Borders Bookstores, once one of the premiere book sellers in America, filed for bankruptcy. As a result, the risk premium demanded by its investors will increase significantly. Assume the following: Borders has outstanding bonds with face amount of $1,000 paying interest of 10% per year. At the time those bonds were issued for their face value of $1,000, they were considered riskless (no risk premium). Because of the bankruptcy, an investor in the 40% tax bracket will purchase newly-issued Borders bonds for face value of $1,000 and a five-year term only if these new bonds pay 30% interest per year.

Question 1: For this investor, what is the maximum price she will pay for outstanding Borders bonds with face value of $1,000, paying 10% interest per year, with five years remaining until redemption, assuming that any gain at redemption of the bonds will be taxed as ordinary income at the end of year 5?

Question 2: What equation defines the investor's pre-tax rate of return from the new bond?

Question 3: What is the effective tax rate on the new bond, assuming the new bond's pre-tax rate of return equals 28%.

Question 4: Why is the answer to question 3 lower than the 40% statutory tax rate?

Question 5: Based on your answer to question 2, is this bond an asset type I, II, III, or IV, as described in exercise 5 on page 163?

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Answer 1: If the investor is willing to pay $1,000 for the new bond, then the investor is demanding a before tax rate of return of 30% which implies an after-tax rate of return of 18%. So, if the investor is willing to pay $I for the outstanding bond, then $I = $100(1 – 0.40)/1.18 + $100(1 – 0.40)/(1.18)2 + . . . + $100(1 – 0.40)/(1.18)5 + $1,000/(1.18)5 – ($1,000 - $I)(0.40)/(1.18)5. From this equation, we get $I = $545.22.

Answer 2: The pre-tax rate of return, R, is defined by the equation $545.22 = $100/(1 + R) + $100/(1 + R)2 + . . . + 1,100/(1 + R)5. Solving iteratively for R yields an approximate value of 28%.

Answer 3: If R is the pre-tax rate of return and r is the after-tax rate of return, then r = R(1 – t), or t = 1 - r/R, or t = 36%.

Answer 4: Some of the risk premium in a new bond is reflected in the annual interest payment (because interest of $100 on an investment of $545.22 is above a 10% pre-tax return) and some of the risk premium is received at the end of the five-year investment horizon and so the taxes on that component of the risk premium are deferred. Thus, this bond offers deferral of some of the tax liability, and so a pre-tax return of only 28% yields an after-tax return of 18%, for an effective tax rate slightly below the statutory rate of 40%.

Answer 5: A type IV asset because the risk-free return is taxed at 40% but the risk premium bears a lower rate of tax.