by

$$N^s = 0.5\frac{W}{P}$$

where W is the nominal wage and P is the aggregate price level (so W/P is the real wage).

(a) Derive the labour demand curve.

(b) If the labour market is in equilibrium, find the implied real wage, the level of employment and full-employment output, $\bar{Y}$.

(c) Suppose W is determined before P is known for sure at a value such that the labour market is expected to clear. If the expected price level is $P^e = 2$, at what value is W set? For any realized price level, P, what is employment and what is the short-run aggregate supply (SRAS) curve for this economy?

The IS and LM curves for this economy are described by

$$4000r = 800 - 100Y \quad \text{(IS)}$$

$$2000r = 50Y - 6\frac{M}{P} \quad \text{(LM)}$$

where Y denotes income/output, r denotes the real interest rate and $M = 100$ is the money supply.

(d) Derive the equation for the aggregate demand (AD) curve.

(e) What are the short-run equilibrium values of P, Y and r? Illustrate this short-run equilibrium in a diagram.