SUNY-Binghamton **Name** _____

Fall 2023 Economics 450 Monetary Economics Hanes

First midterm exam

No calculators. Total points on exam: 135**.** Look over the entire exam before you begin. If you need more room for an answer, continue it on the blank pages at the end. Good luck!

1) 5 pts. Suppose you buy a zero-coupon bond today, in September 2023, for $20. The bond's IOU promises to pay the bearer $100 in September 2025, two years from today. In September 2024 you sell the bond for $22. What rate of return did you receive, in percent?

_____ percent

2) 5 pts. Suppose you buy a zero-coupon bond today, in September 2023, for $100. The bond's IOU promises to pay the bearer $400 in September 2025, two years from today. What is the yield to maturity on the bond, in percent?

_____percent

3) Consider a three-year coupon bond that you can buy today in September 2023. The bond will make coupon payments in September 2024, September 2025, and September 2026, and ***also pay off its face value (or par value) in September 2026***. The face value is $60. The coupon rate, expressed as a fraction is 1/3 (as a percent that's 33.3333333...). You look on a website and see that current yields to maturity on "zero coupon" bonds are:

400% for bonds paying off in September 2024
100% for bonds paying off in September 2025
100% for bonds paying off in September 2026

a) 10 pts. Calculate the highest price anyone should be willing to pay for this bond. I am looking for an actual dollar value. You can do it!

b) 5 pts. Using the price you calculated in a) and as many actual numbers as possible, write (do not solve) a formula that defines the bond's yield to maturity. Point out which symbol in the formula stands for yield to maturity.

4) 10 pts. What is the “duration” of a bond? Why would an investor care about a bond’s duration? Explain.

5) 10 pts. What is "ledger money"? Note that I am asking for a definition, not an example.

6) 10 pts. What does “screening” mean, in the context of lending?

7) 10 pts. Suppose the "expectations hypothesis" is correct: people care only about the expected value of the return on an investment. Suppose also that the Tesla corporation has issued bonds. Financial market participants believe there is a probability of ½ that Tesla will default (totally default) on its bonds because its CEO, Elon Musk, is such a tool. What is today's market price of a zero-coupon bond issed by Tesla that will pay an IOU of $300 one year from today, if today's yield on one-year zero-coupon Treasury bonds is 50 percent? Show your work.

$_____ (market price)

8) 10 pts. Suppose that you are a sleazy person and you are employed by Standard and Poor's, a company that rates bonds. Looking at papers on your boss's desk, you see that *tomorrow* Standard and Poor's will announce that it has changed the rating on Tesla bonds from AA to BBB. You own Tesla bonds yourself. *Today*, will you buy more of the bonds, sell the bonds you own, or do nothing? Explain why.

9) 10 pts. Look at the following sets of yields and interest rates. Each column gives a hypothetical set of interest rates and yields that might prevail on a certain day. Only one of the columns could exist in reality - in all of the other columns, there is something about the interest rates which is not consistent with what you have learned.

Loan or bond	Interest rate or yield, in percent				
	a)	b)	c)	d)	e)
U.S. Treasury bond maturing in five years	3	3	3	3	3
Ford Motor Co. bond maturing in five years	3	4	3	4	3
Loan to Ford Motor Co. due in five years	3	4	4	5	4

Which is the column that could exist in reality? _____

Explain why column b) could not exist in reality:

Explain why column c) could not exist in reality:

10) 10 pts. Colleges do not pay income taxes on the earnings from investment of their endowments. Colleges almost never hold municipal bonds. Explain the connection between these two facts.

11) 20 pts. Suppose the "expectations hypothesis" of the yield curve is correct. That is, there are no term premiums. Today, the Fed's target overnight rate is 0%. People are sure it will remain 0% through the end of this year. After that, they believe, there are two things that can happen. With a probability of 1/2, the Fed will keep the target overnight rate at 0% for many years. With a probability of 1/2, the Fed will raise the target overnight rate to 3% and keep it at 3% for many years. In the space below, figure out what yields will be for one-year, two-year and three-year zero-coupon Treasury bonds. **Show your work**. At the bottom, plot the yield curve.

a) What is ${}_1i$? _____ percent

b) What is ${}_2i$? _____percent

b) What is ${}_3i$? _____percent

c) Yield curve

12) 20 pts. Suppose that there *are* term premiums in bond yields.
a) Today, the overnight rate is 4 percent. People believe that future overnight rates may be higher, lower, or the same as they are today. Specifically,
there is a probability of 1/3 that the overnight rate will remain the same in the future as it is today
1/3 that at some time this year or later (not sure when) the overnight rate will be hiked to 6 percent
1/3 that at some time this year or later (not sure when) the overnight rate will be cut to 2 percent
What does the yield curve look like today?
On the graph, use a dotted line to draw
what the yield curve would look like
if the expectations hypothesis were correct.
Use a solid line to draw what the yield curve
looks like with term premiums.

b) Tomorrow, beliefs change somewhat. People still believe that future overnight rates may be higher, lower, or the same as they are today. But specifically,
there is a probability of 1/3 that the overnight rate will remain the same in the future as it is today
1/3 that at some time this year or later (not sure when) the overnight rate will be hiked to **7** percent
1/3 that at some time this year or later (not sure when) the overnight rate will be cut to **1** percent
What does the yield curve look like tomorrow?
On the graph, use a dotted line to draw what
the yield curve would look like if the expectations
hypothesis were correct. Use a solid line to draw
what the yield curve looks like with
term premiums.

Is tomorrow's yield curve with term premiums different from the one you drew for a)? **Explain why or why not.**