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	:	**09-MAY-03**
TIME	:	**10.00**
TIME ALLOWED	:	**3 Hours**

03-C0186-3-60

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*Answer **ALL FOUR QUESTIONS.** **EACH** question carries a mark as follows: Q.1 = 20, Q.2 = 25, Q.3 = 30, and Q.4 = 25, subdivided as shown.*

1.

a) What are the prime functions of a company's balance sheet and profit/loss account. [3]

b) Using the alphabetical list of items in the accompanying data sheet, construct the profit/loss account and balance sheet to which they belong. [15]

c) On the evidence available to you here, which items in the balance sheet will have changed since last year, and by how much? [2]

2.

a) What is the purpose of a depreciation allowance, and how is it calculated? [3]

b) Using the data given in the accompanying data sheet for the operating and other financial conditions of a project, calculate:

i) the Return on Capital Employed in the first year of operation (stating basis for format of ROCE) [12]

ii) the net cash flow for the third year of operation, and [5]

iii) the net cash flow for the last (tenth) year of operation. [5]

3.

a) Why is the Discounted Cash Flow process used in assessing the financial feasibility of a project? [2]

b) The Internal Rate of Return (or DCF Rate of Return) is a very precise measure of the financial viability of a potential project. What exactly does it represent? [3]

c) Your company has two potential projects in view, one of low commercial risk and one of much higher risk. Using the information in the accompanying data sheet, make and justify a recommendation to the Board as to which one is the more attractive as an investment, given that the company's current Weighted Average Annual Cost of capital is 14%. Your recommendation should cover as many aspects of the investment as possible. [25]

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4.

Your company is proposing to build a new plant with the following main characteristics:

- raw material is a flammable petrochemical delivered in drums;
- product is a toxic and flammable liquid, distributed in drums;
- raw material delivery and product dispatch are by road;
- the production process occurs under moderate temperatures and pressures, with little noise, and no solid residues;
- a toxic gas is evolved during production, which is readily soluble in caustic alkali;
- a main road, used for deliveries to and from the plant, runs along the west side of the site, the rest of the site being surrounded by grazing land;
- the prevailing wind is from the south west;
- there is a large shopping mall on this road, less than a kilometre from this site;
- the other close neighbours across the road are all medium sized industrial companies, there being no housing within 2 kilometres of the site;
- the local land and water courses are sensitive, and quite severe consent restrictions will be imposed on liquid effluents.

Your application for permission to build the plant must include an Environmental Impact Assessment Statement. Outline the features of this statement, paying particular regard to those aspects of plant operation, safety and environmental impact likely to be of concern to the local authority from which you are seeking permission.

(Any other process or site conditions necessary for the definition of the EIAS may be chosen by you, provided that they are stated clearly in your answer.)

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Question 1

DATA SHEET

Accounts payable (to suppliers)	457, 150
Accounts receivable (from customers)	509, 750
Bank overdraft	326, 500
Capital reserves	259, 500
Cash at bank	221, 050
Depreciation	262, 750
Dividends paid	80, 850
Fixed operating costs	1, 096, 700
Intangible assets	185, 600
Interests on loans	52, 650
Inventory	411, 450
Investments	250, 850
Issued share capital	460, 750
Long-term loans	468, 600
Net fixed assets	1, 048, 400
Overheads	458, 650
Retained earnings	85, 300
Revenue reserves	545, 500
Sales costs	67, 500
Taxes on profits	76, 000
Total sales	3, 415, 200
Variable operating costs	1, 234, 800

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Question 2

DATA SHEET

Investment	
Fixed Capital Investment:	
Fees and engineering	£25 millions
Plant and vehicles	£95 millions
Buildings	£20 millions
Interest accrued during construction	£ 5 millions
Working Capital	£25 millions
Start-Up Costs	£10 millions
Loan	70% of FCI, interest rate 8% per annum (constant for whole of plant life)
Plant life	10 years
Scrap value at end of life	5% of plant and vehicles 10% of buildings
Output of plant	150,000 tonnes per annum
Sales price	£900/tonne
Sales and distribution cost	3% of sales revenue
Raw material cost	£250/tonne product
Utilities cost	£ 75/tonne product
Other variable costs	£ 25/tonne product
Waste disposal cost	2.5% of Production Cost in Year 1
Maintenance & cleaning materials	1.5% of Production Cost in Year 1
Labour	£1.75 millions
Depreciation	
Fees and engineering	20% sinking value
Plant and vehicles	15% straight line
Buildings	5% straight line
Other investment	0%
Insurances	3% of FCI as above
Communications	0.5% of Production Cost in Year 1
Overheads	3.5% of FCI as above
Local taxes (rates)	2% of FCI as above
Corporation (profits) tax	30% of net profit after deduction of interest and depreciation

[NB restrict calculation amounts to £millions with no more than two places of decimals]

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Question 3

DATA SHEET

Two different projects, with significant data as follows:

	Project 1	Project 2
	£ millions	
Investment in plant & vehicles:	50	100
Investment in buildings:	30	60
Working capital:	20	35
Construction period:	1 year	1 year
Loan finance:	None	80 @ 7.5%
Net sales revenue:	100	180
Production cost excluding depreciation:	58.5	116.75
Depreciation: 10% on P & V 5% on bldgs		
Hurdle rate:	8% over WACC	2% over WACC
Profits tax: 30% of PBT		

Notes: loan is not repaid during plant lifetime
net sales revenue = total sales less selling costs
no scrap value at end of plant lifetime
restrict numerical amounts to £millions with no more than two places of decimals

END OF PAPER