



PROGRAM : **BTech (Mining)**

SUBJECT : **ENGINEERING MANAGEMENT IVA (S5)**

SUBJECT CODE : **MGNA411**

EXAMINATION : **SUPPLEMENTARY FINAL SUMMATIVE EXAMINATION**

DATE : **16 JULY 2019**

DURATION : **180 MINUTES**

TOTAL MARKS : **120**

EXAMINER : **Maelani Chauke**

MODERATOR : **Mr. Hein Strauss**

NUMBER OF PAGES : **6 PLUS FORMULAE SHEET**

INSTRUCTIONS:

1. **PLEASE** answer **ALL** questions
 2. A question means all the sub-questions that appear under the heading of that question. All the sub-questions must be kept together under the heading of a specific question
 3. Number all questions, and associated sub-questions **CLEARLY**
 4. A formulae sheet is herein attached
 5. The use of a calculator is permissible
 6. All the relevant rules of the University of Johannesburg shall apply
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Question1

- 1.1 Through the use of an appropriate figure, or some other form of visual representation, give an overview of the management process. Explain the salient aspects of the process (10)
- 1.2 With reference to the management, explain the 'controlling' function (4)
- 1.3 Through the use of an appropriate figure, describe the process of 'controlling' (6)

[20]

Question 2

- 2.1 Define human resources management (4)
- 2.2 List the typical activities in the process of human resource management (4)
- 2.3 List six causes of conflict (6)
- 2.4 List and explain three conflict management strategies (6)

[20]

Question 3

You need to select a project for your company and you have to decide between four projects of which the annual cash flows are tabulated below. Determine the ROI, Payback Period, and NPV of each project and make a decision. Use a discount rate of 15%.

<u>Year</u>	<u>Project A</u>	<u>Project B</u>	<u>Project C</u>	<u>Project D</u>
0	- R 215 000	- R 400 000	- R 50 000	- R 18 000
1	- R 15 000	R 27 000	- R 200 000	0
2	R 94 000	R 315 000	R 420 000	R 78 000
3	R 100 000	R 415 000	R 470 000	R 135 000
4	R 120 000	R 285 000	R 475 000	R 185 000
5	R 1555 000	R 300 000	R 515 000	R 272 000

[20]

Question 4

4.1 Within the context of engineering contracts and law, explain the following terms:

4.1.1 Conditions (2)

4.1.2 Guarantees (2)

4.1.3 Cancellation clauses; and (2)

4.1.4 Penalty clauses (2)

4.2 In your own words, explain the 'parole evidence rule'. List and explain exceptions, if any, to the parole evidence rule

(8)

- 4.3 The population of South Africa is currently estimated 54 million people. List and explain the different aspects of 'legal capacity' as it applies to the different members of the population of South Africa, and entities operating within the boundaries of South Africa

(4)

[20]

Question 5

You have been appointed as a project leader for a project to be undertaken by your company. You have identified the following tasks and made the time estimates for each task as listed in the table below:

Activity	Preceding ("from") Activity	Succeeding ("to") Activity	Estimated duration (work-days)
A	-	C,E	8
B	-	D	5
C	A	D	7
D	B,C	F	13
E	A,G	F	18
F	D,E	-	9
G	D	E	16
H	G	G	8
I	-	E	6

- 5.1 Use the above-mentioned table to construct a project network diagram. Show all relevant calculations

(12)

- 5.2 Determine the critical path for the project and its duration. Show all relevant calculations

(8)

[20]

Question 6

- 6.1 What are flexible manufacturing systems? Explain. Give examples of flexible manufacturing systems in the mining industry. Discuss the typical characteristic of flexible manufacturing systems. What are the typical advantages and disadvantages of flexible manufacturing systems?

(10)

- 6.2 Given the data below, calculate productivity measurements before and after salary increase

- 6.2.1 A company produces 8 500 items per day. Labour cost is R370, material cost is R120, and overheads are R190. Calculate productivity (5)

- 6.2.2 Assume labour costs increase from R270 to R450, material costs also increase from R120 to R145, and all other figures remain the same. Calculate productivity after the increases. (5)

[20]

GRAND TOTAL MARKS = 120

MGNA411 – Formulae

Operations management	
Design capacity	Maximum output under ideal conditions.
Effective capacity	Output estimated when constraints such as breakdowns, scheduling & quality are considered.
Actual output	Actual achievement.
Efficiency	$Efficiency = \frac{Actual\ output}{Effective\ Capacity} \times 100$
Utilisation	$Utilisation = \frac{Actual\ output}{Design\ capacity} \times 100$
Productivity	$Productivity = \frac{Output}{Input}$
Project management	
Expected completion	$TE = \frac{a + 4m + b}{6}$
Standard deviation	$\sigma^2 = \left[\frac{b - a}{6} \right]^2$
Probability Z value	$Z = \frac{D - \mu}{\sqrt{\sigma_\mu^2}}$
Time value of money	
Simple interest	$I = Pni$
Compound interest	$F = P(1 + i)^n$ $P = \frac{F}{(1 + i)^n}$
Annuity	$F = A \left[\frac{(1 + i)^n - 1}{i} \right]$ $P = A \left[\frac{(1 + i)^n - 1}{i(1 + i)^n} \right]$
Return on investment	$ROI = \frac{Average\ annual\ profit}{Original\ investment} \times 100$
Net Present Value	$NPV = \sum_{t=1}^n \frac{CF_t}{(1 + k)^t} - I$
Payback period	Time taken to gain financial return equal to the original investment.