



**PROGRAM** : BACCALAUUREUS TECHNOLOGIAE  
MINE SURVEY

**SUBJECT** : **PROCESS ECONOMICS**

**CODE** : **MES41-1**

**DATE** : END OF YEAR EXAMINATION  
23 NOVEMBER 2016.

**DURATION** : (SESSION 1) 08:30 - 11:30

**WEIGHT** : 40: 60

**TOTAL MARKS** : 100

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**ASSESSOR** : MR.T.SHEKEDE

**MODERATOR** : MR.E MUZENDA

5176

**NUMBER OF PAGES** : 6 PAGES

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**INSTRUCTIONS** : ONLY ONE POCKET CALCULATOR PER CANDIDATE  
MAY BE USED.

**REQUIREMENTS** : GRAPH PAPER.

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## INSTRUCTIONS TO STUDENTS

1. PLEASE ANSWER ALL QUESTIONS FROM SECTION A

2. CHOOSE FOUR QUESTIONS FROM SECTION B

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### SECTION A

1.1 With an aid of a diagram explain the economic order quantity in an inventory control system. (3)

1.2 Explain briefly four factors that affect the cost of inventory. (3)

2.1 You want to retire in 13 years' time and have estimated that a monthly pension of R7500 will be required for 20 years after retirement. The financial institution which will manage your annuity expects a return of 14% p.a, interest compounded monthly. Determine the monthly contribution that you have to make for the next 13 years. (3)

2.1.1. It was planned that a producing shaft will be worked out within 15 years. A new shaft will be sunk 10 years from date, the cost of which will be R50 million. With an average inflation rate of 17% what must be the semi-annual investment to enable the mining company to sink the shaft. (3)

2.1.2 A loan of R6500 was made at the interest rate of 10% payable over four years. Calculate the annual payment, capital redemption and interest paid annually. (3)

3.0 Find the present value of an annuity of R150 per month for 4.5 years, if money is worth 7% compounded half yearly. (2)

4.0(a) Sales for November and December was 1200 and 1700 respectively. The selling price is R24 per unit whilst the variable cost is R18 per unit, of which R10 was material. The material was paid for 30 days in arrears but the labour component was paid for in the month of production. The fixed costs is R6000 per month. If the expected sales for January is 800 units and 10% of the sales is for cash, 30% on 30 day credit and the rest paid for after 60 days, determine the expected cash position at the end of January. They started the year with R5000 cash (4)

4.0(b) Determine the profit for January. (3)

4.0(c) Explain why there is a difference between the two values in (a) and (b) (1)

5.0 Product Z has a profit volume ratio of 40%. Fixed operating costs directly attributable to product Z during the quarter two of the financial year 2015-16 will be R280 000. Calculate the sales revenue required to achieve a quarterly profit of R70 000. (3)

6.0 Draw a P.P.F curve of a company producing similar products and explain the law of increasing opportunity costs. (2)

- 6.1 Explain briefly three budgeting strategies and how they can be used to achieve the company's objectives in a production environment. (3)
- 6.2 Draw a diagram of an inventory control model of your choice and explain briefly where it's applicable. (3)
- 6.3 State and explain the theory of labor. (2)
- 6.4 Explain the difference between total standard costing and marginal costing. (2)

[40 marks]

## SECTION B

### QUESTION1

Eland (Pty) Ltd manufactures and sells a single product. The company's sales and expenses for the last month are as follows:

	<b>Total</b>	<b>Per ton</b>
<b>Sales</b>	R3,989,425.00	R275.00
<b>Variable expenses.</b>	R1,595,770.00	R110.00
<b>Fixed costs.</b>	R852,631.00	

- 1.1 What is the break-even ton? (2)
- 1.2 What tonnage will have to be sold per month to increase profits by R797, 885.00. (4)
- 1.3 By what percentage will the sales increase if the tons sold increase by 14 %? (3)
- 1.4 A monthly constant demand for a product in production facility is 900 units. The current cost is R80 per unit but the product is only sold in 5 unit's tins. The cost of placing an order is R50. Inventory holding costs is R5 per unit per year. Lead time from order to deliver is 5 working days. Re-order point for stock is 7 working day supply.
- 1.4.1 Most economic order quantity. (4)
- 1.4.2 Number of orders per year. (2)
- 1.4.3 Cycle times between orders. (2)
- 1.4.4 What is economic an order quantity? (2)

[20]

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## **QUESTION 2**

2.0 By investing R4 million now, a plant can be established and start producing within one year. The output is estimated at 80 000 tonnes/year. At present, the product sells at R15, 50 per ton and the selling price will increase yearly by 8%, 9.05%, 10.11%, 12% and 12.05% respectively for 5 years. The company will start selling the product exactly one year after the investment was made. Assume the increase will happen yearly on anniversary of investment. If the Company has the following targets for their proposal, are they likely to accept the proposal? Money is worth 11%.

If the company has the following targets for their proposals, are they likely to accept the proposal or not ?

1. Pay –back period : 2-3 years.
2. ROCE : 12.5-16%.
3. IRR : >10%.
4. NPV which is positive. (15)

2.1 Explain the three financial and non financial models that can be used to select a project. (5)

**[20]**

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## **QUESTION 3**

A company manufactures three products (X, Y and Z). All direct operatives are the same grade and are paid at R11 per hour. Material is to be paid at R10 per kg. The Company has the following sales target.

Product X     3600 units.  
Product Y     8000 units.  
Product Z     5700 units.

Product	X	Y	Z
	R/unit	R/unit	R/unit
Selling price :	100	69.00	85.00
<b>Variable costs :</b>			
Production	51.60	35.00	42.40
Non production	5.00	3.95	4.25
<b>Fixed costs :</b>			
Production	27.20	19.80	21.00
Non production	7.10	5.90	6.20
Direct operatives	24.20	16.50	17.60
Direct material	20	15	14

**Required :**

Determine the production plan that would maximise profit in the following period, if the available direct operatives hours is 26 400hrs and material is 30 000kg. (15)

3.1 Explain the difference between marginal costing and absorption costing in terms of inventories and why the profit figures are different when applying these costing strategies. (3)

3.2 Explain why it is important to do costing in a production environment. (2)

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#### **QUESTION 4**

4.0 Mhangula copper mine generated the following revenue for the months January to June. Generate a cash flow statement for the first and second quarter of the period:

Amount brought forward for January: R10 000

Sales forecast at R10/unit .The Company wishes to maintain R10000 in cash all the times, and will borrow to achieve this. The client takes two months to pay her account:

Months	Sales forecasts(Units)
November(previous year)	3000
December(previous year)	1500
January	1100
February	2200
March	2900
April	2500
May	2700
June	2700

#### **Cost of Sales:**

1. Overheads are R3500 per month.
2. Material costs are R2.50 per unit. Supplier gives one month credit.
3. Labor costs are R3.50 per unit. This is paid in the month of use.
4. 15% of sales are cash sales and 30% are collected in 30days and the rest in 60days arrears.
5. A dividend is paid of R3500 is to be paid in April.
6. Tax of R4000 is due February.
7. New equipment to be bought I June for R6000
8. Rent every month is R3500
9. Previous loan is being paid every month of R5000.

#### **Loan repayment schedule:**

10. Bank charges 11% interest per year, calculated on the monthly balance of the borrowings. (15)

4.1 Give five reasons why cash flow is important for the mine. (5)

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### **QUESTION 5**

Construct a network diagram (A.O.N) with earliest due date scheduling for the tender of the construction of slimes pretreatment plant.

Activity	Time (days)	Immediate predecessor
A	15	-
B	5	-
C	12	A
D	14	B
E	8	B
F	12	E
G	22	C
H	24	D,F
I	8	F

5.1 Construct a network diagram using earliest and latest due date scheduling technique and Determine the critical path i.e. the shortest possible time of completion. (10)

5.2 Draw a simple bar chart using the earliest due date scheduling technique and show the floats. (5)

5.3 Why is it important to use the earliest due date scheduling when planning your project. (1)

5.4 State two advantages and two dis-advantages of the two numeric models of your choice in project appraisal. (4)

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### **QUESTION 6**

6.0 A company manufactures two products (A and B) and the profit per unit sold is R30 and R50 respectively. Each product has to be assembled on particular machine, each unit of product A taking 10 minutes of assembly time and each unit of B taking 20 minutes of assembly line. The company estimates that the machine used for assembly has an effective working week of only 30 hours.(due to maintenance ).Technological constraints means that for every five units of product A produced at most three units of product B must be produced. The company has been offered the chance to hire an extra machine, thereby doubling the effective assembly time available. What is the maximum amount you would be prepared to pay (per week) for the hire of this machine and why? (10)

6.1 U.D.C (Pvt) Company has prepared the following Budget for analysis:

	<b>Standard Cost Per Unit</b>
Standard output	100 units
Selling price per unit	R100
Raw materials 20kgs at R250/kg.	R50
Direct labor 300hrs at R6/hr.	R18
Variable production overheads	R10
Fixed production overheads	R24

	<b>Actual results.</b>
Production.	120 units
Direct material purchase 22kg.	R4300
Direct labor 300hrs.	R2000
Variable production overheads.	R850
Fixed production overheads.	R2500

6.1.1 Calculate all the variances and state at least one cause for each variance. (6)

6.1.2 Reconcile the actual budget and budget variance. (4)

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