Economics 362 Macroeconomic Theory Hanes Fall 2025 Second midterm

There are 28 multiple choice questions for 2 pts. each, and three written questions totalling 38 pts.
Total points on exam: 94. Look over the whole test before you begin. Good luck!

1) Suppose that real GDP in an economy increases by 5 percent, while the population grows by 6 percent. What is the rate of growth of real GDP per person?
a) -2 percent b) -1 percent c) 0 percent d) 1 percent e) 2 percent

2) Here is some information about an economy. Using the information, calculate the average annual rate of growth in "total factor productivity" (the *A* parameter in the production function) from the year 1995 to 1999.
Share of capital in national income: 1/3
From 1995 to 1999, average annual rate of growth in: Real GDP: 5%
Labor input: 9%
Capital: 3%

a) -2% b) -1% c) 1% d) 2% e) None of the above

3) In recent years, there has been a decline in the share of national income going to pay wages and salaries. Which of the following is a possible explanation of this phenomenon?

a) Many product markets are imperfectly competitive, and monopoly firms' price mark-ups over marginal cost have been decreasing.
b) Many product markets are imperfectly competitive, and monopoly firms' price mark-ups over marginal cost have been increasing.
c) There has been a slowdown in the rate of growth of total factor productivity.
d) There has been a speedup in the rate of growth of total factor productivity
e) None of the above

4) Here are two equations that describe spending in an economy.
$I = 10 - 0.7r$ $C = 5 + 0.8(Y-T)$

What is the "marginal propensity to consume"? a) 10 b) -0.7 c) 5 d) 0.8 e) None of the above

5) Suppose that taxes in an economy increase by 20 units, while there is no change in households' factor income or transfer spending. Consumption spending decreases by 10 units. What is the marginal propensity to consume in this economy?
a) ½ b) 2 c) 10 d) 1/10 e) None of the above

6) What is the real interest rate *r* if the nominal interest rate *i* is 5 percent, the value of the price index this year is 100, and the expected value of what the price index will be next year is 105?
a) 5 percent b) 10 percent c) 15 percent d) 0 percent e) None of the above

7) What is the natural rate of output $\overline{Y}$ in an economy under the following circumstances?
The aggregate production function in an economy is $Y = K^{1/2}L^{1/2}$, where labor input $L$ is measured by number of workers.
The capital stock $\overline{K} = 4$.
The labor force is 5.
The natural rate of unemployment $\overline{u}$ (or $u^n$ ) is 20 percent (1/5).
a) 4 b) 5 c) 6 d) 7 e) None of the above

This information is for questions 8) - 12). Suppose the investment function for an economy is $I = 100 - 5r$, where $r$ is given as a percent.

8) In the "loanable funds" graph for the economy, what is the *slope* of the line that describes the relationship between the real interest rate and investment spending?
a) 100 b) 1/100 c) -5 d) -1/5 e) None of the above

9) In the "loanable funds" graph for the economy, what is the *intercept* of the line that describes the relationship between the real interest rate and investment spending?
a) 100 b) 1/100 c) -5 d) -1/5 e) None of the above

10) Suppose that the real interest rate in the economy *increased* from 1 percent to 3 percent. What would be the resulting change in investment spending *I*?
a) Decrease 5 units b) Decrease 10 units c) Decrease 15 units d) Decrease 20 units e) None of the above

11) What is the value of the real interest rate $r$ that would result in investment spending equal to *50* units?
a) 20 percent b) 10 percent c) 5 percent d) 1 percent e) None of the above

12) The textbook says: "We can also use our model to examine...the demand for investment.....One reason investment demand might increase is technological innovation. Suppose, for example, that someone invents a new technology....Before a firm or household can take advantage of the innovation, it must buy investment goods." How might such an even be depicted in terms of the investment function above?
a) As a decrease in the real interest rate $r$. b) As a change in the coefficient on $r$ from *-5* to *-3*
c) As a change in the constant from *100* to *120* d) As a change in the constant from *100* to *90*
e) None of the above

13) What is "public saving" equal to, in terms of the notation used in the textbook?
a) $S$ b) $S$-$I$ c) $G$-$T$ d) $T$-$G$ e) $Y$-$T$-$C$

14) What is "private saving" equal to, in terms of the notation used in the textbook?
a) $S$ b) $S$-$I$ c) $G$-$T$ d) $T$-$G$ e) $Y$-$T$-$C$

15) What is "net capital outflow" (NCO, also called net foreign investment NFI) equal to, in terms of the notation used in the textbook?
a) $S$ b) $S$-$I$ c) $G$-$T$ d) $T$-$G$ e) $Y$-$T$-$C$

16) What is the government budget deficit equal to, in terms of the notation used in the textbook?
a) $S$ b) $S$-$I$ c) $G$-$T$ d) $T$-$G$ e) $Y$-$T$-$C$

17) What is the nominal exchange rate $e$ for the U.S. if one dollar buys you two euros?
a) ½ b) 2 c) 4 d) 8 e) None of the above

18) Suppose the only thing that people buy is beer. What is the real exchange $\epsilon$ for the U.S. under the following circumstances?
One dollar buys you two euros.
In the U.S., a beer costs 4 dollars.
In Europe, a beer costs 2 euros.

a) ½ b) 2 c) 4 d) 8 e) None of the above

19) In a closed economy just like the model we discussed in class, which of the following events would *increase* the natural rate of interest $\overline{r}$, holding everything else fixed?

I. An increase in government purchases of goods and services
II. A increase in the amount of consumption spending that would take place at a given value of disposable income
III. An increase in taxes

a) I only b) I and II c) I, II and III d) II and III e) III only

20) In a closed economy just like the model we discussed in class, which of the following events would *decrease* the natural rate of interest $\overline{r}$, holding everything else fixed?

I. An increase in transfers
II. An increase in the amount of investment spending $I$ that would take place at a given value of the real interest rate $r$.
III. An increase in the natural rate of output

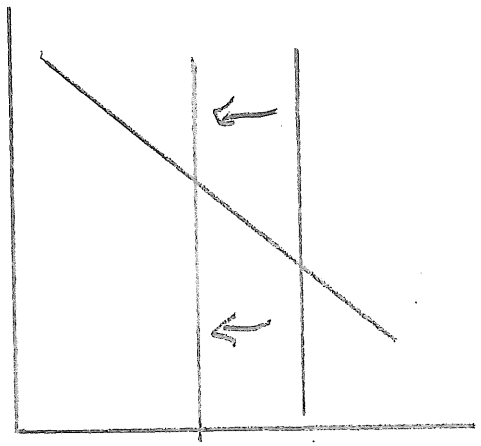
a) I only b) I and II c) I, II and III d) II and III e) III only

The following information is for 21) - 24). These four "loanable funds" graphs depict possible events in a closed economy in which output is always equal to potential output (natural rate of output).In this economy, as in class:

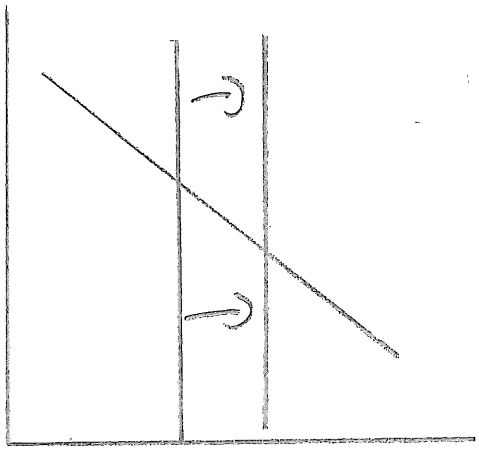
$Y = C + I + G$ $\quad C = a + b(Y - T)$ $\quad I = c - dr$ $\quad G = \overline{G}$ $\quad T = \overline{T}$

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: start by writing down an equation for national savings $\overline{S}$ .

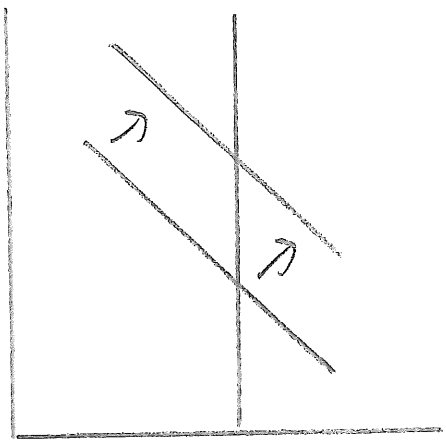
a)



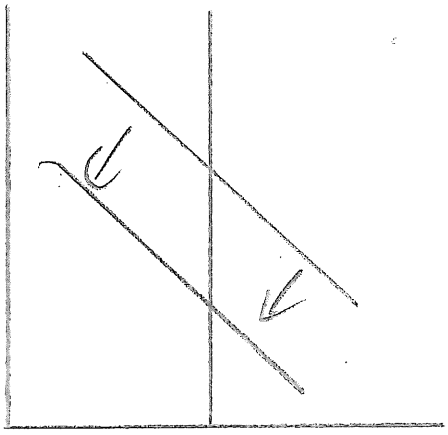
b)



c)



d)



Which graph corresponds to each of the following events?

21) $C = a + b(Y-T)$ and there is a decrease in $a$. a) b) c) d) e) None of the above

22) There is a decrease in taxes net of transfers. a) b) c) d) e) None of the above

23) "The government increases personal income taxes and uses the extra revenue to provide tax cuts for those who invest in new capital" (quote from textbook). Assume no net change in $T$. a) b) c) d) e) None of the above

24) There is an increase in the natural rate of output. a) b) c) d) e) None of the above

For 25)- 28), consider a small open economy in the long run (that is, assume $Y = \overline{Y}$ ). In this economy, as in class:

$Y = C + I + G + NX$ $\quad C = a + b(Y - T)$ $\quad I = c - d\,r$ $\quad G = \overline{G}$ $\quad T = \overline{T}$

$NX = z - j\epsilon$

What happens to the economy's net capital outflow (NCO), net exports (NX) and real exchange rate in response to the following events, assuming everything else remains fixed? Hints: start by writing down an equation for national savings $\overline{S}$ ; in the spaces I left below draw graphs; for simplicity assume that "before" the economy is in a state of *balanced trade*.

25) There is an increase in government purchases of goods and services.
a) NCO increases, NX increases, real exchange rate depreciates (ε decreases)
b) NCO increases, NX decreases, real exchange rate appreciates (ε increases)
c) NCO decreases, NX increases, real exchange rate depreciates (ε decreases).
d) NCO decreases, NX decreases, real exchange rate appreciates (ε increases).
e) None of the above.

26) There is an increase in the world real interest rate $r^*$.
a) NCO increases, NX increases, real exchange rate depreciates (ε decreases)
b) NCO increases, NX decreases, real exchange rate appreciates (ε increases)
c) NCO decreases, NX increases, real exchange rate depreciates (ε decreases).
d) NCO decreases, NX decreases, real exchange rate appreciates (ε increases).
e) None of the above.

27) There is an increase in the natural rate of output $\overline{Y}$.
a) NCO increases, NX increases, real exchange rate depreciates (ε decreases)
b) NCO increases, NX decreases, real exchange rate appreciates (ε increases)
c) NCO decreases, NX increases, real exchange rate depreciates (ε decreases).
d) NCO decreases, NX decreases, real exchange rate appreciates (ε increases).
e) None of the above.

28) The domestic government imposes tariffs on imported goods, so domestic demand for imports would be smaller at any given real exchange rate. (Other taxes are cut at the same time, so there is no change in total taxes net of transfers.)
a) NCO increases, NX increases, real exchange rate depreciates (ε decreases)
b) NCO increases, NX decreases, real exchange rate appreciates (ε increases)
c) NCO decreases, NX increases, real exchange rate depreciates (ε decreases).
d) NCO decreases, NX decreases, real exchange rate appreciates (ε increases).
e) None of the above.

**Written questions**

I) Consider a "closed economy" in which

$$Y = C + I + G$$
$$C = a + b(Y - T) - hr$$
$$I = c - dr$$
$$G = \overline{G}$$
$$T = \overline{T}$$

Note that this economy is somewhat different from the one in the model presented in the textbook and class: in this economy, consumption spending is negatively related to the real interest rate. $h$ is the coefficient that gives the magnitude of this relationship.

a) 6 pts. Using algebra, derive the equation that gives national savings $S$ when output is equal to the natural rate of output $\overline{Y}$ in this economy. We called this $\overline{S}$.

b) 6 pts. Using your answer to a) and the investment equation ($I = c - dr$), derive the natural rate of interest $\overline{r}$ for this economy. Your answer should be an equation with $\overline{r}$ alone on the left-hand side.

c) 6 pts. Draw what the "loanable funds graph" looks like in this economy (the economy set out on the previous page). Mark the natural rate of interest $\overline{r}$ on the vertical axis.

II) 10 pts. This question is about the equilibrium unemployment rate. Suppose that, as in the model presented in class,
The total labor force $L$ is made up of employed people and unemployed people.
$U$ is the total number of unemployed people.
$E$ is the total number of employed people.
The unemployment rate is $u = U/L$.
The number of employed people losing jobs in a period is $sE$ where $s$ is a fraction (between zero and one).
The number of unemployed people finding jobs in a period is $fU$ where $f$ is a fraction (between zero and one).
But unlike the model presented in class, the size of the labor force is not fixed. Instead, it is growing. In every period, there are new entrants to the labor force. New entrants enter the pool of unemployed, just like the existing workers who become unemployed in that period. The number of new entrants to the labor force in a period is equal to $gL$ where $g$ is a fraction between zero and one, and $L$ is the size of the labor force in that period. Derive the long-run equilibrium value of the unemployment rate $u$. Show your work!

III) 10 pts. Consider a closed economy in which all markets are perfectly competitive. The aggregate production function is $Y = 10K^{\alpha}L^{1-\alpha}$. Using calculus and algebra, demonstrate that the share of national income going to labor in this economy is equal to $(1-\alpha)$. Show your work!