1. Susan invests $Z$ at the end of each year for seven years at an annual effective interest rate of 5%. The interest credited at the end of each year is reinvested at an annual effective rate of 6%. The accumulated value at the end of seven years is $X$. Lori invests $Z$ at the end of each year for 14 years at an annual effective interest rate of 2.5%. The interest credited at the end of each year is reinvested at an annual effective rate of 3%. The accumulated value at the end of 14 years is $Y$. Calculate $\frac{Y}{X}$.
   
   (A) 1.93 (B) 1.98 (C) 2.03 (D) 2.08 (E) 2.13

2. Mary invests $1000$ at the end of each year for 5 years at an annual effective rate of 9% and reinvests the interest at an annual effective rate of 9%. At the end of 5 years, her investment has a value of $X$. John invests $1000$ at the beginning of each year for 5 years at an annual effective rate of 10% and reinvests the interest at an annual effective rate of 8%. At the end of 5 years has investment has a value of $Y$. Calculate $Y - X$.
   
   (A) 99 (B) 147 (C) 327 (D) 570 (E) 685

3. John invests a total of $10,000$. He purchases an annuity with payments of $1,000$ at the beginning of each year for 10 years at an effective annual interest rate of 8%. As annuity payments are received, they are reinvested at an effective annual interest rate of 7%. The balance of the $10,000$ is invested in a 10-year certificate of deposit with a nominal annual interest rate of 9%, compounded quarterly. Calculate the annual effective yield rate on the entire $10,000$ investment over the 10-year period.
   
   (A) 7.85% (B) 7.95% (C) 8.05% (D) 8.15% (E) 8.25%

4. James invests $2,000$ at an effective annual interest rate of 17% for 10 years. Interest is payable annually and is reinvested at an effective annual rate of 11%. At the end of 10 years, James’ accumulated interest is 5.685.48.

   Peter invests $150$ at the end of each year for 20 years at an effective annual interest rate of 14%. Interest is payable annually and is reinvested at an effective annual rate of 11%. Calculate Peter’s accumulated interest at the end of 20 years.
   
   (A) 8.439 (B) 9,532 (C) 9.644 (D) 10.247 (E) 10.348

5. On January 1, 1999 Luciano deposits $90$ into an investment account. On April 1, 1999, when the amount in Luciano’s account is equal to $X$, a withdrawal of $W$ is made. No further deposits or withdrawals are made to Luciano’s account for the remainder of the year. On
December 31, 1999, the amount in Lucano’s account is 85. The dollar-weighted return over the 1-year period is 20%. The time-weighted return over the 1-year period is 16%. Calculate X.

(A) 101.6 (B) 103.6 (C) 105.6 (D) 107.6 (E) 109.6

[SOA 5/98 #9]

6. On January 1, an investment account is worth 300,000. M months later, the value has increased to 315,000 and 15,000 is withdrawn. 2M months prior to the end of the year, the account is again worth 315,000 and 15,000 is withdrawn. On December 31, the account is worth 315,000. The annual effective yield rate, using the dollar-weighted method, is 16%. Calculate M.

(A) 2.00 (B) 2.25 (C) 2.50 (D) 2.75 (E) 3.00

[SOA 5/95 #10]

7. 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.

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

[SOA 11/92 #10]

Answer: CEBAD EA