

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF THE BUILT ENVIRONMENT**  
**BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE**  
**PART II FIRST SEMESTER EXAMINATIONS**  
**CONSTRUCTION ECONOMICS - AQS 2108**

Answer any **FOUR** questions

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**Question 1**

The construction industry is often used as a 'yardstick' to measure economic performance of a country. Discuss. [25 marks]

**Question 2**

- a. Explain the concept of life cycle costing showing its relevance to construction industry/business [10 marks]
- b. Calculate the comparative life-cycle costs of the following buildings using only the data provided. The opportunity cost of capital is 7.5%. Both buildings provide similar accommodation space and the life expectancy is expected to be 60 years. Based on NPV and Annual Equivalent, which building project is economical? [15 marks]

<b>Description</b>	<b>Building A (US\$)</b>	<b>Building B (US\$)</b>
Initial cost	75 000	45 000
Repairs	800 (every 5 years)	1 800 (every 5 years)
Maintenance	350 per annum	850 per annum
Heating, lighting etc	1 200 per annum	2 100 per annum
Major modifications (every 20 years)	-	10 000
Demolition and Disposal	3 000	4 500

### Question 3

- a.) Explain the two main classifications of investment appraisal techniques. [10 marks]
- b.) A warehouse building is constructed for an initial cost of \$ 50000. It is expected to have no salvage value at the end of its estimated life of 50 years. In order to handle goods in the warehouse, mechanical equipment at the initial cost of \$15000 is installed in the first instance. The estimated life of the mechanical equipment is 15 years, after which it will have a salvage value of \$1000. Using the straight-line and the sinking fund methods for calculation of depreciation, calculate the annual depreciation charges by the end of the fifth year after construction, and the total book value for both building and equipment at the end of the fifth year. Assume that the interest rate on a sinking fund is 10%. [15 marks]

### Question 4

- a.) Discuss the concept of time value of money mechanics to assessing investment options in the construction industry. [10 marks]
- b.) Office equipment can be bought for \$50000 or hired at \$7500 per annum. Assuming 10 years life and a discount rate of 10% per annum, which option is more economic? [5 marks]
- c.) Peter has been given a legacy by his brother Petros which comprise of property receiving open market rent, in arrears, of \$12050 per annum. However, Peter is unable to directly use the rent receivable from the property for seven years. Peter, however, may reinvest the rent at 12% per annum. How much will the rental have accumulated to after seven years? [5 marks]
- d.) ZB bank advertises that investors can become millionaires in 10 years, given a rate of interest of 15% compounded annually. What is the annual investment that an investor should make to reach the objective of becoming a millionaire? [5 marks]

### Question 5

- a.) Explain the following commonly used methods of economic comparisons of alternative solutions to problems in the building industry
- i) Present Worth [5 marks]
  - ii) Annual Equivalent [5 marks]
- b.) What is the rationale for investment appraisal in the construction industry [10 marks]
- Service records for a specific piece of production equipment indicate that a replacement machine will have first-year maintenance costs of approximately \$1000 and these costs will increase by \$200 per year for each additional year of service. Assuming the equipment is to be in service for 10 years and using an interest rate of 15%, determine the maximum amount which should be paid for a lifetime maintenance contract at the time the equipment is purchased. [5 marks]

### Question 6

- a.) Explain the meaning of *construction economics* showing its relevance to the construction industry [13 marks]
- b.) How relevant is the construction industry to a developing economy like Zimbabwe? [12 marks]