UNIVERSITY OF JOHANNESBURG

PROGRAM	:	BACCALAUREUS TECHNOLOGIAE MINE SURVEY.
SUBJECT	:	PROCESS ECONOMICS
CODE	:	**MES41-1**
DATE	:	SSA END OF YEAR EXAMINATION 13 JANUARY 2017.
DURATION	:	(SESSION 1) 08:00-11:00hrs
WEIGHT	:	40: 60
TOTAL MARKS	:	100

EXAMINER	:	MR. T.SHEKEDE
MODERATOR	:	MR. MUZENDA.
NUMBER OF PAGES	:	7 PAGES.

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INSTRUCTIONS TO CANDIDATES:

1. ANSWER ALL QUESTIONS SECTION A.
2. ANSWER FOUR QUESTIONS FROM SECTION B.
3. ONLY SCHOOL OF MINES CALCULATORS IS ALLOWED.
4. MARKS WILL BE DEDUCTED FOR UNTIDY WORK.

SECTION A.

1.1A mining company decides to build additional houses for its employees at a cost of R4 250 000.The company will put down a deposit of R950 000 with a building society and will be given bonds over a period of 20 years. The interest rate is 15% per annum amortised monthly. Calculate the monthly repayments of the bond to the nearest cent. (3)

1.2 Draw the graph representing any inventory control model of your choice and label it. (2)

1.3 The price of a new machine today is R36 000 including G.S.T.If you wish to replace this machine in 5 years' time and to pay cash for it.How much must you save per month into an account that gives 16% interest compounded monthly .Assuming the inflation rate is to be on average 13% per annum.No change in G.S.T the trade in value is a third of the current value of the new machine. (Present value) (3)

2.1 Discuss briefly the two types of budgeting that can be used in a production plant. (2)

3.0 State and explain two financial models that can used to appraise a project. (2)

4.0 When a mine bought a new plant for R35, 000,000 it was not sure how to depreciate it properly. They knew that it had scrap value of R3, 000,000 after 5 years. They also want to know the book value of the asset after 3 years using the sum of year digit method .Produce a table with schedule of the depreciation, highlighting the book value after 3 years. (4)

5.0 Differentiate between:

5.1 Holding costs and ordering costs. (1)
5.2 Total absorption costing and marginal costing. (1)
5.3 Economic order quantity and lead time. (1)
5.4. Management accounting and financial accounting. (1)
5.5 I.R.R and R.O.C.E. (1)

6.0 Draw a production possibility frontier curve of the production of capital goods vs. consumer goods. Explain the opportunity cost. (3)

7.0 Differentiate between cost push and demand pull inflation. (1)

8.0 Describe briefly the negative and positive aspects of increased productivity. (2)

9.0 With an aid of a diagram explain the opportunity cost in a production possibility frontier curve on any capital and consumer goods of your choice. (3)

10.0 Two different makes of conveyor are being considered for installation in a plant. Both are capable of the same service.

	A	B
Initial cost	R68000	R57000
Expected life.	10years.	10years.
Operating cost/yr.	R500	R540
Salvage value	R14000	R12000

If the company expects the minimum rate of return on investment to 20% per year. Make use of the present value method to decide which would be more economical product to buy. (5)

11.0 It is estimated that R105 000 will be required to implement a project. Once implemented, the facility that was established during the project will generate the following cash flows:

(End of) year Cash flow)
1 R35 000
2 R35 000
3 R35 000
4 R35 000

a) Give the payback period for the project. (1)

b) Determine the return on investment for the project. (2)

c) Calculate the net present value (NPV) of the project. Use a discount rate of 15%. (2)

d) Will you invest in this project? Explain. (1)

[Total 40 marks]

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 1.0

Activity	Time (days)	Immediate predecessor
A	15	-
B	5	-
C	12	A
D	10	B
E	8	B
F	12	E
G	22	C
H	24	D,F
I	8	F

1.2. Draw the earliest due date scheduling bar chart for the project and indicate the critical path and the floats. (8)

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

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QUESTION 2

2.0 ABC mining has the following sales figures and forecast.

Table 2.0

Months	Sales forecasts(Units)
November(previous year)	3000
December(previous year)	1500
January	1200
February	2200
March	2900
April	2500
May	2500
June	2700

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:

Cost of Sales:

1. Overheads are R3, 500 per month.
2. Material costs are R3 per unit. Supplier gives one month credit.
3. Labor costs are R2.50 per unit. This is paid in the month of production.

4. 10% of sales are cash sales and 30% are collected in 30days and the rest in 60days arrears.
5. A dividend is paid of R4, 000 is to be paid in April.
6. Tax of R5000 is due February.
7 New equipment to be bought I June for R10, 000
8. Rent every month is R3000
9. Previous loan is being paid every month of R5, 000.
10. **Loan repayment schedule:**
10.1Bank charges 8 % interest per year, calculated on the monthly balance of the borrowings. (15)

2.1 Is the company profitable? Explain your answer? (3)

2.2 Explain four reasons why cash flow statement is important for the mine. (2)

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QUESTION 3

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

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

3.1 What is the break-even ton? (2)

3.2 What ton. will have to be sold per month to increase profits by R797, 885.00. (4)

3.3 By what percentage will the sales increase if the tons sold increase by 14 %? (3)

3.4 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.

3.4.1 Most economic order quantity. (4)

3.4.2 Number of orders per year. (2)

3.4.3 Cycle times between orders. (2)

3.4.4 What is economic order quantity explain with an aid of a diagram. (2)

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QUESTION 4

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

Table 4.0

	Standard Cost Per Unit
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

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

4.2 Calculate all the variances and state at least one cause for each variance. (10)

4.3 Mining ABC (Pty) Ltd wishes to produce a similar product, selling for the same price, to its present production line. Last year's figures looks as follows:

Table 5.0

Production	Sales revenue	Variable costs	Fixed costs
1200t	R2,500,000	R1,700,000	R500,000

The feasibility study has shown that the new product would require an additional capital investment of R400, 000 with a useful life of 5years.The Company uses straight line depreciation.

4.3.1 Determine the present profit. (3)

4.3.2 Determine if is worthwhile to produce this product, if the variable cost will be the same and 400t a year can be sold at the same price as the present product. (5)

4.3.3 What will the total profit be? (2)

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QUESTION 5

5.1Based on a study of a metallurgical plant by the project team it is recommended that an amount of R480 000 be spent to upgrade the plant. It is estimated that the equipment to be installed will have an effective life of 12 years.

(a)What amount should be paid into the sinking fund each month to replace the equipment in 12 years' time if the investment company offers a 14% per annum interest compounded monthly, under the following conditions?

(1) The cost of the equipment is expected to remain the same. (3)

(2) The inflation rate is expected to be 12% per annum. (3)

(3) The inflation rate is now 12% per annum and is expected to increase by 1% per annum. (4)

5.2 The project team had further estimated that there will be a substantial savings in the operational costs in the plant as shown in the following table:

Period(yrs.)	Annual savings in costs
1	R98 000
2	R107 000
3	R110 000
4	R114 000
5	R110 000

6-7	R108 000
8-12	R106 000

The company expects a 22% return on capital employed. Based on the purchase price of the new plant and the annual savings and the expected rate of return you are to calculate:

5.2.1 What the salvage value of the equipment is to be at the end of 12 years to comply with required rate of return. (5)

5.2.2 If the equipment will have no salvage at the end of 12years what must the additional savings be to comply with the required rate of return? (5)

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QUESTION 6.

6.1 A plant has two processes that it can produce X and Y's.An hour of operation of process 1 produces 3X's and 6Y's and costs R500, an hour's operation of process 2 produces 5X's and 4Y's and costs R300.The plant must produce at least 100 X's and 150Y's over the next week. How many hours should each process be used so that demands are met and costs minimized. (10)

6.2 Define productivity. (1)

6.3 A loan of R6 000 was made at the interest rate of 10% p.a payable over 4 years. Loan capitalized yearly. Calculate the annual payments, the capital redemption, interest paid annually. (5)

6.4 Discuss briefly how increased productivity can achieved. (4)

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QUESTION 7

7.0 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 of product B 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 and breakdown).Technological constraints mean that for every five units of product A produced at least two 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. (15)

7.2 State and explain five objectives of budgeting in a production plant. (5)

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