BM mod11 ch12 EVA practice exam question

(The attached PDF file has better formatting.)

A project lasting 4 years has an initial investment of Z at time t=0 and expected net after-tax cash inflows of

time t =	1	2	3	4
cash inflow	261	285	258	293

For its book accounting statements, the firm writes off the initial investment by straight line depreciation over four years: ¼ × Z at times t=1, 2, 3, and 4. The initial investment has no salvage value after the project ends.

The firm has no non-cash accounting income or expenses besides depreciation of the initial investment, so the accounting income each year equals the cash inflow minus the depreciation of the initial investment.

The IRR of the project equals its opportunity cost of capital of 9.3% *per annum*.

Question 11.1: Initial investment

What is the initial investment of Z at time t=0?

Answer 11.1: The IRR of the project equals its opportunity cost of capital here of 9.3% *per annum*, so

$$Z = 261 / 1.093^1 + 285 / 1.093^2 + 258 / 1.093^3 + 293 / 1.093^4 = 880.24$$

Question 11.2: Book depreciation

What is the firm's book depreciation each year?

Answer 11.2: For its book accounting statements, the firm writes off the initial investment by straight line depreciation over four years: ¼ × Z at times t=1, 2, 3, and 4, or 880.24 / 4 = 220.06 each year.

Question 11.3: Book value return on investment

What is the book value return on investment in year 1 (from time t=0 to time t=1)?

Answer 11.3: The book value return on investment in year T is

(the cash inflow in year T – the annual book depreciation) / the book value at the beginning of the year T.

For year 1, this is

$$(261 – 220.06) / 880.24 = 4.65\%.$$

For year 2, this is

$$(285 – 220.06) / (880.24 – 220.06) = 9.84\%$$

For year 3, this is

$$(258 - 220.06) / (880.24 - 2 \times 220.06) = 8.62\%$$

For year 4, this is

$$(293 - 220.06) / (880.24 - 3 \times 220.06) = 33.15\%$$

Question 11.4: Economic depreciation

What is the present value of future cash flows at time t=1?

Answer 11.4: The present value of future cash flows at time t=1 is

$$285 / 1.093^1 + 258 / 1.093^2 + 293 / 1.093^3 = 701.11$$

At time t=2 this is

$$258 / 1.093^1 + 293 / 1.093^2 = 481.31$$

At time t=3 this is

$$293 / 1.093^1 = 268.07$$

Question 11.5: Economic depreciation

What is the economic depreciation in year 1 (from time t=0 to time t=1)?

Answer 11.5: Economic depreciation in year 1 = change in the present value of future cash flows from time t=0 to time t=1

$$= 880.24 - 701.11 = 179.13$$

Economic depreciation in year 2 = change in present value of future cash flows from time t=1 to time t=2

$$= 701.11 - 481.31 = 219.80$$

Economic depreciation in year 3 = change in present value of future cash flows from time t=2 to time t=3

$$= 481.31 - 268.07 = 213.24$$

Economic depreciation in year 4 = change in present value of future cash flows from time t=3 to time t=4

$$= 268.07 - 0 = 268.07$$

Question 11.6: Economic income

What is the economic income in year 1 (from time t=0 to time t=1)?

Answer 11.6: Economic income in year T = cash inflow in year T – economic depreciation in year T.

For year 1, this is 261 – 179.13 = 81.87

For year 2, this is 285 – 219.80 = 65.20

For year 3, this is 258 – 213.24 = 44.76

For year 4, this is 293 – 268.07 = 24.93