BM Chapter 19 debt tax shield adjusted present value practice exam question.

A firm undertakes a one year project on January 1 with the following attributes:

- The initial investment is 2,016.
- The project provides an expected return of 2,244 at the end of the year (December 31).

- The opportunity cost of capital is 9.4% *per annum*.
- The return on debt r_D is 6.3% *per annum*.
- The debt to value ratio (D/V) is 34.2%.
- The corporate tax rate is 28.4%.

Question 19.1: Base case net present value of the project

What is the base case net present value of the project?

Answer 19.1: The initial investment is 2,016, the project provides an expected return of 2,244 at the end of the year, and the opportunity cost of capital is 9.4% *per annum*. The base case net present value of the project is –2,016 + 2,244 / (1 + 9.4%) = 35.19.

Question 19.2: Value of debt tax shield

What is the value of each dollar of debt tax shield when the tax is paid?

Answer 19.2: The corporate tax rate is 28.4%, and the return on debt r_D is 6.3% *per annum*. The value of each dollar of debt tax shield is 28.4% × 6.3% = 1.79%.

Question 19.3: Present value of debt tax shield

What is the present value of the debt tax shield?

Answer 19.3: The corporate tax rate is 28.4%, the return on debt r_D is 6.3% *per annum*, the initial investment is 2,016, and the debt to value ratio (D/V) is 34.2%. The value of the debt tax shield one year from now is 28.4% × 6.3% × 2,016 × 34.2% = 12.34. The present value of the debt tax shield is

$$(28.4\% \times 6.3\% \times 2{,}016 \times 34.2\%) / (1 + 6.3\%) = 11.60.$$

Question 19.4: Adjusted present value of the project

What is the adjusted present value of the project?

Answer 19.4: the adjusted present value of the project is the base case net present value of the project + the present value of the debt tax shield = 35.19 + 11.60 = 46.79.