NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF Civil, Mining and Process Engineering

QUALIFICATION : Bachelors of Engineering in Mining Engineering	
QUALIFICATION CODE: 08MEG	**LEVEL: 7**
COURSE CODE: MEF811S	**COURSE NAME: MINERAL ECONOMICS AND FINANCIAL VALUATION**
SESSION: JUNE 2023	**PAPER: THEORY**
DURATION: 3 HOURS	**MARKS: 100**

SECOND OPPORTUNITY QUESTION PAPER	
EXAMINER(S)	Dr Lawrence Madziwa
MODERATOR:	Dr Victor Mutambo

INSTRUCTIONS	
	1. Answer all questions.
	2. Read all the questions carefully before answering.
	3. Marks for each questions are indicated at the end of each question.
	4. Please ensure that your writing is legible, neat and presentable.

PERMISSIBLE MATERIALS

1. Examination paper.

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

1. A sum of $ 2,500,000 was spent on purchasing and developing a mine with an estimated reserves of 230,000 tonnes of ore. During the first year, 20,000 tonnes of ore were extracted. A re-estimate of the remaining reserve was then revised to 170,000 tonnes. During the second year 18,000 tonnes were extracted. Compute the depletion allowance for the first and second years.　　　[10]

2. A company plans to install a labour saving equipment, and it has a choice of two models A and B. Each model is expected to last four years and to be worthless at the end of its life. The cost data associated with each model are recorded in table 1 and the models are alike in all other respects. If this firm earns 12.6 % per annum, which model is more economical? Discuss your results,　　　[10]

Table 1: Model and B equipment showing initial cost and annual cost

Item	Model A	Model B	
Initial Cost, $	80,000	65,000	
Estimated Annual Costs, $			
Year 1	7,000	8,100	
Year 2	8,000	8,700	
Year 3	9,100	10,200	
Year 4	9,500	11,300	

3. An individual seller's monthly supply of downloadable e-books is given by the equation

$$Q = -64.5 + 37.5P - 7.5W$$

where Q is number of e-books supplied each month, P is price of e-books in euros, and W is the hourly wage rate in euros paid by e-book sellers to workers. Assume that the price of e-books is €10.68 and the hourly wage is €10.

a. Determine the number of e-books supplied each month.　　　[2]
b. Determine the inverse supply function for an individual seller.　　　[2]
c. Determine the slope of the supply curve for e-books.　　　[2]
d. Determine the new vertical intercept of the individual e-book supply curve if the hourly wage were to rise to €15 from €10.　　　[4]

4. Elaborate and briefly discuss five outcomes of a feasibility study.　[10]

5. Name the four mining risks and possible mitigating actions normally used. [10]

b. Five investment alternatives have the following returns and standard deviations of returns. Using the coefficient of variation, rank the five alternatives from lowest risk to highest risk.

Alternative	Returns— Expected Value	Standard Deviation
A.	$ 5,000	$1,200

B.	4,000	600
C.	4,000	800
D.	8,000	3,200
E.	10,000	900

Using the coefficient of variation, rank the five alternatives from lowest risk to highest risk.

6. i Name the three different mining costs. Which techniques are used to estimate the costs in feasibility studies. (6)
   ii.   What is the capital cost for a planned 35,000tpd mine given that a similar operation of 20,000tpd capacity has a capital cost of R250 million given β =0.7? [4]

7. Discuss the key segments of feasibility studies?   [20]

8. A mining company is evaluating its cost of capital under alternative financing arrangements. In consultation with investment bankers, the company expects to be able to issue new debt at a cost of 8% and to issue new preferred stock with a $2.50 per share dividend at $25 a share. The common stock of the company is currently selling for $20.00 a share. The company expects to pay a dividend of $1.50 per share next year. Market analysts foresee a growth in dividends in Invest stock at a rate of 5% per year. The company' marginal tax rate is 35%.
                    [10]
   Below is a summary of a balance sheet of the company.

Cash	5,000	LT Debt	3,000
Equipment	5,000	Pref. Stock	1,000
		Stock	6,000
Total Assets	10,000	Total Debt and Equity	10,000

9. A mining company Tate, Inc. listed on the stock exchange last year by issuing 1 million shares of common stock @ $25 per share. The shares are currently trading at $30 per share. Current risk-free rate is 4%, market risk premium is 8% and the company has a

beta coefficient of 1.2. During last year, it issued 50,000 bonds of $1,000 par paying 10% coupon annually maturing in 20 years. The bonds are currently trading at $950.The tax rate is 30%. Calculate the weighted average cost of capital. [10]

(End of Exam)

FORMULAE LIST

$$FV = PV (e)^{rt}$$

$$FV = PV(1+i)^n$$

$$PV = FV\left[\frac{1}{(1+i)^n}\right]$$

$$FV = A\left[\frac{(1+i)^n - 1}{i}\right]$$

$$PVA = A\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$$

$$A = FVA\left[\frac{i}{(1+i)^n - 1}\right] = PVA\left[\frac{i(1+i)^n}{(1+i)^n - 1}\right]$$

$$BEV = \frac{TFC}{UR - UVC}$$

$$TR = UR * V$$

$$TC = TFC + UVC$$

$$R_e = R_f + \beta (R_m - R_f)$$

EVA = [NOPAT – Cost of Capital * Invested Capital]

PV Ratio = PV of returns / PV of investments

PI Ratio = PV Ratio – 1

Current Ratio = current assets / current liabilities

Total Debt Ratio = total debt / total assets

Debt to Equity Ratio = total debt / total equity

Net Profit Margin = Profit after interest and tax / sales

Return on Equity = profit after tax / shareholders' equity