

ECON 201: Introduction to Macroeconomics
Professor Robert Gordon
Final Exam:
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NAME _____

NETID _____

Directions: This test is in two parts, a multiple choice question part and a short-answer part. Use this answer packet to complete the exam. Calculators are permitted. Books, notes, reference materials, etc. are prohibited. Good luck!

Part 1: Referring to the questions in the Multiple Choice Questions Packet, choose the one alternative that best completes the statement or answers the question. Each question is worth one point. There is no penalty to guessing, so be sure to answer all of them. Write your answers in the following table using capital letters. Answers outside of the table will not be considered.

1	10	19	28	37
2	11	20	29	38
3	12	21	30	39
4	13	22	31	40
5	14	23	32	41
6	15	24	33	42
7	16	25	34	43
8	17	26	35	44
9	18	27	36	45

1. The labor demand curve is negatively sloped because:
 - A) more people are willing to work at low wages than at high wages.
 - B) more people are willing to work at high wages than at low wages.
 - C) employers are willing to hire more people at low wages.
 - D) employers are willing to hire more people at high wages.

2. Gross domestic product is the economy's total production of _____ for a given period.
 - A) goods and services
 - B) final goods and services
 - C) intermediate goods and services
 - D) consumer goods and services

3. Potential output:
 - A) is the level of output that the economy would produce if all prices, including nominal wages, were fully flexible.
 - B) varies with the price level.
 - C) depends on the level of consumer confidence.
 - D) is greater in periods of expansion than in recessions.

4. An obstacle to a fiscal stimulus during a recession is
 - A) money supply is too small
 - B) federal government must balance its budget
 - C) lack of plans for infrastructure spending on roads and mass transit
 - D) need to raise taxes to balance decreased tax revenue due to recession

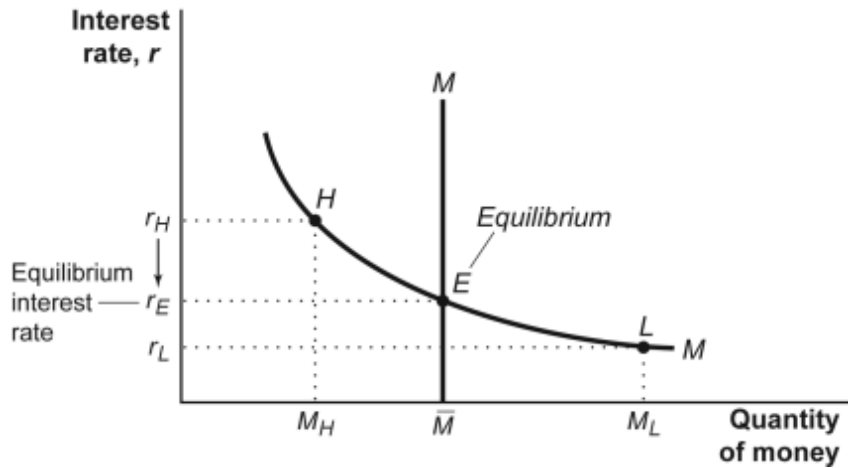
5. Government spending is like investment in each of the following cases EXCEPT when:
 - A) it goes to help pay for education.
 - B) it helps provide infrastructure for the economy.
 - C) it is used for public health measures.
 - D) it is used for a personal income tax rebate.

6. The permanent income hypothesis suggests that consumer:
 - A) spending depends on income people expect over the long term rather than on current income.
 - B) spending is smoothed each month in response to changes in their current disposable income.
 - C) spending is made up of an autonomous amount and an amount dependent upon disposable income.
 - D) savings depends on one's lifetime income.

7. Which of the following eras had the fastest growth in total factor productivity?
- A) 1890-1920
 - B) 1920-1970
 - C) 1970-2016
 - D) growth was roughly the same in all three eras
8. In the reading “What the Fed Chief’s Next Message Should Be,” what is NOT a point of the article?
- A) the Fed should raise rates now to prevent future inflation
 - B) the Fed should keep rates low because inflation is below the Fed’s target
 - C) the Fed should keep rates low to encourage employment growth
 - D) the Fed should avoid a pre-set calendar for future interest rate increases
9. A bank run can break a bank because:
- A) borrowers default on their loans, and the bank's assets become worthless.
 - B) banks cannot quickly convert illiquid loans to liquid assets without facing a large financial loss.
 - C) depositors' panic spreads to borrowers, who want to take additional loans from the bank.
 - D) the bank's reserves kept with the Federal Reserve are in the form of illiquid U.S. Treasury bonds.
10. Price ceilings will impose costs on society because they:
- A) will eliminate long waiting lines.
 - B) may result in black market prices, which are lower than the market-determined price would be.
 - C) lead to a smaller quantity offered on the market.
 - D) help businesses instead of consumers.

Use the following to answer question 11:

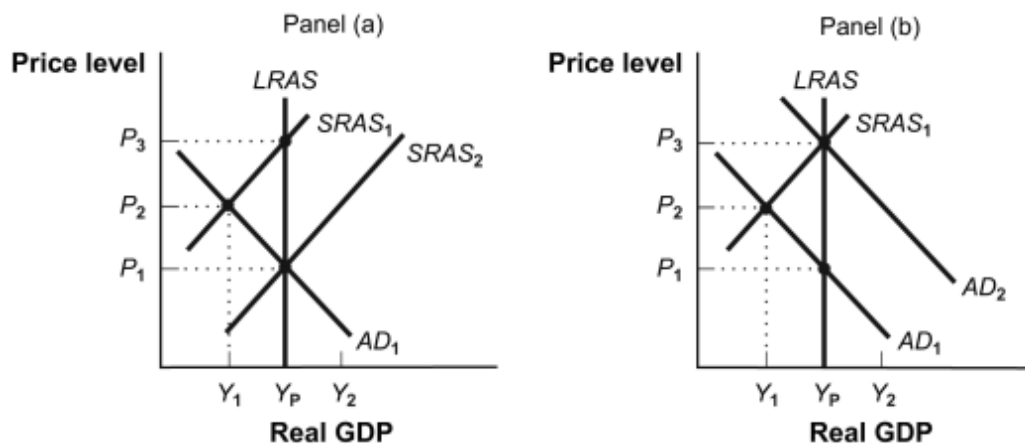
Figure: Money Market I



11. (Figure: Money Market I) Look at the figure Money Market I. If the money market is initially in equilibrium at point E and the central bank buys Treasury bills, then the interest rate will:
- A) move toward point H .
 - B) move toward point L .
 - C) remain at point E .
 - D) shift leftward.

Use the following to answer questions 12-13:

Figure: Policy Alternatives



12. (Figure: Policy Alternatives) Look at the figure Policy Alternatives. Suppose that the initial equilibrium is at real GDP level Y_1 and price level P_2 in panel (a). At real GDP level Y_1 there is:
- A) an inflationary gap.
 - B) a recessionary gap.
 - C) no gap.
 - D) long-run equilibrium.
13. (Figure: Policy Alternatives) Look at the figure Policy Alternatives. Assume that the economy depicted in panel (a) is in short-run equilibrium with AD_1 and $SRAS_1$. If the economy is left to correct itself:
- A) real interest rates will fall, which will shift $SRAS$ rightward.
 - B) lower wages will result in a gradual shift from $SRAS_1$ to $SRAS_2$.
 - C) long-run equilibrium will be established at Y_P and P_3 .
 - D) the aggregate demand curve will shift leftward.
14. Which of the following is not an asset of the Fed?
- A) government long-term bonds
 - B) government treasury bills
 - C) mortgage-backed securities
 - D) corporate stock
15. Economics expansions have tended to be longer in the postwar years than before World War II because
- A) higher share of government spending in GDP
 - B) countercyclical monetary policy
 - C) procyclical monetary policy
 - D) A) and B)
16. Suppose the government increases taxes by more than is necessary to close an inflationary gap. Which of the following is the most likely result?
- A) Equilibrium real GDP will be more than anticipated.
 - B) The economy will move into a recession.
 - C) The economy will generate a larger inflationary gap than anticipated.
 - D) This will not have any adverse effects on the economy, since inflation has been abated.
17. Which of the following inventions was not part of the Second Industrial Revolution? .
- A) electricity
 - B) internal combustion engine
 - C) steam engine
 - D) telephone

18. Following an increase in the minimum wage from \$7.25 to \$15, which of the following would imply the smallest increase in unemployment?
- A) Elastic demand curve
 - B) Inelastic demand curve
 - C) Elastic supply curve
 - D) Horizontal supply curve
19. Which of the following is not a contribution of artificial intelligence?
- A) Voice recognition
 - B) Language translation
 - C) Personal computers
 - D) searches for legal precedents

Use the following to answer question 20:

Table: Population Data for Estill County

Demographic Group	Number of Residents
Employed	5,000
Unemployed and looking for work	1,000
Not working due to disability	200
Not working due to retirement	700
Unemployed and not looking for work due to discouragement over job prospects	500
Under the age of 16	2,000
Total Population	9,400

20. (Table: Population Data for Estill County) Look at the table Population Data for Estill County. What is the unemployment rate?
- A) 64%
 - B) 48%
 - C) 17%
 - D) 6%
21. Alison has a linear production possibility frontier in bracelets and necklaces. In one hour, she can produce 5 bracelets or 10 necklaces. What is the opportunity cost to make 1 necklace?
- A) 5 bracelets
 - B) 10 necklaces
 - C) 0.5 bracelet
 - D) 2 necklaces

22. Government spending will NOT crowd out private spending if:
- A) all of the resources in the economy are employed.
 - B) aggregate income is at its potential level.
 - C) there is an inflationary gap.
 - D) there is a recessionary gap.
23. Every year more and more purchases are made with credit cards on the Internet. Given this trend, all else equal, we would expect:
- A) the money demand curve to shift outward.
 - B) the money demand curve to shift inward.
 - C) a downward movement along a fixed money demand curve.
 - D) an upward movement along a fixed money demand curve.
24. What is the name of the policy that has altered the Fed's balance sheet since 2008?
- A) Qualitative easing
 - B) Quantitative easing
 - C) Qualified easing
 - D) Quality easing
25. Suppose that more police and security workers become aware that wearing bulletproof vests can protect them from injury and decide to start wearing bulletproof vests. At the same time, the price of ceramics used to produce the vests falls. The equilibrium price of bulletproof vests _____ and the equilibrium quantity produced _____.
- A) increases; increases
 - B) decreases; decreases
 - C) probably changes, but in an ambiguous direction; probably changes, but in an ambiguous direction
 - D) probably changes, but in an ambiguous direction; increases
26. Conditional convergence suggests that:
- A) poorer countries are still catching up to richer countries.
 - B) poorer countries' GDP may not catch up to those of richer countries without changes in education and infrastructure.
 - C) poorer countries' growth rates depend on their ties to a richer country.
 - D) poorer countries' growth rates depend on their birth rates.
27. When the economy is in a recession
- A) households should spend more and save less to help the economy
 - B) the government should spend more to help the economy
 - C) the government should raise taxes to reduce the fiscal deficit
 - D) the government should do nothing because recessions are not its responsibility

28. A vicious cycle of deleveraging occurs when:
- A) asset sales to cover losses produce negative balance sheet effects and force creditors to call in loans, forcing more sales of assets at decreasing prices.
 - B) bank regulators take over a bank.
 - C) deposit insurance is paid out.
 - D) top executives at failing companies are forced to return bonuses.
29. Which number is hidden on the back of the one-dollar bill?
- A) 3
 - B) 7
 - C) 13
 - D) 17
30. The aggregate demand curve slopes:
- A) downward for the same reasons that an ordinary demand curve does.
 - B) downward in part because when the price level falls, the real wealth of the public falls, and this induces people to change their consumption.
 - C) downward in part because as the price level falls, the ability of households and firms to borrow cheaply increases.
 - D) upward, unlike an ordinary demand curve.
31. If the equilibrium interest rate in the money market is 5%, at an interest rate of 2% the quantity of nonmonetary interest-bearing financial assets demanded is _____ the quantity supplied.
- A) less than
 - B) greater than
 - C) equal to
 - D) irrelevant to
32. Which of the following industries had the highest cost inflation over the last few decades?
- A) computers
 - B) automobiles
 - C) food
 - D) higher education
33. If the Federal Reserve conducts an open-market purchase, bank reserves _____ and the money supply _____.
- A) decrease; decreases
 - B) increase; increases
 - C) decrease; increases
 - D) increase; decreases

34. If planned investment spending is \$2 trillion and inventories decrease by \$0.5 trillion, actual investment spending is:
- A) \$2.5 trillion.
 - B) \$1.5 trillion.
 - C) \$2 trillion.
 - D) \$1 trillion.
35. Medicaid, Medicare, and Social Security are examples of:
- A) unilateral payments.
 - B) transfer payments.
 - C) monetary policy.
 - D) taxes.
36. In the course packet reading “The Fed Still Has Ammo” what is meant by “ammo:?”
- A) ability to conduct open-market purchases
 - B) ability to conduct open-market sales
 - C) ability substantially to raise interest rates
 - D) ability substantially to reduce interest rates
37. The reading about “A Layoff in the Smith Family” provides examples of
- A) the multiplier
 - B) autonomous consumption
 - C) involuntary inventory decumulation
 - D) an inflationary gap
38. As a limit to economic growth, environmental problems are more difficult to solve than resource problems because:
- A) environmental problems don't automatically provide incentives for changed behavior.
 - B) resource problems don't automatically provide incentives for changed behavior.
 - C) the opportunity cost of solving environmental problems in terms of GDP sacrificed is larger.
 - D) most scientists haven't determined the relationship between greenhouse gas emissions and climate change.

Use the following to answer question 39:

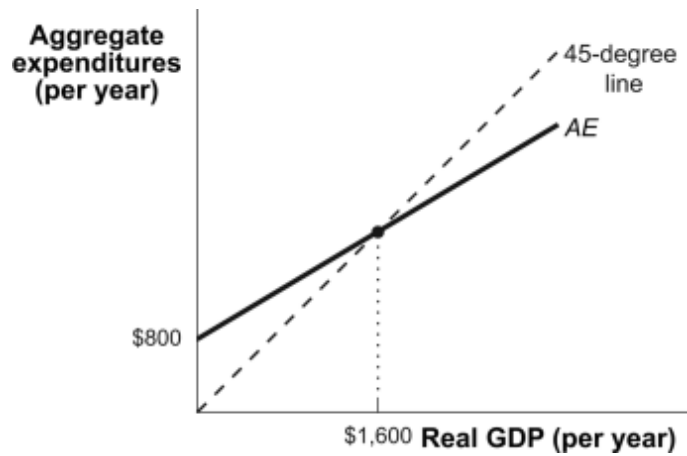
Table: Monetary Aggregates

Monetary Aggregates (in billions)	
Currency in circulation	\$ 500
Money market funds	550
Time deposits	800
Savings deposits	1,110
Checkable bank deposits	380
Traveler's checks	15
American Express gift cards	25

39. (Table: Monetary Aggregates) Look at the table Monetary Aggregates. The value of M1 is:
- A) \$880 billion.
 - B) \$895 billion.
 - C) \$2,005 billion.
 - D) \$920 billion.
40. If the economy is at potential output and the Fed increases the money supply, in the SHORT run the likely result will be a(n) _____ in investment and a(n) _____ in consumption.
- A) increase; increase
 - B) increase; decrease
 - C) decrease; increase
 - D) decrease; decrease
41. Which of the following is a likely prediction about the next 20 years?
- A) Output per person will grow faster than output per hour
 - B) Output per hour will grow faster than output per person
 - C) Output per hour and output per person will grow at the same rate
 - D) Hours of work will grow faster than the population
42. States that are required by their constitution to have annually balanced budgets are likely to _____ than those not required to balance their budget.
- A) have less severe business cycles
 - B) have more severe business cycles
 - C) grow faster
 - D) have a better quality of life
43. Before the twentieth century, the most important determinant of productivity was:
- A) technology.
 - B) natural resources.
 - C) physical capital.
 - D) human capital.

Use the following to answer questions 44-45:

Figure: Aggregate Expenditures Curve I



44. (Figure: Aggregate Expenditures Curve I) Look at the figure Aggregate Expenditures Curve I. The equilibrium level of real GDP in the aggregate expenditures model shown in this figure is:
- A) \$800.
 - B) \$1,000.
 - C) \$1,600.
 - D) \$3,200.
45. (Figure: Aggregate Expenditures Curve I) Look at the figure Aggregate Expenditures Curve I. Suppose that the government's purchases of goods and services in this economy rise by \$100. Real GDP will:
- A) decrease by \$100.
 - B) increase by \$200.
 - C) increase by \$800.
 - D) decrease by \$200.

MC Answer Key:

1.	C
2.	B
3.	A
4.	C
5.	D
6.	A
7.	B
8.	A
9.	B
10.	C
11.	B
12.	B
13.	B
14.	D
15.	D
16.	B
17.	C
18.	B
19.	C
20.	C
21.	C
22.	D
23.	B
24.	B
25.	D
26.	B
27.	B
28.	A
29.	C
30.	C
31.	A
32.	D
33.	B
34.	B
35.	B
36.	D
37.	A
38.	A
39.	B
40.	A
41.	B
42.	B

43.	B
44.	C
45.	B

Part 2: Solve the following problems in the provided space. *Show all your work clearly.*

Problem 1 (10 points)

Complete the blanks using the following table. *Round all values to the nearest two decimal places, including percentages. That is, answers should look like 13,300.72 or 29.87%.*

(Parts 1-13: 0.5 points per blank + 1.0 bonus for no mistakes)

	2015		2016		Annual Percentage Change between 2015-2016 (LN formula)
	Price	Quantity	Price	Quantity	
Tractor	6	60	10	36	
Truck	8	80	4	120	

Nominal GDP	1. 1000	2. 840	3. -17.44%
Real GDP in 2015 prices	4.1000	5.1176	6. 16.21%
Real GDP in 2016 prices	7.920	8.840	9.-9.10%
GDP Deflator with base year 2015	100	10. 71.43	11. -33.65%
GDP Deflator with base year 2016	12. 108.7	100	13. -8.34%

14. What is the percentage growth rate in chain-weighted GDP Deflator? _____ (2 point)

-21%

Problem 2 (12 points)

1. Suppose GDP falls 2% a year. In what number of years will it reach one-quarter of its initial value? (3 points)

$(100 \cdot \log(0.25)) / (-2) = 69.3$ (70 should also be acceptable, Egor)

2. Consider two countries. Country A has GDP of 500 and growth rate of 2%. Country B is in economic decline: it has GDP of 2000, but it *decreases* on average at the rate of 0.5%. After how many years will GDP of Country A be equal to that of Country B? (4 points)

Using the growth rate formula:

$\log(500) + (2 \cdot s) / (100) = \log(2000) - (0.5 \cdot s) / (100)$, $s = 40 \cdot \log(4) = 55.45$ years.

3. Suppose GDP is 400 in 2016. Suppose that economists forecast that the average growth rate for the next 10 years is 4%, and after that the growth rate will be 2%.
 - a. What will be GDP of the country in 15 years? (2 points)
 In 10 years GDP is $\exp(\log(400) + 40/100) = 596.73$. In 15 years it is $\exp(\log(596.73) + (10/100)) = 659.48$
 - b. In how many years GDP will double from its initial 2016 value? (3 points)
 After reaching 596.73 in 10 years, it should reach 800 in $\log(596.73) + (2 \cdot s) / 100 = \log(800)$, solving for s get $s = 14.66$.
 So, it will double in $10 + 14.66 = 24.66$ years.

Problem 3 (9 points)

Consider a country consisting of two regions:

	Region A	Region B	Total
Unemployment Rate		5%	
Labor Force Participation Rate		80%	
Total Population	8,000	2,000	10,000
Total Labor Force	5,000		
Total Employed	4,500		

1. Fill in the missing numbers (0.5 points each+1 point for no mistakes)
2. Suppose 250 of unemployed workers move from Region A to Region B and immediately start looking for job there (but have not found it yet). How does it affect the unemployment level in each region? How does it affect the national unemployment level? (4 points)

Solution:

	Region A	Region B	Total
Unemployment Rate	<i>10%</i>	<i>5%</i>	<i>8.8%</i>
Labor Force Participation Rate	<i>62.5%</i>	<i>80%</i>	<i>66%</i>
Total Population	8,000	2,000	10,000
Total Labor Force	5,000	<i>1,600</i>	<i>6,600</i>
Total Employed	4,500	<i>1,520</i>	<i>6,020</i>

For **B**: new unemployment in A is $250/4750=5.26\%$, new unemployment in B is $(80+250)/(1600+250) = 17.8\%$. Country-level unemployment is the same.

Problem 4 (24 points)

Consider the following model economy:

Autonomous consumption	3000
Net exports	-200
Planned Investments	1400
Government spending	800
Autonomous taxes	600
Transfers	300
Income tax	0.2
MPC	0.7

1. What is the consumption function? (5 points)?

$$C = 2790 + 0.56 Y$$

2. What is the level of aggregate autonomous expenditures? (4 points)

4790

3. What is the level of GDP in equilibrium? (5 points)

10'886.36

4. Suppose the government wants to boost output so to reach a level of 12,000. By how much should the government increase government expenditures to achieve it? (5 points)

490

5. By how much should the government increase transfers to achieve it? Compare the result with part 4. What is the best way for the government to achieve its goal? (5 points)

700. Increasing government expenditures is less costly.

Problem 5 (14 points)

You are given the following information:

Deposits _____ 100
 Currency-to-deposit ratio ____ 0.2
 Required reserve ratio _____ 0.1

1) Calculate the money multiplier. (3 points)

$$\mu = \frac{M}{B} = \frac{C + D}{C + R} = \frac{c + 1}{c + rr} = \frac{1.2}{0.3} = 4$$

2) Calculate the bank reserves, monetary base, and the money supply. (3 points)

$$R = rr \times 100 = 10, B = (c + rr) \times 100 = 30 \text{ and } M = 4 \times B = 120$$

3) Assume that the central bank increases the required reserve ratio to 0.5 by keeping the currency, the level of deposits, and the currency-holding ratio constant. What is the new level of bank reserves, monetary base, and money supply? (4 points)

$$R = rr \times D = 0.5 \times 100 = 50, B = (c + rr) \times D = 70 \text{ and } M = (1 + c) \times D = 120$$

4) Suppose that the central bank wants decrease the monetary base to 30 under the new regime ($rr = 0.5$). What is the new level of bank reserves, deposits, and money supply? (4 points)

$$30 = B = (c + rr) \times D = 0.7 \times D \text{ then } D = 42.85$$

$$R = rr \times D = 21.43, M = (1 + c) \times D = 51.42$$

Problem 6 (6 points)

Here are equations for the demand and supply of minivans.

$$P = 22 - 3Q^D$$

$$P = 2 + Q^S$$

1. Find the equilibrium price. (2 points)

7

2. Find the equilibrium quantity. (2 points)

5

3. A new technology is released that allows firms to charge a lower price for minivans.

Suppose the new equilibrium is $Q = 6, P = 4$. What is the new supply equation, assuming the supply curve made a parallel shift? (2 points)

$$P = -2 + Q^S$$