MTH 351
Half Exam 4
Fall 2020

50 points possible. (Five problems, 10 points each.)

1. A 3000 par value 30-year bond has 8% semiannual coupons, and is callable at the end of the 15th through the 29th years.

If called at the end of years 15 through 20, the redemption value would be 3500.

If called at the end of years 21 through 29, the redemption value would be 3100.

If it matures, at the end of year 30, the redemption value would be 3000.

Find the price to yield 7% convertible semiannually.

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2. An association had a fund balance of 250 on Jan 1 and 550 on Dec 31. The association deposited 30 at the end of every month for 11 months, from Jan 31 through Nov 30, inclusive. There were withdrawals of 20 on Apr 30, and 40 on Oct 31. Calculate the dollar-weighted rate of return for the year.

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3. You are given the following table of interest rates (in percents):

y	i_1^y	i_2^y	i_3^y	i^{y+3}	Portfolio Year
1998	7.0	6.5	6.0	5.8	2001
1999	6.4	6.1	5.8	5.9	2002
2000	6.2	6.0	5.9	6.0	2003
2001	6.1	5.9	6.1	6.4	2004
2002	6.0	6.1	6.3	6.6	2005
2003	6.4	6.6	6.7		
2004	6.8	7.0			
2005	7.5				

Lennox invests 3000 in a fund on January 1, 2000. The fund uses the investment year method of determining interest rates. Calculate the amount that Lennox will have at the end of 2005.

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4. You are given the following term structure of spot interest rates:

Term (in Years)	Spot Interest Rate
1	6.00%
2	7.00%
3	7.75%
4	8.25%
5	8.50%

Find the following expected forward rates:

(a) 3-year deferred 1-year forward rate.

(b) 3-year deferred 2-year forward rate.

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5. Find the duration of a perpetuity-immediate with annual payments of 100, using an effective annual interest rate of 7%.