PROGRAM : BACHELOR OF ENGINEERING TECHNOLOGY
EXTRACTION & PHYSICAL METALLURGY.

SUBJECT : PRINCIPLES OF ECONOMICS & MANAGEMENT

CODE : PMEMTB3

DATE : END OF YEAR EXAMINATION
18 NOVEMBER 2019

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

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

1.0 Differentiate the following terms in economics:

1.1 Short run versus long decision processes in production. (2)

1.2 Business risk and financial risk. (1)

1.3 Stock out costs and ordering costs. (1)

1.4 Re-order point system and periodic review systems. (1)

2.0 Explain briefly three basis factors in maximization of profits in a production plant. (3)

3.0 Blue-sky (Pty) Ltd has fixed operating costs of R837 117 per year, and its selling price per unit is R1261 and its variable operating cost per unit is R745.Calculate the minimum number of units that needs to be manufactured in order not to incur any operating losses or profit. (3)

4.0 A mining company proposes raising a bond for R1 700 000 at 14.45 % pa interest payable monthly over 10 years. Determine the monthly repayments of the bond and the value of the capital remaining to be paid at the end of the 105 period. (3)

5.0. The current cost of plant machinery is R2 800 000.The escalation is 12% throughout the life of the plant. The salvage value of the plant after 6 years is absolete.Find the annuity amount to be invested monthly to enable the business to replace the current plant at the end of 6 years. The investment interest is 15 %. (3)

6.0 How long will it take R6 000 to grow to R15 000 if money is invested at 10.5% compounded monthly? (3)

7.0 Find the future value of an annuity of R250 per month for 10 years, if money is worth 7% compounded semi annually. (2)

8.0 Product Z has a profit volume ratio of 50%.Fixed operating costs directly attributable to product Z during the quarter two of the financial year 2018-19 will be R250 000.

9.0 (a) Calculate the sales revenue required to increase quarterly profit by R70 000. (2)

10.0 State and explain three objectives of budgeting in a production plant. (2)

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

12.0 Draw a graph of marginal product and average product and explain the laws of diminishing returns. (3)

13.0 Discuss briefly an inventory control model of your choice and explain where it is applicable. (2)

14.0 Explain briefly two views of inflation. (2)

15.0 A firm manufactures component BK and the unit costs for the current productions levels of 50000 units are:

Material   R25.00
Labor   R12.50
Variable overheads R17.50
Fixed overheads   R35.00

Component BK 200 could be bought in for R77.50 and, if so, the production capacity utilized at present would be unused. Assuming that they are no overriding technical considerations, should BK 200 be bought in or continue to be manufactured. (3)

16.0 Your company can buy out the following company given as Appendix A.Determine the acid test and the current ratio. Advice your company on the sales using the ratio as basis. (2)

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[40] Marks

SECTION B

QUESTION 1

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

Table 1.0

Activity code	Activity	Time (days)	Immediate predecessor
1	Laboratory trials	3	-
2	Pilot plant design	5	1
3	Pilot tenders	4	1
4	Erection	6	2
5	Commissioning	2	2

6	Pilot plant trial	4	3
7	Evaluation	3	4
8	Slimes plant design	10	4
9	Tender adjudication	2	7
10	Awarding Tender	1	5,6,8,9

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 three financial and non-financial models that can be used in a plant rehabilitation project. (4)

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QUESTION 2

2.0 Your company has an average mark-up of 50%.It has sales of R2, 500,000 for September 2019.

2.1.1 Determine the sales revenue and the gross profit. (4)

2.1.2 Determine the net profit if the fixed costs is R450, 000. (4)

2.1.3 Determine the average sales price per ton if the variable cost is R50/ton. (4)

2.2 Gold Digger Ltd has obtained a loan and has two options of re-payment. The first is to make equal monthly payments of R80 000 for 6 years. Money is worth 15% compounded monthly. The second option is to make two equal payments, one now and the other in 6 years' time. Determine the two payments. (4)

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

	A	**B**
Initial cost	R68 500	R57 000
Expected life	10 years	10 years
Operating costs/year	R500/month	R540/month
Salvage value	R14 000	R12 000

If the company expects a minimum rate of return on investment to 20% per annum.Make use of the present value method to decide which would be more economical product to buy.(4)

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QUESTION 3

The following information was generated for a proposed gold mining operation.

Table 2.0

	Year1	Year 2	Year 3	Year 4	Year 5
ROM (t)	900 000	1 000 000	1 200 000	1 300 000	1 200 000
Grade(g/t)	16	17.3	15.4	16.7	14.4
Milled tonnage	700 000	1 200 000	1 200 000	1 200 000	1 200 000
Mill grade	15.8	17.5	15.4	16.7	14.4
Plant recovery	95%	95%	95%	95%	95%
Gold price(US$/oz)	1150	1150	1150	1150	1150
Exchange rate(R/US$)	14	14	14	14	14
Mining costs(R/t mined)	350	350	350	350	350
Plant cost(R/t milled)	97	97	97	97	97
Capex	R350 000 000				

3.1.1 Determine the cash flow for this proposed gold mine production. In the first quarter of its operation. (7)

3.1.2 What is the NPV of the project if the discount factor changes annually by 2% starting at 10% at the start of the project? (3)

3.1.3 State and explain the five 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

Israel (Pvt) (Ltd) has prepared the following information for analysis:

Extract From a Standard Cost for 120 Units Part No. 50Y

Standard cost /Unit

Selling price	R350
Raw materials 60kgs at R35 per kg	R210
Direct labor 15 hours @ R27.50 per hour	R41.25
Fixed production overheads	R20.00
Variable production overheads	R15.00

Actual Results

Production	140 units
Direct material purchase	8000 kgs at a cost of R300 000
Opening Stock Direct Material	1800 kgs
Closing Stock Direct Material	1450 kgs
Direct Wages 2150hrs	R58 000
Fixed production overheads	R25 000
Variable production overheads	R30 000

4.1 You are required to calculate all the variances for this period. (10)

4.2 List at least two causes of each of the above variance. (4)

4.3 Beta company manufactures three products R, S and T using different quantities of the same resources. Beta buys in a special component XX from supplier called Gamma that it uses in making product T at R350 per unit. It is considering manufacturing this component in-house and has established that the total cost per unit of doing so would be as follows direct material at 3kg/unit (R120)+ direct labour (R80)+variable overhead (R60) =R260.The material used to produce component XX is the same material A that is used in making products R,S and T.The quantity of output of component XX will relate directly to that of product T.Beta has established that it can obtain only 57 000 kg of direct material A per week for the foreseeable future.

Table 3.0 Manufacturing data for R, S and T.

Selling price	R720	R640	R1390
Cost per unit			
Direct material A @R40/kg	R240	R200	R320
Special component	0	0	R350
Direct labour	R100	R120	R140
Variable overheads	R60	R80	R120

Demand per week(units)	1800	3000	4200

You are required to:

4.3.1 Calculate whether the company should continue to purchase component XX from Gamma or whether it should manufacture this internally.   (6)

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QUESTION 5

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5.1 A single product company sells its products at R60 per unit. In 2018, 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 2019,it estimated that the variable costs will go up by 15% and the fixed costs will increase by 7%.Find the selling price to be fixed in 2019 to earn the same P/V ratio as in 2018.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 2018.   (10)

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

Year	Nominal Cash Flow
0	(R1500 000)
1	R900 000
2	R700 000
3	R300 000
4	R350 000

5.2.1 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)

5.2.2 With the help of a diagram explain the importance of safety stock in production.   (5)

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QUESTION 6

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6.0 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.

Table 4.0

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

(5)

6.1 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. (5)

6.2 Rose of Sharon Enterprises makes and sales a single product A.The following information is available for use in the budgeting process for the year to 31 December 2018.

1. Sales   Selling price per unit=R200

Table 5.0

Quarter	1	2	3	4	5
Production units	6000	4000	3600	5600	4800

2. Stock Levels
At 31 December 2017   -Finished Product A   1500
                             -Raw Material X   3500 kgs

3. Finished Product **A** Closing Stock

-at the end of each quarter, it is budgeted as a percentage of the sales units of the following quarter as follows:

-at the end of quarters 1 and 2: 25%
-at the end of quarters 3 and 4: 35%

Closing Stock of Raw Materials X

-is budgeted to fall by 300kg at the end of each quarter in order to reduce holdings by 1200kgs during 2018.

4. Product **A** Unit Data

-Material   4kgs@ R11.60 per kg

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-Direct Labor   0.60 hrs @ R35 per hour

Your are required to prepare for each quarter:

a) Production budget.   (5)

b) Material purchases budget in both quantities and value.   (5)

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TOTAL MARKS 120