Corpfin Mod 4 npv irr 3 projects practice exam question

A firm has three projects (S = short; M = medium; L = long), each with an opportunity cost of capital of 11.3% and one initial investment at time t=0. The initial investment differs for the three projects.

- Project S has one cash inflow of 1,846.00 at time t=1.
- Project M has cash inflows of 392.00 each at times t=1 and t=2.
- Project L has cash inflows of 548.00 each at times t=1, t=2, and t=3.

❏ Projects S and M have the same IRR.
❏ Projects S and L have the same NPV.

The IRR of Project L is 15.9%.

Question 1.2: What is the initial investment (at time t=0) of project L?

Answer 1.2: The cash flows for Project L are the initial investment at time t=0 and cash inflows of 548.00 each at times t=1, t=2, and t=3. The IRR of Project L is 15.9%. We solve for the initial investment Z:

$Z = 548 / 1.159^1 + 548 / 1.159^2 + 548 / 1.159^3 = 1{,}232.77$

Question 1.3: What is the NPV of Projects L and S?

Answer 1.3: The opportunity cost of capital is 11.3%. For project L, the initial investment is 1,232.77 at time t=0 and the cash inflows are 548.00 each at times t=1, t=2, and t=3. The NPV of the project is

$$– 1{,}232.77 + 548 / 1.113^1 + 548 / 1.113^2 + 548 / 1.113^3 = 99.43$$

Project S has the same NPV.

Question 1.4: What is the initial investment of Project S?

Answer 1.4: The NPV of Project S is 99.43 and it has one cash inflow of 1,846.00 at time t=1. The initial investment of Project S satisfies

$$\text{initial investment} + 1{,}846.00 / 1.113^1 = 99.43$$

$$\Rightarrow \text{initial investment} = 99.43 – 1{,}846.00 / 1.113^1 = (1{,}559.15)$$, or a cash outflow of 1,559.15.

Question 1.5: What is the IRR of Projects S and M?

The IRR of Project S satisfies 1,559.15 × IRR = 1,846.00, so

$$\text{IRR} = 1{,}846.00 / 1{,}559.15 – 1 = 18.398\%$$

Project M has the same IRR.

Question 1.6: What is the initial investment of Project M?

Using the IRR of 18.398% for Project M and the cash inflows of 392.00 each at times t=1 and t=2, we derive the initial investment as

$$392 / 1.18398^{1} + 392 / 1.18398^{2} = 610.73$$

Question 1.7: What is the NPV of Project M?

Answer 1.7: The opportunity cost of capital is 11.3%. For project M, the initial investment is 610.73 at time t=0 and the cash inflows are 392.00 each at times t=1 and t=2. The NPV of the project is

$$-610.73 + 392 / 1.113^{1} + 392 / 1.113^{2} = 57.91$$