



PROGRAM : BACCALAUREUS TECHNOLOGIAE
EXTRACTION METALLURGY.

SUBJECT : PROCESS ECONOMICS

CODE : MPI11-1

DATE : SS WINTER EXAMINATION
18 JULY 2019

DURATION : 8:00-11:00

WEIGHT : 40: 60

TOTAL MARKS : 120

ASSESSOR : T.SHEKEDE

MODERATOR : MR.D.ZHARARE 5176

NUMBER OF PAGES : 5 PAGES

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

REQUIREMENTS : NONE.

INSTRUCTIONS TO STUDENTS

1. PLEASE ANSWER ALL QUESTIONS SECTION A.
2. CHOOSE FOUR QUESTIONS FROM SECTION B.

SECTION A
[40 MARKS]

1.0 An ore processing company produces the following products with the following standard cost per unit for the budget period 1. The total supply of labor and material is limited to 4000hrs and 400 000kg respectively in period X. The problem is to decide which products to manufacture to maximize profit. (5)

Table 1.0

Product	A	B	C	D
Selling price	R100	R150	R150	R180
Variable costs	R25	R40	R30	R50
Material @R1/kg	R20	R25	R50	R30
Resources/Unit				
Labor (hrs)	30mins	20mins	12min	10mins
Material(kgs)	20	25	50	30
Maximum demand(Sales)	6100	900	2500	2000

2.0 Explain briefly five factors that affect production in a mining operation. (4)

3.0 You want to retire in 15 years' time and have estimated that a monthly pension of R7000 will be required for 20 years after retirement. The financial institution which will manage your annuity expects a return of 10% p.a, interest compounded monthly. Determine the monthly contribution that you have to make for the next 13 years. (3)

4.0 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 15% what must be the annual investment to enable the mining company to sink the shaft. (3)

5.0 Find the present value of an annuity of R150 per month for 10 years, if money is worth 7% compounded half yearly. (2)

PROCESS ECONOMICS MPI11-1

6.0(a) 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(b) Determine the break-even sales. (3)

6.0(c) Draw a graph to illustrate your answer. (2)

7.0 Explain briefly three budgeting strategies and how they can be used to achieve the company's objectives in a production environment. (3)

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

9.0 Draw an inventory control model of your choice and explain briefly where it's applicable. (2)

10.0 Explain briefly the theory of labor. (2)

11.0 Prepare a production budget for Ostrich Gold Mine for January to March.

The company anticipates the following sales:

Month.	January.	February.	March
Sales in kg.	52300	60000	51400

The opening stock on January was 30000. The company wishes to maintain the following closing stock positions.

Month.	January.	February.	March.
Stock in kg.	3300	2500	3500

(4)

12.0 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. Most economic order quantity. (2)

SECTION B

QUESTION 1

1.1 Construct a network diagram (A.O.N) with earliest due date scheduling for the tender of the construction of slimes pretreatment plant. (10)

Table 2.0

Activity	Time (days)	Immediate predecessor
Laboratory trials	3	-
Pilot plant design	5	1
Pilot tenders	4	1
Erection	6	1
Commissioning	2	2
Pilot plant trial	6	3,4
Evaluation	9	5,6
Slimes Pretreatment plant design	10	4
Tenders and awarding	4	7,8

1.2. Draw the earliest due date scheduling bar chart for the project and indicate the critical path and the floats. (4)

1.3 Why do you use the earliest due date scheduling technique when you are implementing a project? (2)

1.4 State and explain two financial models that can be used in capital expenditure project in a mining environment. (4)

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QUESTION 2

2.1 Salinga (Pty) Ltd produces a single product and sells the product themselves. During the previous month the income from sales was R300 000 and the profit was R75 000. Each unit sells for R270, of which R120 was for the variable costs. Determine:

2.1.1 The break-even quantity. (5)

2.1.2 How many units must be sold to increase the profit by R75 000. (3)

2.1.3. By what percentage will the profit if the company increased their sales by 15%. (2)

2.2 Calculate the pay-back period and I.R.R in respect to the following proposal:

CAPEX Proposal

	Year	Costs
CNC lathe	0	R2 000 000
Installation costs	0	R100 000
Working capital	1	R200 000
Economic Life	5	
Residual value after 5 years		R100 000
Estimated value of working capital		

PROCESS ECONOMICS MPI11-1

at the end of 5 years at today's value		R50 000
Profits before tax	1	R300 000
	2	R450 000
	3	R600 000
	4	R500 000
	5	R450 000

If the company has the following targets for their proposals, are there likely to accept this proposal that is pay-back period of 2 years and I.R.R of 24% before tax. (10)

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QUESTION 3

3.1 Diamond Mine has R20 000 cash reserves. Draw up the cash flow for the first two quarters of 2017. Sales achieved for November were 2000units and December1000 units. The sales forecast for the next 6 months are:

Table 3.0

Month.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Sales in Units.	2000	1000	1100	2200	2900	2500	2700	2700

Unit sells at R7/Unit with labor cost being R2.50 /Unit, payable in the month of production. Raw materials costs are R2/Unit and is payable on 30 days. All sales are paid in 60 days arrears. Tax of R1000 is due in February. The premise is rented for R4500/Month .A previous loan is being repaid at R5000 /Month. Come up with a cash flow for the first two quarters of 2017. (7)

3.1.1 State and explain the four advantages of cash flows. (5)

3.2 A manufacturing company produces 2 types of products X and Y. X product must go through two stages of the manufacturing process: assembly, finishing and inspections. One product requires 1 hour of assembly, 45mins of finishing and of inspection. Y product requires 30 mins of assembly, 90mins of finishing and inspection. The profit for X is R90 while the other is R50. Currently, each week there are 400 hours of assembly time available, 600 hours of finishing and inspection time. A maximum of 500hrs are available for both products. Find the optimum initial solution to the production. (8)

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QUESTION 4

4.0 Exxarro Pvt (Ltd) has prepared the following information for analysis:
The budgeted production units is 35 units. The standard budget per unit is given below:

Standard cost per unit.

Raw materials 60kgs at R3.50/kg	R210.00
Direct labor 15hrs at R2.75/hr.	R41.25
Variable production overhead	R15
Fixed production overhead	R10

ACTUAL RESULTS

Production.	40 Units
Direct material purchase.	8000kgs@R30,000
Opening stock direct material .	800kgs
Closing stock direct material	1400kgs
Direct wages.	R5800 for 2150hrs
Variable production overhead	R800
Fixed production overheads	R500

4.1 Calculate all the variances that have arisen and state the causes of any of the variances. (10)

4.2 The mine has borrowed R2 500 000 and was contracted to pay it back in 36 equally monthly instalments .Money is worth 18%per year compounded monthly.After 5 instalments ,it however decided to pay back the reminder of the debt in one payment .How much were they required to pay that in single lump sum? Complete a schedule to determine the amount .Verify this with an independent method. (10)

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QUESTION 5

5.1 A single product company sells its products at R60 per unit. In 2015, the company operated at margin of safety of 40%.The fixed costs amounted to R360 000 and the variable costs ratio to sales was 80%.In 2016,it estimated that the variable costs will go up by 10% and the fixed costs will increase by 5%.Find the selling price to be fixed in 2016 to earn the same P/V ratio as in 2015.Assuming the same selling price R60 per unit in 2016, find the number units required to be produced and sold to earn the same profit as 2015. (10)

5.2 A waste screening project is expected to generate the following nominal cash stream:

Year	Nominal Cash Flow(R'000)
0	(R1500)
1	R900
2	R700
3	R300

Calculate the NPV at discounted rates of 0%, 5%, 10%, 15% and 20%. What is the I.R.R and if the company has a cost of capital of 12%, is the project acceptable. (5)

5.3 State and explain briefly four financial and non-financial models that can be used to select a project. (5)

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QUESTION 6

6.0 M.R.P is the theory of labor in a market economy. State and explain the A company manufactures three products (X, Y and Z). All direct operatives are the same Grade and are paid at R12 per hour. It is anticipated that there will be shortage of the direct Operatives in the following period, which will prevent the company from achieving the following sales target.

Product X 3500 units.
 Product Y 8000 units.
 Product Z 5000 units.

Table 4.0

Product	Product RX/unit	Product RY/unit	Product Z R/unit
Selling price	100	69	85
Variable costs :			
Production	51.60	35.00	42.40
Non production	5.00	3.95	4.25
Fixed costs :			
Production	27.20	19.80	21.00
Non production	7.10	5.90	6.20
Direct operatives	24	16	20

Required :

Determine the production plan that would maximise profit in the following period, if the available direct operatives hours is 26 400hrs. (10)

6.1 A plant Manager has recently produced an outline budget for next year as follows:

Table5.0

Output	10000units
Unit value at R100/unit.	
Sales	R1000000
Cost of sales:	
Direct material	R400000
Direct labor	R150000
Variable production overheads.	R150000
Fixed overheads.	R200000

6.1.1 The second proposal is that 2500units of the output should be bought –out instead of manufactured by the company. The sub-contract price will be R75 per unit, which includes additional costs arising from making a change. In addition to this, there would be redundancy and notice costs of R2000. The Company does not anticipate obtaining work to replace the work that would be sub-contracted, according to the Production Manager and the Accountant. What decision should the Company take? (**Show all test workings**). (10)

[20]

TOTAL MARKS 120
