ECON 201: Introduction to Macroeconomics  
Professor Robert Gordon  
Midterm Exam 2:  
November 12, 2018

NAME ________________________________

Circle the TA session you attend:  Ola - 3PM       Ola - 4PM  
                                      Deborah - 3PM      Deborah - 4PM  
                                      Cassiano - 3PM      Cassiano - 4PM

**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 multiple questions below, 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. Circled answers outside of the table will not be considered.
1. Which factor is the MOST widely accepted measure of economic growth over time?
A) inflation
B) increases in real per capita GDP
C) decline in real interest rates
D) increases in the available labor supply

2. Suppose that a panel of economists predicts that a nation's real GDP per capita will double in approximately 20 years. According to the rule of 70, what must be the predicted annual growth rate of real GDP per capita?
A) 140%
B) 3.5%
C) 2.85%
D) 14%

3. Baumol's “cost disease” is most closely related to
A) rising cost of gasoline
B) rising cost of computer software
C) rising cost of college tuition
D) rising cost of soybeans

4. In general, expansions are characterized by:
A) increasing unemployment.
B) falling unemployment.
C) decreasing employment.
D) constant employment.

5. The convergence hypothesis says that international differences in GDP per capita tend to ______ over time.
A) narrow
B) expand
C) remain steady
D) narrow and then expand

6. Which statement about GDP is FALSE?
A) GDP can be calculated by summing total market value of all final goods and services produced in a country in a given year.
B) GDP can be calculated by summing all factor payments within a country's borders in a given year.
C) GDP can be calculated by summing the value added for all goods and services.
D) GDP can be calculated by summing government spending and tax revenues.

7. Real per capita GDP is:
A) real GDP divided by the population.
B) real GDP divided by the amount of capital available in the economy.
C) not a useful measure of human welfare.
D) rarely used as a tool to compare countries' possible resources.
8. In the “Econundrum” article on low investment, which of the following is NOT suggested as a cause?
   A) slow productivity growth
   B) slow population growth
   C) technological innovations are ever-less revolutionary
   D) tighter credit

9. When an economy is operating between a trough and a peak of the business cycle, it is in:
   A) an expansion.
   B) a contraction.
   C) a short-run condition.
   D) the beginning of a fall in aggregate spending.

10. Samantha asks her employer for a 5% raise for the coming year. If the inflation rate during the next year is 5.5%, then her real wage will:
    A) increase by 5%.
    B) decrease by 0.5%.
    C) decrease by 5%.
    D) increase by 0.5%.

11. Financial markets:
    A) increase transaction costs.
    B) reduce diversification.
    C) provide liquidity.
    D) determine tax rates.

Use the following to answer question 12:

<table>
<thead>
<tr>
<th>Project</th>
<th>Rate of return on investment</th>
<th>Cost of investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>20%</td>
<td>$500</td>
</tr>
<tr>
<td>G</td>
<td>18</td>
<td>300</td>
</tr>
<tr>
<td>H</td>
<td>16</td>
<td>1,000</td>
</tr>
<tr>
<td>I</td>
<td>14</td>
<td>200</td>
</tr>
<tr>
<td>J</td>
<td>12</td>
<td>2,000</td>
</tr>
<tr>
<td>K</td>
<td>10</td>
<td>1,500</td>
</tr>
<tr>
<td>L</td>
<td>8</td>
<td>1,200</td>
</tr>
<tr>
<td>M</td>
<td>6</td>
<td>800</td>
</tr>
</tbody>
</table>

12. (Table: Investment Projects) Use Table: Investment Projects. If the market interest rate is 15%, the last project undertaken is:
   A) F.
   B) G.
   C) H.
   D) I.
13. Double counting would occur if:
A) GDP were calculated by adding C, I, G, and NX.
B) used goods were included in the GDP calculation.
C) imports were subtracted from GDP.
D) inventories were added to the GDP calculation.

14. When a firm buys a new machine for its business, it is considered to be:
A) consumption.
B) investment spending.
C) government spending.
D) private saving.

15. Which sources provide funds for investment spending?
I. domestic savings
II. foreign savings
III. consumption
A) I only
B) II only
C) I and II only
D) I, II, and III

16. Which of the following countries has NOT been mentioned in this class as having experienced very rapid inflation?
A) Germany
B) Hungary
C) Venezuela
D) Zimbabwe

17. If an economy is open:
A) anyone can immigrate to the country.
B) trading with other countries makes up a portion of its economy.
C) it does not trade with other countries.
D) its real GDP will drop.

18. A trade surplus occurs:
A) during economic contractions only.
B) when the value of imports exceeds the value of exports.
C) when the value of imports is less than the value exports.
D) when unemployment is rising.

19. A course packet reading item discusses ________ as a cause of suicide.
A) increased growth in income per capita
B) decreased growth in income per capita
C) increase of long-term unemployment
D) increase in labor-force participation rate
20. Long-run economic growth has been MOSTLY dependent on:
A) rising productivity.
B) a low unemployment rate.
C) an increase in the population, which eventually leads to an increase in the labor population.
D) countries following the rule of 70.

21. If a country has a trade surplus, we can conclude that it also has a:
A) budget surplus.
B) net capital outflow.
C) net capital inflow.
D) budget deficit.

22. A survey reveals that, on a small island, initially 1,000 people have jobs, 250 people are not working but are looking for jobs, and 450 people are neither working nor looking for work. Suppose that 150 of the 450 people who weren't looking for work now begin looking for work. There are now 400 people looking for work and 1,000 people working. The unemployment rate:
A) falls to 20%.
B) rises to 28.6%.
C) rises to 50%.
D) Nothing happens to the unemployment rate because these people weren't working before and they aren't working now.

23. Relatively high wages of non-college graduates compared to college graduates are an achievement of
A) German vocational apprenticeships
B) American community colleges
C) British secondary schools
D) Chinese exports

24. A course packet reading shows “economic welfare” and “income per capita” as a ratio of the U.S. for various countries. France ranks at 92 percent for welfare and only 67 percent for income per capita. Which of these reasons accounts for the higher rank of France for welfare?
A) lower leisure, higher inequality, longer life expectancy
B) higher leisure, lower inequality, longer life expectancy
C) higher leisure, higher inequality, shorter life expectancy
D) higher leisure, lower inequality, shorter life expectancy
Use Figure: The Labor Market. What will be the level of employment if firms decide to pay an efficiency wage of $16?
A) 80,000  
B) 100,000  
C) 110,000  
D) 200,000

26. GDP is $12 trillion this year in a closed economy. Consumption is $8 trillion and government spending is $2 trillion. Taxes are $0.5 trillion. What is the government budget balance?
A) a surplus of $1.5 trillion  
B) a deficit of $1.5 trillion  
C) a surplus of $0.5 trillion  
D) a deficit of $0.5 trillion

27. One reason financial institutions become very large is to:
A) decrease transaction costs.  
B) enjoy the power of having a large corporation.  
C) increase transaction costs.  
D) avoid the risks of diversification.
Use the following to answer question 28:

<table>
<thead>
<tr>
<th></th>
<th>Year 2009</th>
<th>Year 2010</th>
<th>Year 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of good A</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Price of good A</td>
<td>$500</td>
<td>$550</td>
<td>$550</td>
</tr>
<tr>
<td>Quantity of good B</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Price of good B</td>
<td>$2</td>
<td>$4</td>
<td>$5</td>
</tr>
</tbody>
</table>

28. The town of York produces two goods, good A and good B. The following is information regarding York's production of these two goods and their prices over three years. With 2009 as the base year, real GDP was GREATEST in:
A) 2009.
B) 2010.
C) 2011.
D) its base year always.

29. If there are 100 million people in the total population, a labor force of 50 million, and 47 million employed workers, the unemployment rate is _____%.
A) 3
B) 6
C) 8
D) 10

30. Which of the following countries is described as being stuck in the “middle-income trap”?
A) Brazil
B) North Korea
C) South Korea
D) Switzerland
**Part 2:** Solve the following problems in the provided space. *Show all your work clearly.*

**Problem 1 (8 points; 0.5 point per blank)**

Consider a hedonic economy in which wine and beer are the only goods produced. 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%.*

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>Annual Percentage Change between 2017-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price</td>
<td>Quantity</td>
<td>Price</td>
</tr>
<tr>
<td>Bottles of Wine</td>
<td>9</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Bottles of Beer</td>
<td>6</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td><strong>Nominal GDP</strong></td>
<td>180</td>
<td></td>
<td>190</td>
</tr>
<tr>
<td><strong>Real GDP in 2017 prices</strong></td>
<td>180</td>
<td></td>
<td>195.00</td>
</tr>
<tr>
<td><strong>Real GDP in 2018 prices</strong></td>
<td>175</td>
<td></td>
<td>238.00</td>
</tr>
<tr>
<td><strong>GDP Deflator with base year 2017</strong></td>
<td>100</td>
<td></td>
<td>97.44</td>
</tr>
<tr>
<td><strong>GDP Deflator with base year 2018</strong></td>
<td>102.86</td>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

14. What is the percentage growth rate in chain-weighted GDP deflator? _____ **-2.71%** _____ (1 point)
Problem 2 (10 points)

Consider several countries:

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP 2017</th>
<th>Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>100</td>
<td>5.00%</td>
</tr>
<tr>
<td>Country B</td>
<td>400</td>
<td>2.00%</td>
</tr>
<tr>
<td>Country C</td>
<td>1200</td>
<td>1.00%</td>
</tr>
</tbody>
</table>

Round all values to the nearest two decimal places, including percentages. Use the LN formulas shown in class.

1. In how many years GDP of Country B will triple? _______________ (1 point)

\[
100 \cdot \log(3) / 2 = 54.93 \text{ years}
\]

2. What would the growth rate of Country A have to be for it to have GDP equal to 1200 in 10 years? _______________ (1 point)

\[
100 \cdot \log(1200/100) / 10 = 24.85\%
\]

3. In 100 years, which country will be the richest? _______________ (3 points)

\[
g = 100*\log(GDP_{new}/GDP_{old})/100, \text{ so } GDP_{new} = GDP_{old}\cdot\exp(g).
\]

For A: GDP_{new} = 14841.32

For B: GDP_{new} = 2955.62

For C: GDP_{new} = 3261.94

Therefore, A is the richest.

4. In how many years Country A will catch up with Country C? What will be their GDP at this moment? _______________ (3 points)

By inverting the formula, \( \log GDP_{new} = \log GDP_{old} + (g\cdot s/100) \). Therefore:

\[
\log 100 + (5\cdot s)/100 = \log 1200 + (1\cdot s)/100, \text{ so } s = 100/4\cdot\log(12) = 62.12, \text{ in 62 years.}
\]

\[
GDP_{new} = 100\cdot\exp(62.12\cdot0.05) = 2233.15
\]
5. Suppose there is **Country D** with growth rate of 3%. Suppose it catches up with **Country B** in 100 years. What is **Country D**'s current GDP? _______________ (2 points)

   In 100 years, GDP of B is 2955.62. Therefore the current GDP of country D must be: 
   \[ \frac{2955.62}{\exp(100 \times 0.03/100)} = 147.15 \].

**Problem 3 (8 points)**

The following table shows the population of a fictional country by age and employment status. The units are in ‘000s of people.

<table>
<thead>
<tr>
<th>Age</th>
<th>Full-time workers</th>
<th>Part-time workers</th>
<th>Don’t have a job but are looking for one</th>
<th>Want a job but aren’t searching because believe jobs are hard to find</th>
<th>Don’t want a job now</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>16-24</td>
<td>90</td>
<td>66</td>
<td>15</td>
<td>1</td>
<td>202</td>
<td>374</td>
</tr>
<tr>
<td>25-54</td>
<td>315</td>
<td>20</td>
<td>30</td>
<td>5</td>
<td>150</td>
<td>520</td>
</tr>
<tr>
<td>&gt;55</td>
<td>234</td>
<td>11</td>
<td>97</td>
<td>8</td>
<td>550</td>
<td>900</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>639</strong></td>
<td><strong>97</strong></td>
<td><strong>142</strong></td>
<td><strong>14</strong></td>
<td><strong>1202</strong></td>
<td><strong>2094</strong></td>
</tr>
</tbody>
</table>

1. Calculate the **Labor Force Participation Rate** for this economy. *Report as a percentage to two decimal places.* _______________ (1 point)

   878/1794=48.8%

2. Calculate the **Unemployment Rate** for this economy. *Report as a percentage to two decimal places.* _______________ (1 point)

   142/878=16.17%

3. What is the **Employment-Population Ratio**? *Report as a percentage to two decimal places.* _______________ (1 point)

   736/1794=41.03%
4. What is the Unemployment Rate for People Aged 25-54? Report as a percentage to two decimal places. ______________ (1 point)

30/365=8.22%

5. The economy is hit by a recession and people become more pessimistic. 20 thousand full-time workers are forced to switch to a part time job. 10 thousand full-time workers and 5 thousand part-time workers become unemployed, and all of them start looking for new jobs. 7 thousand people that were previously unemployed and looking for a job stop looking for it because of poor employment prospects.

What is the new unemployment rate? ______________ (4 points)

150/871=17.22%

Problem 4 (4 points)

You have the following information:

<table>
<thead>
<tr>
<th>Consumption</th>
<th>13.04 trillion USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Domestic Product</td>
<td>18.62 trillion USD</td>
</tr>
<tr>
<td>Investment</td>
<td>3.72 trillion USD</td>
</tr>
<tr>
<td>Total tax revenues</td>
<td>1.60 trillion USD</td>
</tr>
<tr>
<td>Transfers</td>
<td>0.30 trillion USD</td>
</tr>
<tr>
<td>Net capital inflow</td>
<td>0.48 trillion USD</td>
</tr>
</tbody>
</table>

1. Net exports are ______________(1 point) X – M = -NCI = -0.48 trillion USD
2. Government spending is ______________ (2 points)
   \( Y-C-I-NX=G = 2.34 \text{ trillion USD} \)
3. Private saving is ______________ (1 point)
   \[ S_{\text{private}} = Y - C - (T - TR) = 4.28 \text{ trillion USD} \]
MC Answer Key

1. B
2. B
3. C
4. B
5. A
6. D
7. A
8. D
9. A
10. B
11. C
12. C
13. B
14. B
15. C
16. B
17. B
18. C
19. C
20. A
21. B
22. B
23. A
24. B
25. A
26. B
27. A
28. C
29. B
30. A