Capital Budgeting
Questions

Question 1

For each of the following statements indicate whether the statement is true or false and explain why.

a. The internal rate of return eliminates the need to calculate the required rate of return.

False. The required rate of return is still needed because the *IRR* has to be compared to it.

b. Using a discount rate higher than the internal rate of return of a project will result in a negative net present value.

True. The internal rate of return is the discount rate that makes the net present value equal to zero.

c. If a firm accepts a zero net present value project then the value of the firm may increase or decrease depending on whether the project's internal rate of return was how high or low.

False. Accepting a zero net present value project will have no effect on the firm's value.

Question 2

You have analyzed an investment project which has a conventional cash flow pattern. If the initial outlay and all the after-tax net cash flows are doubled what effect would this have on the project's net present value and internal rate of return? *Explain*.

The *IRR* would not change and the *NPV* would increase.

Question 3

In evaluating a project a firm typically requires several inputs. Which of the following inputs are **not** necessary for evaluating a project? *Explain*.
a. The initial cash outlay.
b. The life of a project.
c. The project's internal rate of return.
d. The project's required rate of return.
e. The method used to finance the project (that is, debt versus equity).

The *IRR* and how the project will be financed.

Question 4
A project has an initial outlay of $50,000 and its expected net cash flows are $12,000 per year for the next eight years. The project is evaluated using a required rate of return of 12% p.a.
a. Compute the project's net present value.

NPV = $9,611.68.

b. Compute the project's internal rate of return.

Using trial and error the *IRR* to be between 17% and 18%. The actual *IRR* is 17.3%.

Question 5
Petro Ltd is considering three independent projects which are expected to last eight years each and generate the following net present values and internal rates of return:

	Project X	Project Y	Project Z
Net Present Value	$1,000,000	-$500,000	$1,500,000
Internal Rate of Return	20.0%	12.0%	22.0%

The firm uses a discount rate of 14% to evaluate its investment projects. What should the firm do?

Since the projects are independent the firm should accept all positive *NPV* projects.

Question 6
GLM Ltd is considering three mutually exclusive projects which are expected to generate the following net present values and internal rates of return:

	Project A	Project B	Project C
Net Present Value	$2,000,000	$2,500,000	$2,900,000
Internal Rate of Return	20.05	18.0%	20.0%
Project Life	5 years	5 years	5 years

If the firm uses a discount rate of 12% to evaluate its investment projects what should the firm do?

The firm needs to use the net present value method to evaluate mutually exclusive projects because the internal rate of return can give conflicting decisions when mutually exclusive projects are being compared.

Question 7

Biosys Ltd has developed a patented procedure that is able to reverse genetic mutations in mice. Initial human trials have been successful and the company expects this procedure to be prohibitively expensive for its competitors to develop or mimic. Once the procedure is fully implemented the company expects to generate net after-tax cash flows of $12,000,000 next year with the cash flows expected to grow at a constant rate of 8% per annum in perpetuity. The initial investment required for the development and further testing of the procedure is $90,000,000. The company uses a discount rate of 20% to evaluate its projects.

a. Compute the project's net present value. What decision would the firm make?

NPV = $10,000,000.

b. Compute the project's internal rate of return. What decision would the firm make now?

IRR = 21.3%.

c. Are there any conflicts in your decisions in parts (a) and (b) above? If so, explain why these conflicts may exist.

The two methods give the same decision.

Question 8

You are the owner and manager of the 400-seat Roma Majestic Cinema in Geelong. Recently you were approached by the Royal Victorian Mozart Society to see whether you would be interested in having the society perform a one-night-only concert at the cinema every two years. The first concert will be scheduled almost immediately (year 0) and you are guaranteed repeat business in year 2 and year 4. Because the society is an amateur group, the musicians are not paid but the cinema will have to meet all operating costs such as advertising, the wages of the ushers, electricity and so on. In return, the cinema also retains all the revenue from ticket sales. Knowing that there is a strong unmet demand for listening to Mozart's music in Geelong, you estimate that you will be able to sell 75% of the tickets, of which two thirds will be at the standard price of $60 per ticket in year 0 and one-third at the premium price of $80 per ticket also in year 0. Ticket prices are then expected to increase at a rate of 5% per annum. The operating cost of a one-night concert is currently estimated to be $7,000 and these operating costs are expected to increase at a rate of 6% per annum. You have been advised that if you decide to proceed with the proposal you will need to make immediate improvements to the cinema's acoustics at a cost of $35,000. Such improvements are essential to attract a music-loving audience but will also attract some extra cinema patrons and hence produce a small increase in the net cash inflows to the cinema side of the business. The present value of these increased net cash inflows has been estimated at $12,500. The nominal required rate of return for this proposal is 15% per annum. Ignore tax issues and show your calculations. Clearly state any assumptions that you to make in analyzing this proposal.

Complete the following table.

The completed table and *NPV* are as follows.

Year	Cash Inflows	Cash Outflows	Net Cash Flows	Present Value of Cash Flows
0	20,000 + 12,500[a]	7,000 + 35,000[b]	-9,500	-9,500
2	22,050	7,865	14,185	10,726
4	24,310	8,837	15,473	8,847
			NPV	**$10,073**

[a] Present value of increased net cash flows from improvements.
[b] The initial outlay.

Question 9
Scanlin is considering a project that will result in initial after- tax cash savings of £ 2.7 million at the end of the first year, and these savings will grow at a rate of 4 per cent per year indefinitely. The firm has a target debt– equity ratio of 0.90, a cost of equity of 13 per cent, and an after- tax cost of debt of 4.8 per cent. The cost- saving proposal is somewhat riskier than the usual project the firm undertakes; management uses the subjective approach and applies an adjustment factor of + 2 per cent to the cost of capital for such risky projects. Under what circumstances should the company take on the project?

Using the debt-equity ratio to calculate the WACC, we find:

WACC = (.90/1.90)(.048) + (1/1.90)(.13) = .0912 or 9.12%

Since the project is riskier than the company, we need to adjust the project discount rate for the additional risk. Using the subjective risk factor given, we find:

Project discount rate = 9.12% + 2.00% = 11.12%

We would accept the project if the NPV is positive. The NPV is the PV of the cash outflows plus the PV of the cash inflows. Since we have the costs, we just need to find the PV of inflows. The cash inflows are a growing perpetuity. If you remember, the equation for the PV of a growing perpetuity is the same as the dividend growth equation, so:

PV of future CF = €2,700,000/(.1112 − .04) = €37,943,787

The project should only be undertaken if its cost is less than €37,943,787 since costs less than this amount will result in a positive NPV.