

UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For the following qualifications :-

B. Eng.

M. Eng.

Chemical Eng E837: Project Appraisal

COURSE CODE : **CENGE837**

UNIT VALUE : **0.50**

DATE : **15-MAY-02**

TIME : **14.30**

TIME ALLOWED : **3 hours**

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Answer **ALL FOUR** questions.

Each question carries marks as follows: Q.1 = 18, Q.2 = 25, Q.3 = 35, and Q.4 = 22, subdivided as shown [].

Additional stationery provided: **Graph paper**

1. a) There are five main components of a company's balance sheet. Define and explain them, and show their inter-relationship. [5]
- b) Describe the changes in an annual balance sheet that will show how the depreciation of a fixed asset is treated. [3]
- c) Describe the changes in an annual balance sheet consequent upon the purchase of a large new fixed asset, a purchase that is entirely financed by a new long-term bank loan (such changes to ignore the effect of depreciation). [3]
- d) A company buys, at the beginning of its financial year, two large new fixed assets, costing £5 millions and £3 millions each. If the annual depreciation rates applicable to these assets are 15% and 10% respectively (straight line), and if the purchase is financed entirely by a new bank loan, show what changes these purchases will have on the balance sheet at the year's end. [5]

2. a) Describe how the annual net cash flow for a project is derived from its annual sales revenue. [5]
- b) Using the data given in the accompanying data sheet for the operating and other financial conditions of a project, calculate:
 - i) the net cash flow for the first year of operation, and [10]
 - ii) the net cash flow for the last (tenth) year of operation. [10]

3. a) What is the relationship between risk, commercial and technical, and the Hurdle Rate of Return for any new project, likely to be set by the Board of your Company? [3]
- b) Your company has three potential projects in view, but has only sufficient resources of money and management capability to implement one of them. One is about half the size of the other two, and, of the larger pair, one has a regular income, while the other peaks half way through its life. Using the net cash flow data in the attached data sheet, make and justify a recommendation to the Board as to which one is the most attractive as an investment, given that the imposed Hurdle Rate of Return is 20%. [32]

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4. a) List, and briefly describe, the main legislative instruments that are used in the United Kingdom to control the operations of a large chemical project. [10]
- b) Your company has a new project in hand, which offers attractive financial returns. The proposed plant makes a poisonous gas as an intermediate product, and its final product is a poisonous and hygroscopic solid. Describe the main components of your Environmental Impact Assessment Statement, paying particular regard to the internal and external aspects of safety in coping with the hazardous aspects of plant operation. [12]

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Question 2

DATA SHEET

Investment

Fixed Capital Investment - plant and vehicles	£85 millions
buildings	£15 millions
Working Capital	£15 millions
Start-Up Costs	£10 millions

Loan

60% of FCI, interest rate 8% per annum

Plant life

10 years

Output of plant

135,000 tons in Year 1 of operation

150,000 tons per annum for years 2 to 10

Sales price

£800/ton

Sales and distribution cost

2% of sales revenue

Raw material cost

£210/ton product

Utilities cost

£ 65/ton product

Other variable costs

£ 15/ton

Waste disposal cost

2.5% of full year's Production Cost

Maintenance & cleaning materials

1.5% of full year's Production Cost

Labour

Shift labour

5 shifts of 6 people at £450 each per week

Laboratory &

maintenance labour

25% of shift labour cost

Other plant labour

6 people at £420 per week each

Supervision

23% of total labour

Payroll costs

27% of total labour plus supervision

Depreciation

Plant and vehicles

15% straight line

Buildings

5% straight line

Other investment

0%

Insurances

3% of FCI

Communications

0.5% of full year's Production Cost

Overheads

3.5% of FCI

Local taxes (rates)

2% of FCI

Corporation (profits) tax

30% of net profit after interest and depreciation

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Question 3

DATA SHEET

Three different projects, with projected net cash flows as follows:

		Project 1	Project 2	Project 3
		£ millions		
Construction	Year -3	20	45	45
	Year -2	15	40	40
	Year -1	20	40	40
Start-up	Year 0	15	30	30
Operation	Year 1	30	60	25
	Year 2	30	60	40
	Year 3	30	60	55
	Year 4	30	60	70
	Year 5	30	60	95
	Year 6	30	60	110
	Year 7	30	60	100
	Year 8	27	57	80
	Year 9	24	54	55
	Year 10	37	75	70

END OF PAPER