Economics 450 Hanes Spring 2021 First midterm practice questions

1) 5 pts. Suppose you buy a zero-coupon bond today, in September 2020, for $20. The bond's IOU promises to pay the bearer $100 in September 2022, two years from today. In September 2021 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 2020, for $100. The bond's IOU promises to pay the bearer $400 in September 2022, 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 2020. The bond will make coupon payments in September 2021, September 2022, and September 2023, and ***also pay off its face value (or par value) in September 2023***. 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 2021
100% for bonds paying off in September 2022
100% for bonds paying off in September 2023

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. Consider a zero-coupon bond with a maturity of 10 years, compared with a coupon bond with a maturity of 10 years (the bond's last payment is made ten years from now). Is the "duration" of these two bonds the same, or different? If different, which bond has the longer duration? Explain why.

5) 10 pts. Suppose yields at all maturities are 3 percent. You have three friends who hold bonds. Jane holds nothing but one-year zero-coupon bonds. John holds nothing but 10-year fixed-payment bonds. Jean holds nothing but consols. Unexpectedly, yields at all maturities rise to 5 percent. Which of your friends suffers the biggest percentage loss in the value of his or her bonds? Explain why.

7) 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:

8) 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.

9) 10 pts. Suppose that a bond rating agency "downgrades" the rating on a bond from AA to BBB. Is the yield on the bond likely to increase, decrease, or remain the same? Explain why.

10) 10 pts. This question is about "bid-ask spreads" on bonds.
a) What is the "bid-ask spread" on a bond?

b) Comparing across bonds, other things equal, bonds with larger bid-ask spreads tend to have higher yields (taking the yield to be the average of the bid and ask yields). Why?

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4) 10 pts. Draw the yield curve under each of the following circumstances. With a dotted line, draw what the yield curve would look like under the expectations hypothesis alone, without term premiums. With a solid line, draw the actual yield curve with term premiums.

a) We think future overnight rates may be higher, lower, or the same as today's - all possibilities equally likely.

b) We think future overnight rates may be the same as today's or higher.

5) 10 pts Suppose the "expectations hypothesis" is completely correct, that is all people care about is the expected values of returns of their investment. The IBM corporation has issued bonds in the past. There is an IBM bond that promises to pay the bearer $300 one year from now (in February 2021). IBM is in trouble. There is a probability of fifty percent (one half) that it will be bankrupt before February 2021, in which case it will not pay the IOU on that bond. Calculate today's market price of the bond assuming today's yield on one-year zero-coupon U.S. Treasury bonds is 50 percent. Show your calculations below.

$_____

6) 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. On a suitable graph plot today’s yield curve. Put numbers on the vertical axis. Be precise. Exact numbers matter. Show your work.