

## Question 01

CD is a furniture manufacturer based in the UK. It manufactures a limited range of furniture products to a very high quality and sells to a small number of retail outlets worldwide.

At a recent meeting with one of its major customers it became clear that the market is changing and the final consumer of CD's products is now more interested in variety and choice rather than exclusivity and exceptional quality.

CD is therefore reviewing two mutually exclusive alternatives to apply to a selection of its products:

### Alternative 1

To continue to manufacture, but expand its product range and reduce its quality. The net present value (NPV), internal rate of return (IRR) and modified internal rate of return (MIRR) for this alternative have already been calculated as follows:

NPV	=	£1.45 million	using a nominal discount rate of 9%
IRR	=	10.5%	MIRR = Approximately 13.2%
Payback	=	2.6 years	Discounted payback = 3.05 years

### Alternative 2

To import furniture carcasses in 'flat packs' from the US. The imports would be in a variety of types of wood and unvarnished. CD would buy in bulk from its US suppliers, assemble and varnish the furniture and re-sell, mainly to existing customers. An initial investigation into potential sources of supply and costs of transportation has already been carried out by a consultancy entity at a cost of £75,000. CD's Finance Director has provided estimates of net sterling and US\$ cash flows for this alternative. These net cash flows, in **real** terms, are shown below.

Year	0	1	2	3
US\$m	(25.00)	2.60	3.80	4.10
£m	0	3.70	4.20	4.60

The following information is relevant:

- CD evaluates all its investments using nominal sterling cash flows and a nominal discount rate. All non-UK customers are invoiced in US\$. US\$ nominal cash flows are converted to sterling at the forward rate and discounted at the UK nominal rate.
- For the purposes of evaluation, assume the entity has a three year time horizon for investment appraisals.
- Based on recent economic forecasts, inflation rates in the US are expected to be constant at 4% per annum. UK inflation rates are expected to be 3% per annum. The current exchange rate is £1 = US\$1.6.

**Note.** Ignore taxation.

*Required*

Assume you are the Financial Manager of CD.

- Evaluate alternative 2, using net present value, discounted payback, internal rate of return and the (approximate) modified internal rate of return. **(11 marks)**
- Calculate the project duration for alternative 2 and discuss the significance of your results if you are told that the duration for alternative one is 3.2 years. **(4 marks)**
- Evaluate the two alternatives and recommend which alternative the entity should choose. Include in your answer a discussion about what other criteria should be considered before a final decision is taken. **(10 marks)**

**(Total = 25 marks)**

## Question 02

Slow Fashions Co is considering the following series of investments for the current financial year 20X9:

Project bid proposals (\$'000) for immediate investment with the first cash return assumed to follow in 12 months and at annual intervals thereafter.

Project	Now	20Y0	20Y1	20Y2	20Y3	20Y4	20Y5	NPV	IRR
P0801	-620	280	400	120				55	16%
P0802	-640	80	120	200	210	420	-30	69	13%
P0803	-240	120	120	60	10			20	15%
P0804	-1000	300	500	250	290			72	13%
P0805	-120	25	55	75	21			19	17%
P0806	-400	245	250					29	15%

There is no real option to delay any of these projects. All except project P0801, can be scaled down but not scaled up. P0801 is a potential fixed three-year contract to supply a supermarket chain and cannot be varied. The company has a limited capital budget of \$1.2 million and is concerned about the best way to allocate its capital to the projects listed. The company has a current cost of finance of 10% but it would take a year to establish further funding at that rate. Further funding for a short period could be arranged at a higher rate.

### Required

- (a) Draft a capital investment plan with full supporting calculations justifying those projects which should be adopted giving:
- The priorities for investment
  - The net present value and internal rate of return of the plan
  - The net present value per dollar invested on the plan
- (b) Estimate and advise upon the maximum interest rate which the company should be prepared to pay to finance investment in all of the remaining projects available to it.
- (c) Assume that there is a real option to delay projects P0802 and P0804 for a further year, when capital will not be restricted. Explain, without further calculations, how this would change the answer to part (a).

**(14 marks)**

**(8 marks)**

**(3 marks)**

**(Total = 25 marks)**



### Question 03

You have been conducting a detailed review of an investment project proposed by one of the divisions of your business. Your review has two aims: first to correct the proposal for any errors of principle and second, to recommend a financial measure to replace payback as one of the criteria for acceptability when a project is presented to the company's board of directors for approval. The company's current weighted average cost of capital is 10% per annum.

The initial capital investment is for \$150 million followed by \$50 million one year later. The post tax cash flows, for this project, in \$million, including the estimated tax benefit from capital allowances for tax purposes, are as follows:

Year	0	1	2	3	4	5	6
Capital investment (plant and machinery):							
First phase	-127.50						
Second phase		-36.88					
Project post tax cash flow (\$ millions)			44.00	68.00	60.00	35.00	20.00

Company tax is charged at 30% and is paid/recovered in the year in which the liability is incurred. The company has sufficient profits elsewhere to recover capital allowances on this project, in full, in the year they are incurred. All the capital investment is eligible for a first year allowance for tax purposes of 50% followed by a writing down allowance of 25% per annum on a reducing balance basis.

You notice the following points when conducting your review:

1. An interest charge of 8% per annum on a proposed \$50 million loan has been included in the project's post tax cash flow before tax has been calculated.
2. Depreciation for the use of company shared assets of \$4 million per annum has been charged in calculating the project post tax cash flow.
3. Activity based allocations of company indirect costs of \$8 million have been included in the project's post tax cash flow. However, additional corporate infrastructure costs of \$4 million per annum have been ignored which you discover would only be incurred if the project proceeds.
4. It is expected that the capital equipment will be written off and disposed of at the end of year six. The proceeds of the sale of the capital equipment are expected to be \$7 million which have been included in the forecast of the project's post tax cash flow. You also notice that an estimate for site clearance of \$5 million has not been included nor any tax saving recognised on the unclaimed writing down allowance on the disposal of the capital equipment.

#### Required

- (a) Prepare a corrected project evaluation using the net present value technique supported by a separate assessment of the sensitivity of the project to a \$1 million change in the initial capital expenditure. **(14 marks)**
- (b) Estimate the discounted payback period and the duration for this project commenting on the relative advantages and disadvantages of each method. **(5 marks)**
- (c) Recommend whether this project is acceptable and also which techniques the board should consider when reviewing capital investment projects in future. **(6 marks)**

**(Total = 25 marks)**

## Question 04

You have recently commenced working for Burung Co and are reviewing a four-year project which the company is considering for investment. The project is in a business activity which is very different from Burung Co's current line of business.

The following net present value estimate has been made for the project:

**All figures are in \$ million**

Year	0	1	2	3	4
Sales revenue		23.03	36.60	49.07	27.14
Direct project costs		(13.82)	(21.96)	(29.44)	(16.28)
Interest		(1.20)	(1.20)	(1.20)	(1.20)
Profit		8.01	13.44	18.43	9.66
Tax (20%)		(1.60)	(2.69)	(3.69)	(1.93)
Investment/sale	(38.00)				4.00
Cash flows	(38.00)	6.41	10.75	14.74	11.73
Discount factors (7%)	1	0.935	0.873	0.816	0.763
Present values	(38.00)	5.99	9.38	12.03	8.95

Net present value is negative \$1.65 million, and therefore the recommendation is that the project should not be accepted.

In calculating the net present value of the project, the following notes were made:

- Since the real cost of capital is used to discount cash flows, neither the sales revenue nor the direct project costs have been inflated. It is estimated that the inflation rate applicable to sales revenue is 8% per year and to the direct project costs is 4% per year.
- The project will require an initial investment of \$38 million. Of this, \$16 million relates to plant and machinery, which is expected to be sold for \$4 million when the project ceases, after taking any taxation and inflation impact into account.
- Tax allowable depreciation is available on the plant and machinery at 50% in the first year, followed by 25% per year thereafter on a reducing balance basis. A balancing adjustment is available in the year the plant and machinery is sold. Burung Co pays 20% tax on its annual taxable profits. No tax allowable depreciation is available on the remaining investment assets and they will have a nil value at the end of the project.
- Burung Co uses either a nominal cost of capital of 11% or a real cost of capital of 7% to discount all projects, given that the rate of inflation has been stable at 4% for a number of years.
- Interest is based on Burung Co's normal borrowing rate of 150 basis points over the 10-year government yield rate.
- At the beginning of each year, Burung Co will need to provide working capital of 20% of the anticipated sales revenue for the year. Any remaining working capital will be released at the end of the project.
- Working capital and depreciation have not been taken into account in the net present value calculation above, since depreciation is not a cash flow and all the working capital is returned at the end of the project.

It is anticipated that the project will be financed entirely by debt, 60% of which will be obtained from a subsidised loan scheme run by the Government, which lends money at a rate of 100 basis points below the 10-year government debt yield rate of 2.5%. Issue costs related to raising the finance are 2% of the gross finance required. The remaining 40% will be funded from Burung Co's normal borrowing sources. It can be assumed that the debt capacity available to Burung Co is equal to the actual amount of debt finance raised for the project.

Burung Co has identified a company, Lintu Co, which operates in the same line of business as that of the project it is considering. Lintu Co is financed by 40 million shares trading at \$3.20 each and \$34 million debt trading at \$94 per \$100. Lintu Co's equity beta is estimated at 1.5. The current yield on government treasury bills is 2% and it is estimated that the market risk premium is 8%. Lintu Co pays tax at an annual rate of 20%.

Both Burung Co and Lintu Co pay tax in the same year as when profits are earned.

*Required*

- Calculate the adjusted present value (APV) for the project, correcting any errors made in the net present value estimate above, and conclude whether the project should be accepted or not. Show all relevant calculations. **(15 marks)**
- Comment on the corrections made to the original net present value estimate and explain the APV approach taken in part (a), including any assumptions made. **(10 marks)**

**(Total = 25 marks)**

## Question 05

The chief executive officer (CEO) of Faoilean Co has just returned from a discussion at a leading university on the 'application of options to investment decisions and corporate value'. She wants to understand how some of the ideas which were discussed can be applied to decisions made at Faoilean Co. She is still a little unclear about some of the discussion on options and their application, and wants further clarification on the following:

- (i) Faoilean Co is involved in the exploration and extraction of oil and gas. Recently there have been indications that there could be significant deposits of oil and gas just off the shores of Ireland. The Government of Ireland has invited companies to submit bids for the rights to commence the initial exploration of the area to assess the likelihood and amount of oil and gas deposits, with further extraction rights to follow. Faoilean Co is considering putting in a bid for the rights. The speaker leading the discussion suggested that using options as an investment assessment tool would be particularly useful to Faoilean Co in this respect.
- (ii) The speaker further suggested that options were useful in determining the value of equity and default risk, and suggested that this was why companies facing severe financial distress could still have a positive equity value.
- (iii) Towards the end of the discussion, the speaker suggested that changes in the values of options can be measured in terms of a number of risk factors known as the 'greeks', such as the 'vega'. The CEO is unclear why option values are affected by so many different risk factors.

### *Required*

- (a) With regard to (i) above, discuss how Faoilean Co may use the idea of options to help with the investment decision in bidding for the exploration rights, and explain the assumptions made when using the idea of options in making investment decisions. **(11 marks)**
- (b) With regard to (ii) above, discuss how options could be useful in determining the value of equity and default risk, and why companies facing severe financial distress still have positive equity values. **(9 marks)**
- (c) With regard to (iii) above, explain why changes in option values are determined by numerous different risk factors and what 'vega' determines. **(5 marks)**

**(Total = 25 marks)**

