Name: ________________________________

Before beginning the exam, please verify that you have 11 pages with 26 questions in your exam booklet. The exam is worth 100 points. Good luck.

Multiple Choice (each 3 points)
Identify the letter of the choice that best completes the statement or answers the question.

1. Most economists believe that the classical dichotomy:
   a. holds approximately in both the short run and the long run.
   b. holds approximately in the long run but not at all in the short run.
   c. holds approximately in the short run but there is no consensus about the long run.
   d. holds approximately in the short run but not at all in the long run.
   e. does not hold even approximately in either the long run or the short run.

2. In the mid-1980s, oil prices ______, inflation was ______, and the unemployment rate ______.
   a. rose rapidly; high; rose
   b. rose slowly; moderate; was high
   c. fell; low; declined
   d. fell; low; rose
   e. rose rapidly; high; fell

3. Which of the facts about the business cycles is incorrect?
   a. fluctuations in investment tend to be smaller than fluctuations in GDP
   b. fluctuations in investment tend to be larger than fluctuations in GDP
   c. fluctuations in consumption tend to be smaller than fluctuations in GDP
   d. unemployment rises during recession and falls during expansions
   e. changes in the rate of unemployment typically lag changes in GDP growth

4. If a liquidity trap does exist, then ______ policy will not be effective in increasing income when interest rates reach very ______ levels.
   a. monetary; high
   b. monetary; low
   c. fiscal; high
   d. fiscal; low
   e. both monetary policy and fiscal; low

5. In the long run, the level of national income in an economy is determined by its:
   a. government budget surplus or deficit.
   b. rate of economic and accounting profit.
   c. real and nominal interest rate.
   d. factors of production and production function.
   e. GDP deflator
6. If the money supply increases 12 percent, velocity decreases 4 percent, and the price level increases 5 percent, then the change in real GDP must be ______ percent.
   a. 9
   b. 3
   c. 11
   d. 4
   e. 21

7. John Taylor's rule for setting the federal funds rate proposes **decreasing** the nominal federal funds rate as inflation ______ and the GDP gap \[100 \cdot \frac{Y - \bar{Y}}{\bar{Y}}\] ______.
   a. increases; increases
   b. increases; decreases
   c. decreases; increases
   d. decreases; decreases
   e. decreases; stays the same

8. Protectionist policies in a small open economy do not alter the trade balance because the:
   a. quantity of imports and exports is fixed.
   b. interest rate adjusts to offset any reductions in imports.
   c. level of net capital outflow is fixed by the world interest rate.
   d. exchange rate appreciates to offset the increase in net exports.
   e. rate of inflation decreases, which removes any benefits of protectionist policies.

9. Which of the following factors in the Solow model can lead to **sustained** increases in the standard of living?
   a. increase in \(K\)
   b. decrease in \(n\)
   c. increase in \(A\)
   d. increase in \(s\)
   e. decrease in \(\delta\)

10. Which of the following investment banks was the first one to fail by either bankrupting or being bought by another institution?
    a. Goldman Sachs
    b. Merry Lynch
    c. Morgan Stanley
    d. Bear Sterns
    e. Lehman Brothers

11. Who was the CEO of Goldman Sachs during the 2008 financial crisis?
    a. Henry Paulson
    b. Ben Bernanke
    c. Warren Buffett
    d. Tim Geithner
    e. Lloyd Blankfein
12. The idea that the amount of any currency that can buy a particular good in one country should be able to buy (after being exchanged for the local currency) the same quantity of the same good anywhere in the world is called:
   a. the theory of the real exchange rate.
   b. equal currency conversion.
   c. international monetary exchange.
   d. international arbitrage.
   e. purchasing-power parity.

13. In 2015, the largest component of GDP was:
   a. consumption
   b. investment
   c. government purchases
   d. imports
   e. exports

14. An increase in the trade surplus of a small open economy could be the result of:
   a. a domestic tax cut.
   b. an increase in the world interest rate.
   c. an increase in government spending.
   d. a decrease in government spending abroad by a large open economy.
   e. the implementation of an investment tax-credit provision.

15. Which of the following is an example of frictional unemployment?
   b. Bo is willing to work for less than the minimum wage, but employers cannot hire her.
   c. Tim is qualified and would like to be an airline pilot, but airlines do not find it profitable to hire him at the wage established by the airline pilot's union.
   d. Sue is willing to work at the going wage, but there are no jobs available.
   e. Daniel is a student and wants to find a part-time seasonal job in the mall helping with packaging holiday gifts.
Short Answers

16. **Policy I** *(6 points)* Two identical countries, Estonia and Latvia, can be described by the *IS-LM* model in the short run. The governments of both countries cut taxes by the same amount. The Central Bank of Estonia follows a policy of holding a constant money supply. The Central Bank of Latvia follows a policy of holding a constant interest rate. Compare the impact of the tax cut on income and interest rates in the two countries.

![Graph showing IS-LM model for two countries with changes in taxes and interest rates]

17. **Policy II** *(6 points)* Policymakers are contemplating undertaking either an increase in government spending or an increase in the money supply. Either policy is forecast to have the same impact on income in the short run. Use the IS-LM model to compare the impact on consumption and investment of the two policy alternatives.

![Graph showing IS-LM model with changes in government spending and the money supply]
18. **Nominal Interest Rates** *(6 points)* In the 1970s, inflation in the United States was over 10%. Paul Volker, who was the Fed chairman at the time reduced money supply to decrease inflation. By 1983 inflation decreased to 3.7%. Consider the effect of this monetary tightening on nominal interest rates in the economy. Use the theory from class to explain the movement of nominal interest rates between August 1979 and January 1983 *(Hint: focus first on the short-run and then on the long-run)*.

<table>
<thead>
<tr>
<th>Date</th>
<th>Nominal interest rate <em>(i)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>8/1979</td>
<td>10.4%</td>
</tr>
<tr>
<td>4/1980</td>
<td>15.8%</td>
</tr>
<tr>
<td>1/1983</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

19. **Depreciation** *(5 points)* It rains so much in the country of Tropicana that capital equipment rusts out (depreciates) at a much faster rate than it does in the country of Sahara. If the countries are otherwise identical, in which country will the standard of living be higher? *Illustrate graphically.*

![Graph](image)
20. **IS-LM and AD-AS in the Long run (10 points)** The United States is a closed economy that finds itself at the full employment output. However, OPEC successfully cuts oil production and price of oil dramatically increases. Please use the graphs on the next page to answer graphical questions.

a. Use the IS-LM model on the next page to illustrate graphically how income and interest rates change in response to a dramatic increase in the price of oil in the short-run. Does income increase/decrease/remain unchanged? How about interest rates? *(Label the initial equilibrium A and the new short-run equilibrium B)*

b. What happens to aggregate demand and or short-run aggregate supply when there is a dramatic increase in the price of oil? Show on the AD-AS graph on the next page how the economy moves from the initial equilibrium to the short-run equilibrium after a dramatic increase in the price of oil. *(Label the initial equilibrium A and the new short-run equilibrium B)*

c. Use the AD-AS graph from part (b) to show the how the economy moves from the short-run equilibrium to the long-run equilibrium when prices are allowed to adjust. What happens to income and prices? How about interest rates? *(Label the short-run equilibrium B and the new long-run equilibrium C)*
d. Show graphically how income, interest rates, and prices evolve over time as a consequence on a dramatic increase in the price of oil.
e. If, however, policymakers do not want to wait for the economy to adjust after a dramatic increase in the price of oil and want to bring income and interest rates back to the original levels right away, what type of a policy could they employ?
Choose one of the following two questions (8 points):

21. **Quantitative Easing** (8 points) Explain what is Quantitative Easing. Which US institution pursued the policy of Quantitative Easing? Why were “standard” tools not enough during the Great Recession?

22. **Leverage** (8 points) Explain how even a small loss on the assets side of highly leveraged institutions can push them into bankruptcy
Choose one of the following two questions (8 points):

23. **Unemployment** (8 points) If the government wanted to reduce the natural rate of unemployment, what could it do to the rate of job separation and/or rate of job finding (increase/decrease)? State one government policy that could reduce frictional unemployment and one that could reduce structural unemployment.

24. **Inflation** (8 points) Milton Friedman said, “Inflation is always and everywhere a monetary phenomenon.” Thomas Sargent said, “Inflation is always and everywhere a fiscal phenomenon.” Explain how both statements can be true. (*Hint: Your answer should include a discussion of a government's requirement for seigniorage.*)
Choose one of the following two questions (6 points):

25. Neoclassical Theory of Distribution (6 points) Use the neoclassical theory of distribution to predict the impact on the real wage and the rental price of capital of each of the following events:
   a. an epidemic of Ebola wipes out a quarter of the population.
      Real wage rate \( (w) \) ___________ Real rental rate of capital \( (r) \) ___________
   b. a developing country receives a large gift in form of capital from advanced countries
      Real wage rate \( (w) \) ___________ Real rental rate of capital \( (r) \) ___________
   c. a developing country improves its institutions thereby improving its production function
      Real wage rate \( (w) \) ___________ Real rental rate of capital \( (r) \) ___________

26. The Great Depression (6 points) List macroeconomic shocks associated with the Great Depression in the United States.

Extra Credit
If you have not missed more than one class since the last exam, you can answer the question below and earn 3 points extra credit.

27. The interest rate at which banks make loans to other banks is called the:
   a. prime rate.
   b. discount rate.
   c. federal funds rate.
   d. Treasury bill rate.
   e. Treasury bond rate.
16. The interest rate will increase in Estonia, but remain constant in Latvia. The increase in output will be larger in Latvia because the Central Bank of Latvia will increase the money supply to keep the interest rate constant in the face of the tax cut. Thus, there will be no crowding out of investment in Latvia, but there will be crowding out in Estonia because of the higher interest rate.

17. The increase in government spending will increase interest rates, but the increase in the money supply will lower interest rates. The amount of consumption will be the same under either policy. There will be less investment if the policy of increasing government spending is chosen because some investment will be crowded out to accommodate the higher level of government spending. There will be more investment if the monetary supply expansion is chosen, because interest rates will be lower.

18. From the Fisher effect, we know that $i = r + \pi$ and we know that prices (inflation) is fixed in the short run. Since the monetary policy decreased the supply of money, real interest rates increase (LM shifts to the left). Since prices are fixed in the short run, and increase in $r$ will lead to an increase in $i$. Therefore, initially nominal interest rates increase. In the long run, prices can change and since the level of output is below the natural rate of output, prices will decrease. This will lead to a decrease in $\pi$. As prices decrease, the LM curve slowly starts moving back to the right. With that, real interest rates decrease to the same level as before the policy. Hence, $r$ is back to the original level and $\pi$ is lower, which means that $i$ is lower than it originally was.

Therefore, nominal interest rates increase in the short run and decrease in the long run due to a contractionary monetary policy.
19. The standard of living will be higher in Sahara \( \left( Y_S > Y_T \right) \).

20.a. When OPEC dramatically increases the price of oil, prices in the economy rise, the LM curve shifts to the left (1). Consequently, income decreases from \( Y_1 \) to \( Y_2 \) and the interest rates increase from \( r_1 \) to \( r_2 \). The United States finds itself at point B in the short-run.

20.b. When prices increase, the SRAS curve shifts upwards (2). Consequently, income decreases from \( Y_1 \) to \( Y_2 \). Income decreases due to lower investment (I) arising from a higher interest rate. The economy moves from point A to point B.

20.c. The economy finds itself in the short-run equilibrium below the natural rate of output: \( Y_2 < Y_1 \) (point B). Because aggregate demand is lower than the long-run aggregate supply at the price level \( P_2 \), there will be a downward pressure on the price level. Over time, prices can change and they adjust. Therefore, prices fall over time and eventually reach level \( P_1 \), which is the same as the original price level. At that point, the economy is in the long-run equilibrium (point C). Income increases from \( Y_2 \) to \( Y_1 \) and prices decrease from \( P_2 \) to \( P_1 \). Since prices decrease, the supply of real money balances increases (↑ \( M/P \)) and the LM curve shifts right (3) back to LM1. Consequently, interest rates decrease and come back to their original level.
20.d.
20.e. Policymakers could either employ an expansionary fiscal or an expansionary monetary policy. Either of those would shift the AD curve to the right and bring income back to the long-run level. However, prices would remain permanently higher.

21. Quantitative Easing was the policy pursued by the Fed and it is a form of a monetary policy where the Fed increases the money supply by buying non-traditional assets such as mortgage-backed securities (MBS) and other asset-backed securities (ABS). Typically, when the Fed increases the money supply, it buys US treasuries as these are considered the safest assets. During the Great Recession, financial institutions that were in trouble either did not have any treasuries or were not willing to sell them as they were considered safe. Hence, the Fed relaxed the rules of what type of assets they would buy and for long they would hold them. The result was a large increase in the monetary base in the US economy.

22. When a firm is highly leveraged, it has a small share of its own capital to total assets. Most of the assets are liabilities to other lenders (borrowed funds). When there is a decrease in total assets (due to a financial crisis), total capital becomes smaller than firm's liabilities (own capital is not enough to absorb the loss) and the firm cannot meet all of its obligations. Hence, the firm is bankrupt. The more highly the leverage, the smaller the loss in total assets needs to be for the firm to go bankrupt.

23. If the government wanted to reduce the natural rate of unemployment it would either increase the rate of job finding \( f \) and/or decrease the rate of job separation \( s \).

Since frictional unemployment is the natural rate of unemployment, any government policy that reduces \( s \) or increases \( f \) would decrease frictional unemployment. Some examples would include opening job finding agencies, helping unemployed workers relocate to a geographic location where more jobs are available, retrain workers to get skills which are more marketable and wanted in the labor market. Also, the government could reduce the unemployment benefits.

Structural unemployment is a direct cause of a wage rate that is above the equilibrium level. Anything that would lower the wage rate to the equilibrium level would reduce structural unemployment. An example would be to reduce the minimum wage or to remove/limit unionization of workers.

24. The statement “inflation is always and everywhere a monetary phenomenon" is true because inflation comes from the growth of the money supply. According to the quantity theory, \( \%\Delta M + \%\Delta V = \%\Delta P + \%\Delta Y \), so if the money supply \( (M) \) grows faster than real output \( (Y) \), this is translated into higher prices \( (P) \), which means inflation.

The statement “inflation is always and everywhere a fiscal phenomenon" is also true because the root cause of inflation lies in the reason of why the money supply grows faster than real output. What usually happens is that the government runs into fiscal problems and faces a budget deficit. Instead of being fiscally responsible by either decreasing government expenditure or increasing taxes, the government opts of an easier (at least in the short-run) solution by printing money to cover the budget deficit. And this phenomenon of printing money to cover the fiscal deficit is known as seignorage.
25.a. According to the neoclassical theory of distribution, the real wage equals the marginal product of labor. Because of diminishing returns to labor, a decrease in the labor force causes the marginal product of labor to rise. Hence, the real wage rises. The return to capital decreases as each unit of capital is used less intensely.

25.b Error! Reference source not found.. The real rental price equals the marginal product of capital. If a developing country receives a large gift of capital, the marginal product of capital falls due to diminishing returns to capital and, hence, the real rental price falls. Wages increase as each worker has more capital to work with and is more productive.
25.c. If an improvement in country’s institutions improves the production function, this is likely to increase the marginal products of both capital and labor. Hence, the real wage and the real rental price both increase.

26. Shocks:
Demand: fall in housing prices, decline in the stock market, fall in both consumer and producer confidence → shift of the IS curve to the left.
Supply: an increase in the price of oil → shift of the LM curve to the left
The effect of both of these shocks was a decrease in total income (output).