

AS2053- Intersession 2011 - TESTS

TEST1

QUESTIONS:

1. At what rate of simple interest will \$1,000 accumulate to \$1,120 in 2 years, 3 months?
A) 5.20% B) 5.30% C) 5.33% D) 5.35% E) 5.39%

2. \$250 is deposited on February 28th, 2011 into a new account. Given a simple discount rate of $d=6\%$, determine the accumulated value of the account on May 18th, 2011. Assume the bankers rule (ordinary simple interest) is used for t .
A) \$253.25 B) 253.29 C) 253.34 D) \$253.38 E) 253.44

3. Mrs. Smith borrows \$12,000. She pays this loan of with 3 payments as follows; a \$200 payment 100 days after the loan is advanced, a \$8,000 payment 300 days after the loan has advanced and a final payment of \$Y 350 days after the loan has advanced. The loan interest rate is $r=10\%$. Assuming the Declining Balance method is used, determine \$Y.
A) \$4,859.02 B) 4,836.08 C) 4,827.40 D) \$4,851.87 E) 4,931.65

4. A \$5,000 non-interest bearing promissory note (with an original term of 5 years) is due on October 3, 2011. On May 15th, 2011 the note was sold to a bank that charges interest at $j_{12}=12\%$. How much did the bank pay for this note? Assume the practical (or approximate) method is used for fractional time periods.
A) \$4,757.33 B) \$4,779.23 C) \$4,780.79 D) \$5,179.48 E) 4,776.10

5. It is known that an investment of \$1,000 will accumulate to \$1,825 at the end of 10 years at a varying simple interest rate. You are given that the \$1,000 investment earns interest at a simple interest rate r during the first year, $2r$ during the second year, $3r$ during the third year, $4r$ during the fourth year, $5r$ during the fifth year, $6r$ during the sixth year, $7r$ during the seventh year, $8r$ during the eighth year, $9r$ during the ninth year and $10r$ during the tenth year. Determine r .
(A) 1.50% B) 1.25% C) 1.00% D) 0.75% E) 2.50%

6. How many years will it take \$2,000 to earn \$800 interest if $j_4=10\%$?
A) 3.30 years B) 3.35 years C) 3.38 years D) 3.41 years E) 3.43 years

7. A manufacturing company has just received an invoice for \$20,000 for a shipment of various stock items. The terms of the invoice are 2/20 n/75. What is the highest rate of interest that the company can afford to borrow funds in order take advantage of the cash discount?

- A) 13.54% B) 12.12% C) 8.23% D) 14.19% E) 13.65%

8. An individual invests \$2,500 into an account earning interest at 8% compounded semi-annually. Another individual invests the same amount into an account that credits interest at a simple discount rate d . At the end of 6 months, the accumulated values in the two accounts are equal. Determine d . Use a focal date of 6 months

- A) 8.00% B) 7.69% C) 8.20% D) 7.94% E) 6.79%

9. A 180 day promissory note for \$2,000 bears 14% simple interest. After 60 days it is sold at a simple discount rate of 12%. What simple interest rate did the original note owner actually earn (answers are rounded to the nearest $1/10^{\text{th}}$ of a percent)?

- A) 16.4% B) 15.9% C) 14.8% D) 14.0% E) 14.2%

10. A student borrows \$2,000 today and they agree to pay off the loan with one payment of \$2,590.06 to be made at the end of 3 years time. It is then agreed that, instead of paying off the loan with one payment, the student can pay off the loan with a payment of \$1,000 one year from now and \$X two years from now. Given that $j_2=6\%$, determine \$X.

- A) \$1,529.16 B) \$1,380.48 C) \$1,286.20 D) \$1,190.12

11. You shop around for the best interest rate and have narrowed your choices to the following:

- Bank I: $j_1 = 8\%$
Bank II: $j_4 = 7.75\%$
Bank III: $j_6 = 7.60\%$

You wish to have \$S in 3 years. What is the present value of S? Put the banks in order, from lowest to highest present value of S.

- A) $I < II < III$ B) $III < II < I$ C) $II < I < III$ (D) $III < I < II$

12. 100,000 was deposited into an investment account earning interest at 8% compounded quarterly for five years. How much interest was earned in the third year?

- A) \$10,454.39 B) \$10,231.14 C) \$9,852.36 D) 9,434.37 E) \$9,658.24

AS2053- Intersession 2011 - TEST 2 (70 minutes)

QUESTIONS:

1. You invest \$1,000 for 3 years in a fund earning $j_1 = 6\%$ in the first year, $j_2 = x\%$ in the second year, and $j_3 = 8\%$ in the third year. You are given that the total amount of interest earned over the three year period is \$264.98. Calculate x .
A) 10.00% B) 9.75% C) 8.5% D) 8.05% E) 7.31%
2. If inflation is 3.4% per year, what does the purchasing power of \$100 today become in 10 years?
A) \$71.58 B) \$74.60 C) \$82.19 D) \$84.77 E) 139.70
3. An individual borrows \$10,000 at $j_4 = 8\%$. They are to pay off this loan with quarterly payments of \$X over ten years, the first payment to be made 3 months after the loan is advanced. Calculate \$X.
A) \$365.56 B) \$338.75 C) \$317.01 D) \$296.74 E) \$275.95
4. A \$30,000 loan is to be paid back with n quarterly payments of \$1,500 at $j_4 = 8\%$ (with the 1st payment made 3 months after the loan is taken out), followed by one final payment that will be less than \$1,500. What is the total number of loan payments that is required?
A) 29 B) 28 C) 27 D) 26 E) 25
5. An annuity provides for payments of \$100 at the end of every 6 months for 15 years. The annuity interest rate is 4% compounded quarterly. What is the present value of the annuity?
A) \$1,108 B) 1,654 C) 1,721 D) 1,832 E) 2,237
6. An individual deposits \$80 at the end of every 3 months for five years into an account that earns interest at $j_4 = x\%$. At the end of 5 years, they have accumulated \$2,200. Using linear interpolation, determine x . The following annuity factors should help speed up your calculations
 $s_{\overline{20}|.03} = 26.870$ $s_{\overline{20}|.0325} = 27.564$ $s_{\overline{20}|.035} = 28.279$
A) 13.09% B) 12.91% C) 12.75% D) 12.84% E) 12.45%
7. A couple takes out a mortgage for \$135,000. The term of the mortgage is 5 years, and the amortization period is 20 years. If the mortgage rate is 8% compounded semi-annually, what is the size of their weekly mortgage payment?
A) \$237.02 B) \$239.14 C) \$257.42 D) \$297.43 E) \$474.04
8. A corporation invests \$26,655 today to provide for an annual perpetuity of \$R and, the first payment is to be paid five years from now. If $j_2 = 7\%$, determine \$R (to the nearest dollar).
A) \$1,899 B) \$2,415 C) \$2,334 D) \$2,588 E) 2,500

9. The present value at j_{12} of a \$10,000 payment today, followed by 32 monthly payments of \$5000 is \$136,335.69. What is the present value of 33 monthly payments of \$2000, first payment made today, if these payments earn the same interest rate, j_{12} ?

A) \$48,534.28 B) \$50,534.28 C) \$52,534.28 D) Cannot be determined

10. An individual makes quarterly deposits into a savings account for 10 years. He deposits \$250 at the end of each quarter for the first 5 years, and then doubles the size of his deposit for the next 5 years. Assuming that $j_4=10\%$, find the accumulated account value five years after the last deposit is made.

The following annuity factors may help speed up your calculations.

$$s_{\overline{20}|.025} = 25.545 \qquad s_{\overline{40}|.025} = 67.403 \qquad s_{\overline{60}|.025} = 135.992$$

A) \$23,237 B) \$28,492 C) \$31,098 D) \$38,076 E) \$40,255

11. You deposit \$300 every 3-months. Your first deposit is made November 8, 2002 and your final deposit is made November 8, 2010. If the deposits earn $j_4 = 8\%$, how much did you have immediately after the deposit on November 8, 2010?

A) \$13,833.47 B) \$12,713.83 C) \$13,268.11 D) \$13,533.47 E) \$13,341.98

12. Payments of \$100 are deposited into a savings account at the beginning of every six months for five years. What of the following is a correct expression for the accumulated value of this account at the end of five years if interest is at 10% compounded semi-annually for the first three years, and 8% compounded semi-annually for years four and five?

A) $100 \ddot{s}_{\overline{5}|5\%} (1.04)^5 + 100 s_{\overline{5}|4\%} (1.04)$

B) $100 \ddot{s}_{\overline{6}|5\%} (1.04)^4 + 100 \ddot{s}_{\overline{4}|4\%} (1.04)$

C) $100 \ddot{s}_{\overline{5}|5\%} (1.04)^5 + 100 s_{\overline{4}|4\%} (1.04)$

D) $100 \ddot{s}_{\overline{6}|5\%} (1.04)^5 + 100 s_{\overline{4}|4\%} (1.04)$

E) $100 s_{\overline{7}|5\%} (1.04)^4 + 100 \ddot{s}_{\overline{3}|4\%}$

AS2053- Intersession 2011 - TEST 3 (70 minutes)

QUESTIONS:

- (1) You deposit \$200 in a savings account. Each succeeding annual deposit increases by 3%. How much has been saved in your account immediately after you make your 20th deposit if $j_1 = 6\%$?
- A) \$9,340.16 B) \$9,900.57 C) \$3,087.05 D) \$5,326.56 E) 17,026.83
- (2) An ordinary varying perpetuity has the following payments; the first payment is \$100 and each payment thereafter increases by \$100 until a payment of \$1,000 is made. Every payment thereafter is also \$1,000. Find the present value of this perpetuity assuming $j_1=5\%$. Answers are rounded to the nearest dollar
- You are given: $a_{\overline{9}|0.05} = 7.107822$ and $a_{\overline{10}|0.05} = 7.721734$
- A) \$3,223 B) \$5,298 C) \$12,893 D) \$13,367 E) \$16,216
- (3) A loan is being amortized with 20 level annual payments of principal and interest. The principal repaid in the 13th payment is \$801.45 and the interest portion of the 13th payment is \$698.55. What is the effective annual rate of interest, j_1 , being charged on this loan?
- A) 11.01% B) 10.02% C) 9.37% D) 9.12% E) 8.15%
- (4) Exactly five years ago, a \$100,000 condominium was purchased by making a \$65,000 down payment and taking out a \$35,000 mortgage. The mortgage interest rate was $j_2 = 8\%$ and monthly mortgage payments of \$267.10 have been made at the end of each month for the past five years. What is the buyer's equity position today?
- You are given: $S_{\overline{60}|0.0065582} = 73.22814$
- (A) \$32,249 (B) \$67,249 (C) \$67,751 (D) \$80,441
- (5) A company has borrowed \$A and has agreed to pay interest on the loan every 3-months at $j_4 = 8\%$ and pay back the \$A in one lump sum at the end of 11 years. The company will make quarterly deposits in a sinking fund earning $j_4 = 4\%$ to accumulate to \$A by the end of 11 years. If the book value of the loan after 5 years is \$81,485, what is the value of A?
- (A) less than 135,000 (B) between 135,000 and 200,000
(C) between 200,000 and 250,000 (D) more than 250,000
- (6) A \$1,000 par value 10-year bond with coupons at $j_2=8.40\%$ is redeemable at 105. Calculate the price of this bond assuming $j_2=10\%$.
- A) \$905.35 B) \$910.50 C) 919.14 D) \$927.85 E) \$929.30

(7) Anderson takes out a loan of \$22,000 at $j_{12} = 9\%$ to be repaid over 5 years with monthly payments. After 24 payments, the outstanding balance on the loan is \$14,361.35, but Anderson misses the next 10 monthly payments. At the end of the 34th month, Anderson makes lump sum payment of \$3000 and refinances the loan such that he still can pay off the loan at the end of 5 years as per the original schedule. If the interest rate is unchanged, what is the new monthly payment (first payment made at time 35)?

- (A) \$473.39 (B) \$529.93 (C) \$519.04 (D) \$656.09

(8) A \$25,000 bond with level semi-annual coupons is redeemable 'at 105' in 5 years. You are given that $BVA_1 = \$ 22.50$. What is the price of the bond in order to yield $j_2 = 8\%$? Answers are rounded to the nearest dollar.

- A) \$25,270 B) \$25,980 C) \$26,520 D) \$27,451 E) \$28,290

(9) A \$100,000 bond pays annual coupons at $j_1 = 4.75\%$ and is redeemable at par in exactly 24 years. Its price today to yield $j_1 = x\%$ is \$109,500. Estimate x using the method of averages.

- A) 4.16% B) 5.40% C) 8.01% D) 8.31% E) 4.85%

(10) A \$5,000 bond paying interest at $j_2 = 7\%$ is redeemable at par on October 30th 2014. It was purchased on June 23, 2010 at a price that yields $j_2 = 8\%$. Determine the market quotation price (q). (Note: from your text tables, the day counts for April 30, June 23, and October 30th are 120, 174, and 303 respectively.

You are also given that $a_{\overline{9}|.04} = 7.43533$ and $a_{\overline{8}|.04} = 6.73274$

- A) 98.451 B) 98.10 C) 97.403 D) 97.13 E) 96.370

(11) A \$1000 bond is redeemable at par in 10 years and is callable at par after 7 years. The price of the bond to yield $j_2 = 10\%$ is

- \$982.37 assuming the bond is held to maturity
- \$975.48 assuming the bond is called after 7 years

Which of the following statements is true?

- (A) If you pay \$982.37 and the bond is called after 7 years, the yield will exceed $j_2 = 10\%$
 (B) If you pay \$975.48 and the bond is held to maturity, the yield will equal $j_2 = 10\%$.
 (C) If you pay \$975.48 and the bond is called after 7 years, the yield will exceed $j_2 = 10\%$.
 (D) If you pay \$975.48 and the bond is held to maturity, the yield will exceed $j_2 = 10\%$.
 (E) None of the above statements are true

(12) You buy a 5-year \$1000 bond that is redeemable at par and that pays interest at $j_2 = 5\%$. The price you pay yields $j_2 = 7\%$. Which of the following is the correct price you would pay if this bond was an accumulation bond and if it was a strip bond (where the coupons have been "stripped" from the bond that you purchased)?

	<u>If it was an Accumulation Bond</u>	<u>If it was a Strip Bond</u>
(A)	\$1101.96	\$ 708.92
(B)	\$ 907.48	\$ 708.92
(C)	\$1101.96	\$ 781.20
(D)	\$ 907.48	\$ 781.20
(E)	\$ 781.20	\$1,101.96

AS2053- Intersession 2011 - TEST 4 (70 minutes)

QUESTIONS:

(1) A machine costing \$42,246 is expected to last 10 years with a scrap value of \$4000. It is depreciated using the constant percentage method with $d = 21\%$. After 5 years, the depreciation method is changed to the straight-line method for the final 5 years. What is the book value after 7 years?

- A) \$7,799.60 B) \$8,112.88 C) \$8,661.11 D) \$9,399.60

(2) A delivery van costing \$24,000 has an estimated lifetime of 12 years at which time it will cost \$1200 to tow it to the dump. Annual maintenance costs are \$900. If the interest rate is $j_1 = 9\%$, what is the capitalized cost of the van? (answer to nearest dollar)

- A) \$45,378 B) \$46,578 C) \$47,902 D) \$49,102

(3) A mine has an original acquisition cost of \$1,000,000. It is estimated to hold 50,000 grams of recoverable silver. After the mineral worth is exhausted, the land will be sold for \$80,000. You are given that 10,000 grams are recovered in the first year and 15,000 grams are recovered in the 2nd year. Determine the accumulated depletion at the end of year 2.

- A) \$540,000 B) \$460,000 C) \$294,000 D) \$276,000 E) \$184,000

(4) You are given 3 investments, each costing \$100,000:

- (I) Government of Canada 10-year bond with a yield of $j_2 = 5\%$
- (II) An annuity paying \$12,960 a year for 10 years
- (III) A lump sum of \$163,000 due in 10 years

Rank the above investments from highest NPV to lowest NPV. Assume a cost of capital of 5.0625% (which is the equivalent annual rate to $j_2 = 5\%$)

- A) I > II > III B) II > III > I C) II > I > III D) III > I > II E) III > II > I

(5) An asset that is selling for \$5,105 has a modified duration of 12.8 years and a convexity of 85.0 at $j_2 = 6\%$. What is the predicted value of this asset if the interest rate rises to $j_2 = 6.75\%$?

- A) \$4,641.40 B) \$4,627.12 C) \$5,314.97 D) \$4,614.92 E) \$4,602.72

(6) A \$100,000 par value twenty year bond has annual coupons payable at $j_1=4\%$ and is redeemable at par. Find the Macaulay duration(D) of this bond using $j_1=3\%$. The bond price at $j_1=3\%$ is \$114,878

You are given that $a_{\overline{20}|.03} = 14.8775$ and also that $(1.03)^{-20} = 0.55368$

- A) 15.18 years B) 14.82 years C) 14.03 years D) 14.15 years E) 14.57 years

(7) Which of the following statements is true:

- (i) Default risk is the risk of a company's credit rating going from an AA to BB.
 - (ii) The book value of a bond at the beginning and end of the year one (year of purchase) is \$980 and \$990 respectively. The market value of this same bond at the beginning and end of year 1 is \$980 and \$1000 respectively. The semi-annual coupon paid is \$50. The total rate of return for this bond in year 1 must then approximately $j_2=11.17\%$
 - (iii) X is the duration of a 5 year accumulation bond with coupons payable at $j_2=10\%$. Y is the duration of a 5 year mortgage with monthly payments at $j_2=10\%$. X is less than Y.
- (A) (i) B) (ii) C) (iii) D) more than 1 statement is true E) none of them are true

(8) A fair coin is tossed four times. What is the probability that exactly two of the tosses show a head?

- A) 0.0625 B) 0.250 C) 0.3750 D) 0.5000 E) 0.5652

(9) You are given the following mortality rates: $q_x = 0.25$, $q_{x+1} = 0.30$, $q_{x+2} = 0.35$, $q_{x+3} = 0.40$. What is the probability that (x) will die between age $x+2$ and $x+4$?

- A) 0.3203 B) 0.1635 C) 0.1820 D) 0.2180 E) 0.2730

(10) You are given that $e_{95}=2.4$, $e_{96}=2.3$, and $e_{97}=2.2$. Determine ${}_2p_{95}$.

- A) 0.35 B) 0.45 C) 0.52 D) 0.65 E) 0.72

The following partial mortality table is to be used for the next three questions:

age	l_x	d_x	q_x	e_x
95	100,000	41,512		1.5333
96			0.48679	
97		18,000		
98			0.76648	0.7335
99		2,806	1.00000	

(11) What is the probability that (95) survives to age 98?

- A) 0.0981 B) 0.2021 C) 0.3002 D) 0.1202 E) 0.6988

(12) How many deaths are there between age 96 and age 99 of those currently age 95?

- A) 46,471 B) 55,682 C) 58,488 D) 48,679 E) 69,983

(13) What is the probability that (95) lives to 3 years but does not live 4 years?

- A) 0.7496 B) 0.3825 C) 0.8104 D) 0.0921 E) 1.0000