Question 1:

A 10-year bond with par value 1000 and annual coupon rate r is redeemable at 1100.

You are given:

(i) the price to yield an effective annual interest rate of 4% is P;
(ii) the price to yield an effective annual interest rate of 5% is $P - 81.49$; and
(iii) the price to yield an effective annual interest rate of r is X.

Calculate X. [SOA 5/90 #15]

(A) 1061 (B) 1064 (C) 1068 (D) 1071 (E) 1075

Question 2:

Two bonds are both redeemable at their par value of \$100 in t years. Bond A has 3.5% semiannual coupons and cost \$88. Bond B has 4% semiannual coupons and cost \$92. The bonds were purchased to produce the same yield rate. What is the yield rate per annum convertible semiannually? [CAS 5/87 #14]

(A) Less than 4.8%
(B) At least 4.8%, but less than 5.2%
(C) At least 5.2%, but less than 5.6%
(D) At least 5.6%, but less than 6.0%
(E) 6.0% or more

Question 3:

Two bonds are purchased for the same price to yield 5%. Bond X has 4% annual coupons and matures for its face value of 100. Bond Y has annual coupons of 3 and matures for 180. Both bonds mature at the end of n years. Calculate n. [SOA 11/86 #12]

(A) 14 (B) 20 (C) 26 (D) 33 (E) 40

Question 4:

Joe negotiates a \$65,000 mortgage on a house with monthly payments of \$500 for the first year. \$600 for the second year, and \$700 until the final payment. The first payment is due one month after the loan. The annual interest rate is 12% convertible monthly. Find the outstanding balance to the nearest \$500 on Joe's mortgage immediately after the 36th payment. [CAS 5/90 #10]

(A) \$64,500 (B) \$65,500 (C) \$66,500 (D) \$67,500 (E) Cannot be determined

Question 5:

Warren has a loan with an effective interest rate of 5% per annum. He makes payments at the end of each year for 10 years. The first payment is 200, and each subsequent payment increases by 10 per year. Calculate the interest portion in the fifth payment. [SOA 11/88 #11]

(A) 58 (B) 60 (C) 62 (D) 65 (E) 67

Question 6:

A loan is being repaid by 15 annual installments of 1,000 each. Interest is at an effective annual rate of 5%. Immediately after the fifth installment is paid, the loan is renegotiated. The revised amortization schedule calls for a sixth installment of 800, a seventh installment of $(800 + K)$, with each subsequent installment increasing by K over the previous payment. The period of the loan is not changed. Determine the revised amount of the last installment. [SOA SAMPLE/83 #8]

(A) 1,240 (B) 1,290 (C) 1,360 (D) 1,440 (E) 1,460

Question 7:

Ron borrows $20,000 for 20 years at an annual interest rate of 10% convertible semiannually. He repays $500 in interest at the end of each six months. The principal and the remaining accrued interest are to be repaid at the end of 20 years by equal deposits at the end of each six months to a sinking fund that accumulates interest at 8% convertible semiannually. How much must Ron deposit in the sinking fund each six months? [CAS 5/84 #13]

(A) Less than $830
(B) At least $830, but less than $870
(C) At least $870, but less than $910
(D) At least $910, but less than $950
(E) $950 or more

Question 8:

A fund earned investment income of 9200 during 1991. The beginning and ending balances of the fund were 100000 and 129200, respectively. A deposit was made at time K during the year. No other deposits or withdrawals were made. The fund earned 8% in 1991 using the dollar-weighted method. Determine K. [SOA 11/92 #10]

(A) April 1 (B) May 1 (C) July 1 (D) September 1 (E) October 1