

- 1) Jim took out a loan from a bank on June 17 at  $r = 14\%$ . He agrees to pay back the loan in full with a payment of \$10,500 on October 13. If the bank uses ordinary interest (banker's rule), what is the original loan amount?
- (A) \$10,039.31      (B) \$10,045.35      (C) \$10,046.78      (D) \$10,052.72
- 2) Kim owes \$4,000 in 3 months and \$6,000 in 7 months to Sally. Sally agrees to let Kim instead pay  $\$X$  today and  $\$2X$  in 12 months to replace the original payments. If the simple interest rate on the loan is  $r = 15\%$ , what is  $X$  if you use 7 months as your focal date?
- (A) \$3175.10      (B) \$3367.17      (C) \$3400.00      (D) \$3434.51
- 3) You take out a loan of \$10,000, which is due in 24 months with interest at  $j_{12} = 12\%$ . The lender allows you to repay the loan early with a payment of \$5,000 in 12 months and a second payment of  $\$X$  in 18 months. If money is worth  $j_{12} = 6\%$ , what is the value of  $X$ ?
- (A) \$7171.12      (B) \$6809.59      (C) \$6653.87      (D) \$5787.40
- 4) A deposit of \$100 is made into an account earning  $j_{12} = 18\%$ . Another \$100 is deposited into a 2<sup>nd</sup> account earning  $j_2 = 10\%$ . At what time,  $n$  (where  $n$  is in years), would the accumulated value of the 1<sup>st</sup> account be twice as much as the accumulated value in the 2<sup>nd</sup> account? (Answer is in years)
- (A) 8.5      (B) 9.3      (C) 9.9      (D) 10.2
- 5) Mary invested  $\$A$  into a fund that paid  $j_{12} = 12\%$  for 2 years,  $j_4 = 8\%$  for the next 3 years, and  $j_2 = 4\%$  for the last 5 years. What effective rate of return,  $j_1$ , did she earn over the 10-years?
- (A) 6.32%      (B) 6.75%      (C) 6.80%      (D) 6.98%
- 6) A loan of  $\$X$  is taken out today. You are given that this loan is to be paid off with a payment of \$5,000 18 months from today and a payment of \$10,000 3 years and 8 months from today. Determine  $\$X$ . You are given that  $j_2 = 10\%$  and that the practical method of charging interest is used.
- (A) \$11,087.58      (B) \$11,200.39      (C) \$11,313.20      (D) \$11,662.80
- 7) Jerry makes semi-annual deposits of  $\$R$  into a fund paying  $j_2 = 5\%$ . His first deposit was made on March 15, 2011. His last deposit will be made on March 15, 2015. On September 15, 2015 he has accumulated \$15,000 in the fund. What is  $R$ ?
- (A) \$1470.10      (B) \$1506.85      (C) \$1675.13      (D) \$1717.01
- 8) John invests \$10,000 today. He will make 20 quarterly withdrawals of \$600 from this investment, first withdrawal made today. Which of the following equations will give the correct value of the quarterly interest rate,  $i = j_4 / 4$ ?
- (A)  $10,000 = 600 a_{\overline{20}|i}$       (B)  $9,400 = 600 a_{\overline{21}|i}$       (C)  $10,600 = 600 a_{\overline{19}|i}$       (D)  $9,400 = 600 a_{\overline{19}|i}$
- 9) You wish to accumulate \$20,000 by making deposits of \$300 at the end of every month into a fund earning interest at  $j_{12} = 6\%$ . You need to make 57 deposits of \$300 followed by a smaller concluding (drop) deposit made one month later in order to reach the \$20,000 goal. What is the size of the smaller concluding (drop) payment? You are given:  $s_{\overline{57}|0.005} = 65.7636$
- (A) \$0      (B) \$172.27      (C) \$270.92      (D) \$272.27
- 10) A loan of \$11,070 is to be paid back over 5 years with semi-annual payments of \$1500, with the first payment 6 months from today. Using linear interpolation, what nominal rate of interest  $j_2$  is being charged? You are given:  $a_{\overline{10}|0.055} = 7.5376$ ,  $a_{\overline{10}|0.06} = 7.3601$ ,  $a_{\overline{10}|0.065} = 7.1888$
- (A) 12.34%      (B) 12.12%      (C) 11.89%      (D) 11.11%

- 11) An individual deposits \$250 into an account at the end of each month for four years. Then there are no deposits made for a while. Their next deposit into the account is exactly two years after the last \$250 deposit, at which time they start depositing \$300 monthly. Which of the following would give the correct accumulated value of the account immediately after the 24<sup>th</sup> monthly deposit of \$300?
- (A)  $250 s_{\overline{48}|i} (1+i)^{48} + 300 s_{\overline{24}|i}$  (B)  $250 s_{\overline{48}|i} (1+i)^{25} + 300 s_{\overline{24}|i}$   
(C)  $250 s_{\overline{48}|i} (1+i)^{24} + 300 s_{\overline{24}|i}$  (D)  $250 s_{\overline{48}|i} (1+i)^{47} + 300 s_{\overline{24}|i}$
- 12) A \$60,000 mortgage is obtained at a rate of  $j_2 = 13\%$ . The mortgage is to be paid off with weekly payments for 20 years (note: 52 weeks in a year). What is the weekly payment?
- (A) \$172.13 (B) \$162.08 (C) \$158.25 (D) \$154.60
- 13) Gerry make quarterly deposits \$2,000 at the end of every 3-month period in a fund earning interest compounded semi-annually at  $j_2 = 8\%$ . If the fund pays simple interest for the fractional part of any interest period, what is the accumulated value of Gerry's deposits at the end of 5 years?
- (A) \$48,024.44 (B) \$48,264.56 (C) \$48,499.96 (D) \$48,504.67
- 14) A person deposits \$100 into a fund paying interest at  $j_4 = 6\%$ . Each succeeding quarterly deposit is to be 2% higher. How much has been accumulated in the fund immediately after the 18<sup>th</sup> deposit?
- (A) \$2454.38 (B) \$2418.11 (C) \$2089.92 (D) \$1877.39
- 15) A woman deposits \$30,000 into a fund paying interest at  $j_{12} = 12\%$ . She plans to withdraw \$P in one month, with each succeeding monthly withdrawal being \$10 higher. If she makes a total of 30 withdrawals, what is P? You are given:  $a_{\overline{30}|.01} = 25.80771$ ,  $s_{\overline{30}|.01} = 34.78489$
- (A) \$1162.44 (B) \$1024.89 (C) \$1000.00 (D) \$724.89
- 16) A corporation takes out a loan for \$88,000 with interest due every six months for 7-years at  $j_2$ . The principal will be paid in one lump sum at the end of 7-years. The corporation makes semi-annual deposits of \$5,150.32 into a sinking fund. The semi-annual cost of the loan is \$9,110.32. What would be the semi-annual payment if the corporation was to instead pay off the loan using the amortization method, given the interest rate on the loan remained the same at  $j_2$ ?
- (A) \$7,790.32 (B) \$8,608.19 (C) \$8,990.61 (D) \$9,231.00
- 17) Jim takes out a \$10,000 loan at  $j_4 = 10\%$ , to be paid back with quarterly payments over 5 years. At the end of 2 years, the outstanding balance is \$6,580.07. At that time, Jim makes a lump sum payment of \$500 and then refinances the loan at  $j_4 = 8\%$ . He also intends to repay the remainder of the loan over just 2 more years. What is the new quarterly payment?
- (A) \$898.24 (B) \$847.97 (C) \$829.99 (D) \$574.93
- 18) A city borrows \$1 million, paying semi-annual interest at  $j_2 = 6\%$ . The city creates a sinking fund in which semi-annual deposits of \$35,360.93 are made in order to accumulate the \$1 million needed to repay the loan upon maturity. The sinking fund ends earns  $j_2 = 7\%$ . You are given that the book value of the debt immediately after the 12<sup>th</sup> payment is \$483,661.06. How much has been accumulated in the sinking fund immediately after the 13<sup>th</sup> deposit of \$35,360.93?
- (A) \$516,338.94 (B) \$534,410.81 (C) \$535,950.12 (D) \$569,771.74
- 19) A loan is being amortized with 25 quarterly payments. The principal portion of the 16<sup>th</sup> payment is \$609.34. If  $j_4 = 10\%$ , what is original amount of the loan? (nearest dollar). Given:  $s_{\overline{25}|.025} = 34.1578$ ,  $a_{\overline{25}|.025} = 18.4244$
- (A) \$7,752 (B) \$14,021 (C) \$14,371 (D) \$26,643

- 20) A debt of \$15,000 with interest at  $j_2 = 9\%$  is to be paid back over 15 years with semi-annual payments of \$920.87. What is the outstanding balance after 18 payments using the sum of digits method? (nearest dollar)
- (A) \$8397                      (B) \$8933                      (C) \$9166                      (D) \$10,697
- 21) A \$1000 par value 10-year bond with coupons at  $j_2 = x\%$ , is redeemable at 105. The price of this bond to yield  $j_2 = 10\%$  is \$919.15. Determine  $x$ .
- (A) 4.96%                      (B) 8.40%                      (C) 8.80%                      (D) 9.92%
- 22) A \$2,000 bond is redeemable at par in 10-years. It is callable at 102.5 in 5-years. It pays semi-annual coupons at  $j_2 = 8.5\%$ . What is maximum price you would be willing to pay for this bond to guarantee a yield of at least  $j_2 = 8\%$ ? You are given:  $a_{\overline{20}|0.04} = 13.59033$ ,  $a_{\overline{10}|0.04} = 8.11089$
- (A) \$2024.33                      (B) \$2040.55                      (C) \$2067.95                      (D) \$2074.33
- 23) A \$1000 bond pays semi-annual coupons of \$30 every March 1 and September 1. It sells for \$1043.76 on March 1, 2011 to yield  $j_2 = 5\%$ . If the bond is sold on June 18, 2011, what is the market (clean) price,  $Q$ , of the bond on that day?
- (A) \$1076.91                      (B) \$1061.53                      (C) \$1059.14                      (D) \$1041.37
- 24) A \$1,000 bond with semi-annual coupons is redeemable for \$1,040. The absolute value of the sum of the write down column (book value adjustment column) is \$69.30. What is the price of the bond?
- (A) \$970.70                      (B) \$930.70                      (C) \$1069.30                      (D) \$1109.30
- 25) A \$10,000 12-year bond with interest at  $j_2 = 9\%$ , is redeemable at par. It is bought for \$9310.07 to yield  $j_2 = 10\%$ . What is the book value of the bond after 1 coupon has been paid?
- (A) \$9279.02                      (B) \$9294.57                      (C) \$9325.57                      (D) \$9341.12