1. A $1,000 par value bond with 8% annual coupons matures at par in 4 years. The following are
given as the one-year forward rates for year n+1 (i.e., the one-year effective rates during year
n+1):

<table>
<thead>
<tr>
<th>n</th>
<th>Scenario X</th>
<th>Scenario Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>1</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>2</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>3</td>
<td>10%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Scenario X and Scenario Y have an equal probability of occurring. Calculate the expected
present value of the bond payments.
(A) 1,000.00 (B) 1,018.40 (C) 1,022.80 (D) 1,030.39 (E) 1,031.07
(P451.13)

2. On December 31, 1991, your company estimates that it will pay a total (without interest) of X
dollars in 1992 and subsequent years on automobile accidents occurring in 1991. The
estimated cumulative percentages of X that will be paid are 60% by the end of 1992, 90% by
the end of 1994 and 100% by the end of 1994. Assuming an effective rate of interest of 8% and
that all payments will be made in the middle of a calendar year, determine the duration of the
claim payments.
(A) .950 (B) .966 (C) 1.035 (D) 1.138 (E) 1.392
(P 458 . 5 )

3. The yield rate on a one year zero-coupon bond is currently 7% and the yield rate on a two year
zero coupon bond is currently 8%. The Treasury plan to issue a two year bond with 9% annual
coupons, maturing at $100 par value. Determine the yield-to-maturity of the two year coupon
bond.
(A) 7.00% (B) 7.52% (C) 7.83% (D) 7.96 (E) 8.00%
(P439.4)

4. An annuity-immediate has level annual payments for n years. The average time of the
payments using the method of equated time is 7 years. Determine the duration of the
payments if the effective rate of interest is 5%.
(B) 5.32 (B) 5.71 (C) 5.98 (D) 6.32 (E) 6.71
(P458.9)

5. The duration of a perpetuity-due with level annual payments is 25. Determine the effective
rate of interest.
(A) 4.00% (B) 4.25% (C) 4.67% (D) 5.00% (E) 5.35%
(P459.12)
6. A company must pay liabilities of $1,000 due one year from now and another $2,000 due two years from now. There are two available investments: one-year zero coupon bonds and two-year bonds with 10% annual coupons maturing at par. The one year spot rate is 8% and the one-year forward rate is 9%. What is the company's total cost of the bonds required to exactly (absolutely) match the liabilities?
(A) 2,625  (B) 2,670  (C) 2,732  (D) 2,795  (E) 2,887
(P 478.4)

7. A company must pay a benefit of $1,000 to a customer in two years. To provide for this benefit, the company will buy one-year and three-year zero-coupon bonds. The one-year and three-year spot rates are 8% and 10%, respectively. The company wants to immunize itself from small changes in interest rate on either side of 10% (Regington immunization). What amount should it invest in the one-year bonds?
(A) 390  (B) 400  (C) 410  (D) 420  (E) 430
(P478.5)

Answer: EBDDA AD