UNIVERSITY OF JOHANNESBURG

PROGRAM	:	NATIONAL DIPLOMA *ENGINEERING: INDUSTRIAL*
SUBJECT	:	**FACILITY LAY-OUT DESIGN AND MATERIAL HANDLING**
CODE	:	**BFM 2111**
DATE	:	JULY SSA EXAMINATION : JULY 2018
DURATION	:	08:00 - 10:00
TOTAL MARKS	:	100

ASSESSOR	:	MR R P MUTYAVAVIRE
MODERATOR	:	MR T NENZHELELE
NUMBER OF PAGES	:	PAGES 4

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

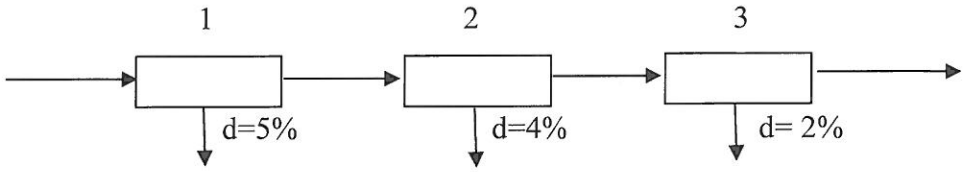
INSTRUCTIONS TO STUDENTS

PLEASE ANSWER ALL QUESTIONS.

QUESTION 1

1.1 A confectionery constitutes three (3) work stations. A total 15000 cakes are sold per month. The defective rates are illustrated in fig. 1 below. Calculate the starting quantity required to meet the required demand of perfect cakes. (5)

1.2 If the scrap costs per unit are R5, R7 and R20 respectively for the work stations, determine the total scrap costs. (10)



1.3 Briefly discuss why safety considerations are critically important in the design of materials handling systems. (5)

[20]

QUESTION 2

2.1 A workshop constitutes five main departments. Space requirements for each of these are specified in table Q2a below. The respective departmental activity relationships are illustrated in table Q2b.

Table Q2a

Department	**Area (sq m)**
1.Body shop	12 000
2.Engine bay	1 000
3.Spray booth	2 000
4.Quality control	3 000
5.Chassis alignment	6 000

Table Q2b

1	2	3	4	5	
	E4	A1	A2	I	1
		O	E	I	2
			I		3
				A1	4
					5

2.1 Develop a worksheet and the respective dimensionless block diagram based on the Activity Relationship Chart in table Q2b.

(10)

2.2 Fit the divisions into a building measuring 200m x 150m. Provide for 20m wide aisles in-between the divisions.

(10)

[20]

QUESTION 3

3.1 Briefly discuss the different levels within a plant that an Industrial Engineer can potentially put to use as he/she seeks to maximise storage space.

(10)

3.2 Industrial Engineers are guided by specific objectives (goals) during the execution of lay-out design projects. In good detail, discuss any five (5) of these objectives.

(10)

[20]

QUESTION 4

4.1 List and briefly discuss any five (5) auxiliary service facilities an Industrial Engineer needs to provide for at any production factory.

(10)

4.3 A Process Engineer is required to specify the most appropriate material handling system for the following cases:
(i) Moving mining aggregates over a distance of 500m from a mine crusher to storage bins.
(ii) Packaged toxic chemical to various points in the plant.

(10)

[20]

QUESTION 5

5.1 List and briefly explain four (4) sources of information and data required by a process Engineer in order to develop an appropriate Facility Lay-out design.

[20]

TOTAL = 100