

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY  
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING  
BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE  
PART II FIRST SEMESTER SUPPLEMENTARY EXAMINATIONS– JULY 2005**

**CONSTRUCTION ECONOMICS – AQS 2108**

**TIME:** 3 Hours

**TOTAL MARKS:** 100

**INSTRUCTIONS:**

Answer Question **1** and any **3** others.

**QUESTION 1**

Concentric Ltd, a manufacturing company, has recently appointed a new managing director. After completing a review of the company's machinery he reported to the Board of Directors that the present machinery was out-of-date and incapable of sustaining high production levels without frequent breakdowns, and that the quality of the present production was poor.

The managing director proposed that the company should change to robotic machines. The following information was available on the robots being considered for purchase.

1)		<b>Robot A</b>	<b>Robot B</b>	<b>Robot C</b>
		\$M	\$M	\$M
Purchase cost of machines		10.00	9.00	15.50
Estimated net cash inflows				
Year 1		3	3	3
Year 2		3.5	3	5
Year 3		4	3.5	6
Year 4		4	4	6

2) The company's cost of capital is 12%

3) Owing to their productive efficiency the robots would make the following number of manufacturing workers redundant:

	<b>Robot A</b>	<b>Robot B</b>	<b>Robot C</b>
	Number of workers	Number of workers	Number of workers
At end of Year 1	50	50	50
At end of Year 2	60	60	80

4) The manufacturing workers' unions were opposed to the implementation of robotics, but in negotiations they had indicated that they would agree to the following:

Redundant workers should each receive

(i) an amount equal to half a year's wages at the end of year in which they were made

- redundant, and  
(ii) an additional flat rate terminal payment of \$2,000 per worker  
*Note:* the average annual wage is \$6,000.

- 5) All estimated net cash inflows arise at the end of the relevant year.  
The net cash inflows in (1) above do not take account of the redundancy payments.

**Required**

- (a) i) Appropriate computations using the net present value and IRR methods for each of the robots being considered. (12 marks)  
ii) A report to the Board of Directors of Concentric Ltd advising them as to which robot should be purchased, based on your results in (i) above (4 marks)  
b) i) Give **five** factors which the directors should consider before reaching their final decision. (5 marks)  
ii) Briefly outline the aspects of social accounting that the company needs to consider before making a final decision. (4 marks)

**QUESTION 2**

- a) A firm has just paid a preference share dividend. It planned to pass the next 3 dividends and resume regular dividends thereafter.  
Par value \$100,00  
Coupon dividend rate 24%  
Required rate of return 30%  
Dividends are cumulative
- Find the value of the preference share. (12 marks)
- b) A firm last paid a dividend of \$120,00  
Supernormal growth is for 3 years at 40% growth rate. Required rate of return during supernormal growth will be 30%. Growth after supernormal phase will be 20% associated with a yield of 25%.  
What is the value of common stock? (13 marks)

**QUESTION 3**

	<u>31-12-2002</u>	<u>31-12-2001</u>
Sales	5 000 000	4 000 000
Purchase of Raw Materials	2 000 000	1 200 000
Raw Materials consumed	1 500 000	1 000 000
Cost of goods manufactured	3 000 000	2 000 000
Cost of Sales	2 900 000	1 900 000
Debtors	900 000	600 000
Creditors	400 000	200 000
Stock: Raw Materials	70 000	100 000
Work in progress	130 000	70 000
Finished Goods	80 000	30 000

From the above information, calculate the cash operating cycle of the firm for the two years and write a short report to the Finance director of the Organisations.

(25 marks)

#### **QUESTION 4**

- a) Outline how the marginal revenue productivity theory suggest that the level of wages in an industry is determined. (13 marks)
- b) How realistic do you consider this explanation to be? (12 marks)

#### **QUESTION 5**

An engineering consulting firm won a contract to design and supervise construction of a sewage-treatment plant at a remote location. The installation phase will last at most 2 years, and two engineers from the firm will supervise on-site operations. They will need both living accommodations and an office. Three alternatives are available, with the costs shown below:

1. Rent a building with furnished living accommodations and an office: \$3000 per month including upkeep and utilities.
2. Buy two furnished trailers to live and rent an office: The purchase price of a house trailer is \$24,000 per trailer (the seller will buy back a used trailer for 40 percent of its purchase price any time within 2 years); trailer upkeep, site rental, and utilities are \$200 per trailer per month; and office rental is \$800 per month.
3. Buy three trailers: Two house trailers as in alternative 2 and a smaller one to serve as an office, purchased for \$16000 from the same seller.

If all the alternatives provide adequate facilities, which one do you recommend?

(25 marks)

**END OF EXAMINATION**