Question 3.13
Bill’s parents have deposited $2,000 into an account that will earn an annual effective interest rate of 8% for 4 years and 6 months, at which time Bill will be given the accumulated value in the fund.
Bill uses an annual effective discount rate of 5% per year to find the present value of the payment he will receive in 4 years and 6 months.
Find the present value calculated by Bill.
A 1,762 B 2,245 C 2,270 D 3,562 E 3,625

Question 3.14
A deposit of $X$ is made into a fund that pays an annual effective interest rate of 3% for 12 years.
At the same time, $X/3$ is deposited into another fund that pays an annual effective rate of discount of $d$ for 12 years.
The amounts of interest earned over the 12 years are equal for both funds.
Calculate $d$.
A 2.0% B 6.6% C 7.1% D 7.5% E 8.7%

Question 3.15
At an annual effective discount rate of $d$, $d > 0$, each of the following two sets of payments has a present value that is equal to $K$:
(i) A payment of 169 immediately and another payment of 169 at the end of 1 year.
(ii) A payment of 196 at the end of 2 years and another payment of 196 at the end of 3 years.
Calculate $K$.
A 315 B 326 C 351 D 378 E 472

Question 3.16
Which of the expressions below is FALSE?
A $i(1 + i) = \frac{d}{v - vd}$
B $i^2 = \frac{d^2}{v^2}$
C $id = i - d$
D $i - d = \frac{1 - v - iv^2}{v}$
E $i + d = i(1 - v)$

Question 3.17
The annual interest rate convertible monthly is 12%. Calculate the equivalent annual effective interest rate.
A 11.39% B 12.00% C 12.12% D 12.68% E 12.75%

Question 3.18
The annual interest rate convertible monthly is 12%. Calculate the equivalent two-year effective interest rate.
A 24.00% B 25.37% C 25.44% D 25.50% E 26.97%
Chapter 3: Compound Interest and Discount

**Question 3.19**

Patty deposits $1,800 into a savings account at time 0. The savings account pays simple interest at an annual rate of $i$.

Sally deposits $1,000 into a different savings account at time 0. Sally’s savings account pays interest at an annual nominal rate of $i$ compounded quarterly.

Patty and Sally earn the same amount of interest during the last 3 months of the 7th year.

Calculate $i$.

A 8.80%  B 8.88%  C 9.10%  D 11.16%  E 36.39%

**Question 3.20**

Calculate the nominal annual rate of interest convertible monthly that is equivalent to a nominal rate of interest of 12% per year convertible quarterly.

A 9.90%  B 11.82%  C 11.88%  D 12.55%  E 15.79%

**Question 3.21**

Wanda and Claire each open up new bank accounts at time 0.

Wanda deposits 1,000 into her bank account, and Claire deposits $700 into hers. Each account earns the same nominal annual interest rate compounded monthly.

The amount of interest earned in Wanda’s account during the 11th year is equal to $X$. The amount of interest earned in Claire’s account during the 15th year is also equal to $X$.

Calculate $X$.

A 18.19  B 18.96  C 218.31  D 227.50  E 761.69

**Question 3.22**

Sam deposits $D$ into a savings account at time 0, and the account pays interest at a nominal rate of $i$, compounded semiannually.

Dennis deposits $2D$ into a different savings account at time 0, and this account pays interest at a simple annual interest rate of $i$.

Sam and Dennis each earn the same amount of interest during the last 6 months of the 7th year.

Calculate $i$.

A 0.00%  B 5.56%  C 9.53%  D 10.95%  E 11.25%

**Question 3.23**

Heidi and Adam each take out a loan of $L$.

Heidi will repay her loan by making a payment of $1,400 in 20 years.

Adam will repay his loan by making a payment of $2,000 in 20 years.

The nominal semiannual interest rate charged to Heidi is half the nominal semiannual interest rate charged to Adam.

Calculate $L$.

A 483  B 683  C 688  D 690  E 977