Instructions: Please explain all your answers to the multiple choice questions when submitting this practice exam as a homework. You also need to submit all your work for the solutions to the second part (model questions).

Good luck!

PART I MULTIPLE CHOICE QUESTIONS

Instructions: This part consists of 20 multiple-choice questions, each of which is worth 3 points. Circle one and only one answer.

1. An increase in the rate of interest will increase household saving because
   a. It will shift the saving supply to the right.
   b. Investment demand will decrease.
   c. The investment demand curve will shift up and hence saving will go up.
   d. It makes future consumption cheaper relative to present consumption.

2. According to the menu cost theory, unemployment may exist because
   a. It is costly for firms to frequently change their price lists.
   b. Of legal restrictions, like minimum wage laws.
   c. Prices are rigid downwards.
   d. Workers are paid less than their marginal products.

3. The cost of investment for a firm is
   a. The nominal interest rate.
   b. The real interest rate.
   c. The inflation rate.
   d. None of the above.

4. If the investment and savings functions are I(r) = 1/(3r) and S(r,Y) = 5Y, what is the resulting IS curve?
   a) r = 1/(5Y)
   b) r = 15Y
   c) r = 1/(15Y)
   d) r = 3/5Y
5. Suppose that \( r \) denotes the real interest rate, \( i \) denotes the nominal interest rate, and \( \pi \) denotes the inflation rate. Which of the following correctly summarizes the relationship between these three variables?
   a. \( r = i - \pi \)
   b. \( i = r\pi \)
   c. \( r = i + \pi \)
   d. \( r = \pi - i \)

6. Suppose that the per worker turnover cost for a firm is given by \( c = 0.33 / (w/p) \). What will be the efficiency wage level in this economy?
   a. 0.29
   b. 0.57
   c. 1.74
   d. 17.4

7. Consider a small open economy called Lagerland. If there is a positive productivity shock in Lagerland, how would the domestic capital market equilibrium be affected?
   a. The domestic interest rate will rise.
   b. The domestic interest rate will fall.
   c. The domestic interest rate will not be affected.
   d. The investment demand will fall.

8. Cyclical unemployment refers to
   a. unemployment that takes place because of business cycles.
   b. unemployment that takes place because of government policy.
   c. unemployment that takes place because of inefficiencies in the labor market.
   d. unemployment that takes place because of ordinary labor turnover.

9. Labor market equilibrium in a model with efficiency wages means that
   a. labor supplied equals labor demanded.
   b. the marginal cost of an increase in the real wage equals the marginal benefit of reduced labor turnover.
   c. involuntary unemployment equals zero.
   d. efficiency wages are less than the market clearing real wage.

10. According to the efficiency wage theory, employment is determined by
    a. Both labor demand and labor supply.
    b. Labor supply.
    c. Labor demanded.
    d. None of the above.

11. Suppose that a new tax is imposed on a firm every time it hires a worker. What would happen to the efficiency wage and unemployment as a result of this tax?
    a. Efficiency wage increases, unemployment decreases.
    b. Efficiency wage increases, unemployment increases.
    c. Efficiency wage decreases, unemployment decreases.
    d. Efficiency wage decreases, unemployment increases.
12. Which of the following is not a difference between the Classical and Keynesian economists?
   a. Classical economists believe that nominal wages adjust to changes in the price level instantaneously, whereas Keynesians do not.
   b. For Classical economists, money is neutral, whereas for Keynesians money is neutral only in the long-run.
   c. For Classical economists, the aggregate supply curve is vertical, whereas for Keynesians the aggregate supply curve is vertical only in the long-run.
   d. Classical economists use contract theory to explain unemployment, whereas Keynesians do not.

13. According to the principle of money neutrality, in the long-run a 50% decrease in the money supply would result in
   a. A 50% fall in output.
   b. A 50% fall in the price level.
   c. The price level doubling.
   d. Both a and b.

14. Which of the following statements is true about a situation in which real incomes are rising at 3% per year?
   a. If money is neutral then if money growth increases, people should see their real income fall.
   b. If inflation were 2% then people should see their nominal incomes rising at 5% a year.
   c. If inflation were 5% then people should see their nominal incomes rising at 5% a year.
   d. None of the above.

15. On average, the unemployment rate in the US is around
   a. 10%.
   b. 14%.
   c. 4%.
   d. 8%.

16. In an open economy, when domestic private saving is greater than domestic private investment
   a. Capital flows out of the country.
   b. Capital flows into the country.
   c. The country experiences a trade deficit.
   d. None of the above.

17. When realized inflation is greater than the expected inflation
   a. Borrowers benefit relative to their expectations.
   b. Borrowers lose relative to their expectations.
   c. Lenders gain relative to their expectations.
   d. No one gains or loses.
18. In a two period model, the lifetime budget constraint states that
   a. The present discounted value of lifetime consumption has to equal the present discounted value of lifetime income.
   b. Income in each period is split between savings and consumption.
   c. Sum of period 1 and period 2 consumption equals the sum of period 1 and period 2 income.
   d. All of the above.

19. According to the IS-LM model, an increase in government expenditures in a recession would
   a) Increase output, decrease interest rates
   b) Increase both output and interest rates
   c) Decrease both output and the interest rates
   d) Have no effect on output or the interest rates

20. If the annual real interest rate in an economy is 4%, then the present discounted value of $1,000 that you receive next year and the year after is
   a. 1980.3
   b. 1886.1
   c. 1961.1
   d. 1903.4

**PART II MODEL SOLVING**

*Instructions*: This part of the exam consists of three questions. Show all your calculations.

**Question 1**: \( L^3 = 0.6, \quad Y = 1.6L^D - 0.5(L^D)^2, \quad c(w/ p) = \frac{0.36}{w/p} \)

a.) **Efficiency wage**:

\[
\min_{\left\{ \frac{w}{p} \right\}} \left\{ (w/p)L + \left( \frac{0.36}{w/p} \right)L \right\}
\]

**FOC**: \( L - \frac{0.36L}{(w/p)^2} = 0 \Rightarrow L = \frac{0.36L}{(w/p)^2} \Rightarrow L(w/p)^2 = 0.36L \)

\( \Rightarrow (w/p)^{eff} = \sqrt{0.36} = 0.6 \)

**Labor demand (or total employment in the economy)**:

\[
\pi = Y - (total\ cost)
\]

\[
\Rightarrow \pi = (1.6L^D - 0.5(L^D)^2) - \left( (w/p)L + \frac{0.36}{w/p}L \right)
\]

Substituting \( w/p = 0.6 \), we get

\[
\Rightarrow \pi = (1.6L^D - 0.5(L^D)^2) - \left( 0.6L + \frac{0.36}{0.6}L \right)
\]
\[ \Rightarrow \pi = \left(0.4L^D - 0.5(L^D)^2\right) \]

To find the labor demand, we maximize profits subject to \( L^D \):

\[
\max_{L^D} \left\{0.4L^D - 0.5(L^D)^2\right\}
\]

FOC: \( 0.4 - L^D = 0 \Rightarrow L^D = 0.4 \)

b.) Equilibrium employment, output and unemployment rate?

\[ L^S = 0.6 \]
\[ Y = 1.6(L^D) - 0.5(L^D)^2 = 1.6(0.4) - 0.5(0.4)^2 \Rightarrow Y = 0.64 - 0.08 = 0.56 \]
\[ L^S - L^D = 0.6 - 0.4 = 0.2 \]

Unemployment Rate = \( \frac{0.2}{0.6} = 0.33 = 33\% \)

**Question 2.** \( Y = \log I, \ U(C_1, C_2) = \log C_1 + 0.9 \log C_2, \ Y_1 = 2, \ Y_2 = 0. \)

a.) HH’s problem will give us saving and consumption in each period.

\[
\max_{C_1, C_2} \left\{\log C_1 + 0.9 \log C_2\right\} \text{ s.t. } C_1 = 2 - S_1 \text{ and } C_2 = S_1(1+r). \]
\[
\max_{S_1} \left\{\log(2 - S_1) + 0.9 \log(S_1(1+r))\right\}
\]

FOC: \( \frac{-1}{2 - S_1} + 0.9 \frac{(1+r)}{S_1(1+r)} = 0 \Rightarrow 0.9(2 - S_1) = S_1 \Rightarrow S_1 = 0.95 \)

\[
C_1 = 2 - 0.95 = 1.05. \quad C_2 = (1 + r)0.95
\]

b.) Firm’s problem will give us investment demand function.

\[
\max_{Y, I} \left\{Y - (1 + r)I\right\} \text{ s.t. } Y = \log I
\]
\[
\max_{Y, I} \left\{\log I - (1 + r)I\right\}
\]

FOC: \( \frac{1}{I} - (1 + r) = 0 \Rightarrow 1 = I(1 + r) \Rightarrow I = \frac{1}{(1+r)} \)

\[
c.) \text{ Equilibrium interest rate, saving and investment?} \\
I = S \Rightarrow \frac{1}{(1+r)} = 0.95 \Rightarrow r = 0.05
\]

\[ S = I = 0.95 \]

**Question 3 (10 points) IS-LM Equilibrium**

Solved in class!