Incremental Investment Analysis

A company is deciding between two mutually exclusive electricity generating plant options for its operations. One Option (Option A) is to build, instal, operate and decommission a new generating plant. Another Option (Option B) is to upgrade the existing generating plant. Option A is expensive to build, instal and decommission, but is cheap to operate. Option B is less expensive to implement initially and to decommission, but is more expensive to operate.

The company's estimates of the future incremental real costs before tax and the future tax treatment for the two options are set out in the table and text below.

Incremental Costs Before - Tax

		Time = End of Years 1 to 8							
Items	Units	1	2	3	4	5	6	7	8
Option A(i)									
Capital Costs	GSMM	60							
Operating Costs	GSMM		5	5	5	5	5	5	
Decomm. Costs	GSMM								30
Option B (i)									
Capital Costs	GSMM	10							
Operating Costs	GSMM		20	20	20	20	20	20	
Decomm. Costs	GSMM								5

(i) In real terms at Time = 0
"GS" means units of goods and services.
"MM" means millions
"Decomm." means Decommissioning.
Blank entries mean zero costs.

Escalation

The rate of escalation on all capital, operating and decommissioning costs is 2% per year. That means, for instance, that the nominal costs at the end of year 1 are 2% greater than the costs at Time = 0 as shown in the table.

Tax

(a) Assume that the costs are increments to the existing net cash flow of the company.
(b) The costs of neither Option A ("A") nor Option B ("B") change the underlying timing of tax for the company as a whole.
(c) Capital costs are depreciated and deductible on a straight-line basis at a rate of 25% per year. Depreciation starts at Time = 1.
(d) Operating costs are immediately deductible as they are incurred with no depreciation.
(e) Decommissioning costs are immediately deductible as they are incurred with no depreciation.
(f) Tax is 40% of taxable income.

1 Calculate separately the annual nominal after-tax costs (ANATC) of A and B.
2 Calculate the ANATC of A minus the ANATC of B.
3 Calculate (a) the differences between the annual nominal before-tax costs of A minus B and then (b) calculate the ANATC of the differences.

4 Calculate the nominal present values (PVs) at Time 0 of the ANATC referred to in question 3(b). Assume a range of nominal discount rates, namely 0%, 5%, 10%, 15%, 20%, 25%.

5 What are the nominal internal rates of return (IRRs) of the ANATC referred to in 3(b)?