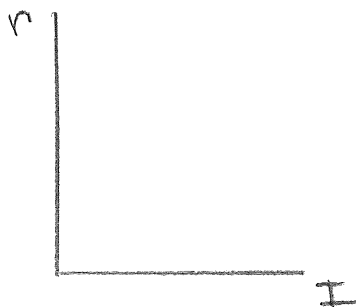


**Econ 362 Hanes, Spring 2024** The exam has 24 multiple choice questions for 1 pt each, and three written questions totalling 20 points. Look over the whole test before you begin. Good luck!

This is for 1) and 2). Consider an economy where the investment function is  $I = 14 - 7r$ . You make a graph like this:



For the line on the graph,

1) What is the vertical (or "Y") intercept (the value where the line hits the vertical axis)?

- a) 2      b) 14      c) -7      d) -1/7      e) -1/2

2) What is the slope?

- a) 2      b) 14      c) -7      d) -1/7      e) -1/2

3) "Real-wage rigidity" means an employer does not cut wages even though there is excess supply of labor. Which of the following reasons for real wage rigidity does *not* belong in the category "efficiency wages"?

- a) The workers in the firm belong to a union, and would respond to a wage cut by going on strike.
- b) If the firm's wages were lower, workers in the firm would be more likely to screw off on the job.
- c) An employer does not cut wages because the workers in the firm would quit at higher rates.
- d) An employer does not cut wages because the workers in the firm are at the edge of subsistence, and if their wages were lower they would suffer from malnutrition
- e) *All* of those reasons belong in the category "efficiency wages."

4) Suppose that in one of our models with an "investment function" there is no change in the nominal interest rate, but there is a change in expected future inflation: "before," people expected that inflation would be 2 percent next year; now, people expect that inflation will be 5 percent next year. What happens to the number of investment projects firms undertake. and to total investment spending?

- a) Increase in number of projects, increase in investment spending
- b) Increase in number of projects, decrease in investment spending
- c) Decrease in number of projects, decrease in investment spending
- d) Decrease in number of projects, increase in investment spending
- e) None of the above

5) Recall that the nominal exchange rate  $e$  is the number of units of foreign currency one can buy with a dollar, and the real exchange rate  $\epsilon$  is the number of units of foreign real output one can buy by giving up one unit of domestic real output. What is the real exchange rate equal to if the following is true?

- the nominal exchange rate is 10
  - the domestic price level  $P$  is 6
  - the foreign price level  $P^*$  is 3
- a) 20    b) 10    c) 5    d) 2    e) None of the above

6) Consider a closed economy. What is the "marginal propensity to consume" if, from one year to the next,

- real GDP increased from 10 units to 15 units
- taxes did not change
- government transfer spending fell from 3 units to 2 units
- consumption spending increased by 3 units

- a) 3/5    b) 3/4    c) 3/10    d) 3/15    e) None of the above

7) Look at the following table and figure out the value of US imports (US purchases of foreign goods and services).

Purchases by American residents of assets from foreigners	10
Purchases by foreign residents of assets from Americans	20
US exports (foreign purchases of US-produced goods and services)	5

- a) 5            b) 10    c) 15    d) 20    e) I do not have enough information to determine that

For 8)- 12), consider a small open economy in the long run (that is, assume  $Y = \bar{Y}$ ). What happens to the economy's net capital outflow (NCO), net exports (NX) and real exchange rate  $\varepsilon$  in response to the following events, assuming everything else remains fixed? Hint: draw graphs, and to keep the graphs simpler assume that prior to the event the economy had balanced trade.

8) There is an increase in the world real interest rate  $r^*$ .

- a) NCO up, NX up,  $\varepsilon$  down.  
b) NCO up, NX down,  $\varepsilon$  up.  
c) NCO down, NX up,  $\varepsilon$  down.  
d) NCO down, NX down,  $\varepsilon$  up.  
e) No change in NCO or NX,  $\varepsilon$  up.

9) Demand for the economy's exports increases, so the value of exports would be larger at any given  $\varepsilon$ .

- a) NCO up, NX up,  $\varepsilon$  down.  
b) NCO up, NX down,  $\varepsilon$  up.  
c) NCO down, NX up,  $\varepsilon$  down.  
d) NCO down, NX down,  $\varepsilon$  up.  
e) No change in NCO or NX,  $\varepsilon$  up.

10) There is a reduction in domestic investment opportunities so that investment spending is

lower at any given real interest rate.

- a) NCO up, NX up,  $\varepsilon$  down.
- b) NCO up, NX down,  $\varepsilon$  up.
- c) NCO down, NX up,  $\varepsilon$  down.
- d) NCO down, NX down,  $\varepsilon$  up.
- e) No change in NCO or NX,  $\varepsilon$  up.

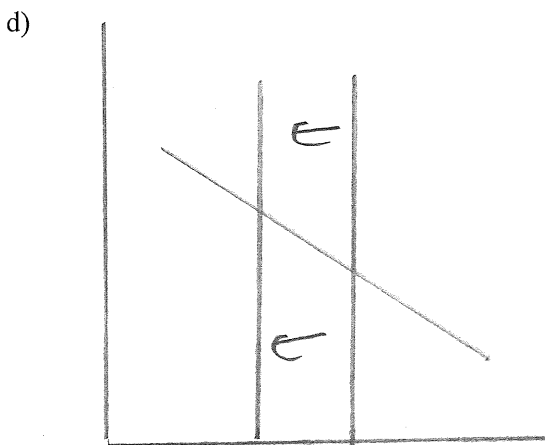
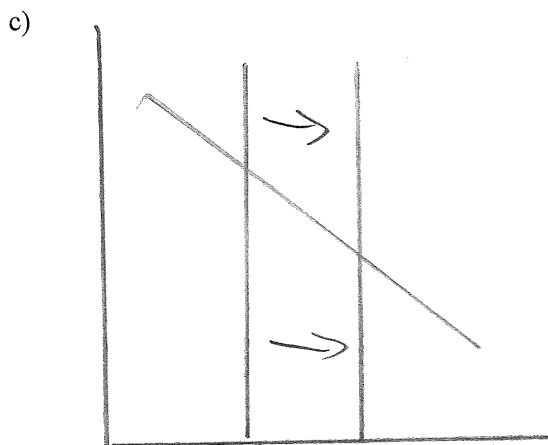
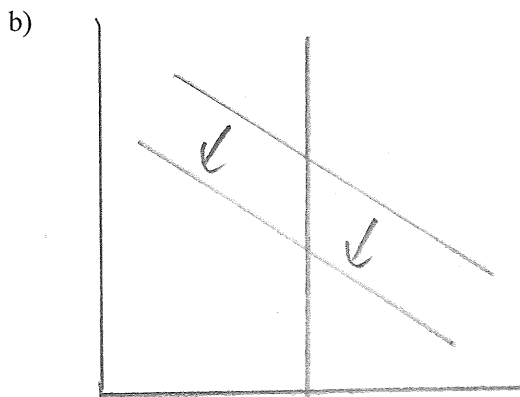
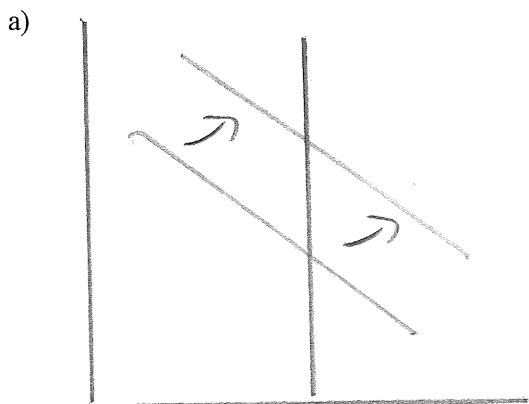
11) There is an increase in government purchases with no change in taxes net of transfers.

- a) NCO up, NX up,  $\varepsilon$  down.
- b) NCO up, NX down,  $\varepsilon$  up.
- c) NCO down, NX up,  $\varepsilon$  down.
- d) NCO down, NX down,  $\varepsilon$  up.
- e) No change in NCO or NX,  $\varepsilon$  up.

12) The economy imposes tariffs on imports.

- a) NCO up, NX up,  $\varepsilon$  down.
- b) NCO up, NX down,  $\varepsilon$  up.
- c) NCO down, NX up,  $\varepsilon$  down.
- d) NCO down, NX down,  $\varepsilon$  up.
- e) No change in NCO or NX,  $\varepsilon$  up.

The following “loanable funds” graphs are for 13) - 16). They depict possible events in a closed economy, of the normal kind described in the textbook, where output  $Y$  is always equal to the natural rate of output  $\bar{Y}$ . Below, I will ask you to tell me which graph corresponds to a particular event. More than one event may correspond to a given graph. Hint: first use the space below to get an equation for national savings  $\bar{S}$ .



Which graph depicts each of the following events?

13) There is an increase in government purchases of goods and services.

- a)    b)    c)    d)    e) None of the above

14) There is an increase in taxes net of transfers.

- a)    b)    c)    d)    e) None of the above

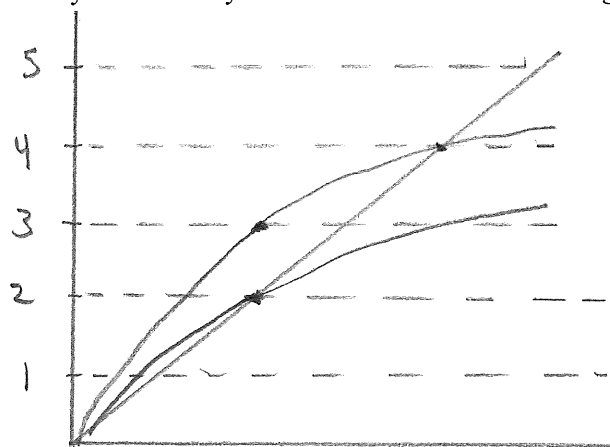
15) New software is developed which many firms want to buy.

- a)    b)    c)    d)    e) None of the above

16) There is an increase in the natural rate of output  $\bar{Y}$ .

- a)    b)    c)    d)    e) None of the above

The figure to the right, for questions 17) - 20), depicts an economy described by the Solow model of economic growth. The numbers on the vertical axis are units of stuff per worker.



17) What is long-run equilibrium (steady-state) output per worker?  
 a) 1    b) 2    c) 3    d) 4    e) None of the above

18) What is long-run equilibrium (steady-state) investment per worker?  
 a) 1    b) 2    c) 3    d) 4    e) None of the above

19) What is long-run equilibrium (steady-state) consumption per worker?  
 a) 1    b) 2    c) 3    d) 4    e) None of the above

20) If there is no population growth, what is the total amount of capital per worker that disappears every year due to depreciation, in long-run equilibrium?  
 a) 1    b) 2    c) 3    d) 4    e) None of the above

The following is for questions 21) - 24). Hint: you might want to draw a graph to get the answers. Consider a country that can be described by the Solow model of economic growth with population (labor force) growth. The economy is in its long-run equilibrium. Then the country is struck by an earthquake. In the earthquake no one is killed but lots of buildings and machinery are destroyed. In the years after the earthquake, the economy's savings rate is the same as the savings rate before the earthquake. **Compared with the situation just before the earthquake,**

21) What happens to output per person?  
 a) bigger in the short run, smaller in the long run.  
 b) smaller in the short run, bigger in the long run.  
 c) bigger in the short run, same in the long run.  
 d) smaller in the short run, same in the long run.  
 e) I do not have enough information to answer this question.

22) What happens to savings per person (not the savings rate, but savings per person)?  
 a) bigger in the short run, smaller in the long run.  
 b) smaller in the short run, bigger in the long run.  
 c) bigger in the short run, same in the long run.  
 d) smaller in the short run, same in the long run.  
 e) I do not have enough information to answer this question.

23) What happens to the marginal product of capital?  
 a) bigger in the short run, smaller in the long run.  
 b) smaller in the short run, bigger in the long run.  
 c) bigger in the short run, same in the long run.  
 d) smaller in the short run, same in the long run.  
 e) I do not have enough information to answer this question.

24) What happens to consumption per person?  
 a) bigger in the short run, smaller in the long run.  
 b) smaller in the short run, bigger in the long run.  
 c) bigger in the short run, same in the long run.  
 d) smaller in the short run, same in the long run.  
 e) I do not have enough information to answer this question.

Written questions. ON ALL QUESTIONS, SHOW YOUR WORK. I WILL NOT GIVE YOU CREDIT UNLESS I SEE HOW YOU GOT YOUR ANSWER.

1) Consider a closed economy that is similar to the model we have used in class in that:

$$C = a + b(Y - T) \quad \text{consumption function}$$

$$I = c - dr \quad \text{investment function}$$

$$T = \bar{T} \quad (\text{taxes net of transfers is exogenous})$$

But unlike the model we used in class, the quantity of government purchases is *not* exogenous. The government follows a policy of spending more when the economy is in a recession, and less in a boom. Thus:

$$G = k - zY \quad \text{where } k \text{ is a constant and } z \text{ (a positive number) is a coefficient.}$$

a) Using algebra, derive the equation that gives the natural rate of interest  $\bar{r}$  as a function of  $\bar{T}$  and  $\bar{Y}$  (that is,  $\bar{r}$  is on the left-hand side of the equation,  $\bar{T}$  and  $\bar{Y}$  and other things are on the right-hand side). 4 pts.

b) Using algebra, derive the equation that gives national savings  $\bar{S}$  when output is equal to the natural rate of output  $\bar{Y}$  (that is,  $\bar{S}$  is on the left-hand side of the equation,  $\bar{T}$  and  $\bar{Y}$  and other things are on the right-hand side). 4 pts.

II) 4 pts. This is about deriving the equilibrium rate of unemployment. As in the model presented in class,  $U$  is the total number of unemployed people.

$E$  is the total number of employed people.

The labor force  $L = U + E$ . The number of people in the labor force is fixed.

The unemployment rate is  $u = U/L$ .

The number of unemployed people finding jobs in a period is  $fU$  where  $f$  is a fraction (between zero and one).

*Unlike the model presented in class*, the number of employed people losing jobs in a period is affected by the number of unemployed people (because employers are more likely to fire a worker when it is easier to replace them). Thus the number of people becoming unemployed in a period is  $sE + hU$ ,  $s$  and  $h$  are fractions (between zero and one).

Derive the equilibrium value of the unemployment rate  $u$ . Show your work!

III) 10 pts. Consider an economy described by the Solow model of economic growth. The aggregate production function is  $Y = 4K^{1/2}L^{1/2}$ . The depreciation rate is  $\delta$ . The labor force (population) is fixed.

a) If the savings rate is  $s$ , what is  $k^*$ , capital per worker in the long-run steady state, in terms of  $s$  and  $\delta$ ? Show your work. 4 pts.

b) What is  $k_{Gold}^*$ , that is the "golden rule" value of long-run steady-state capital per worker? Show your work. 4 pts.