UNIVERSITY
OF
JOHANNESBURG

PROGRAM	:	NATIONAL DIPLOMA ENGINEERING : INDUSTRIAL
SUBJECT	:	**PRODUCTION ENGINEERING 1**
CODE	:	**BEP 121**
DATE	:	SUMMER EXAMINATION 5 NOVEMBER 2014
DURATION	:	(SESSION 1) 08:30 - 11:30
WEIGHT	:	40 : 60
TOTAL MARKS	:	100

ASSESSORS	:	MR F CHIROMO
	:	MS T MOHONO
MODERATOR	:	MR P DUBE
NUMBER OF PAGES	:	4 PAGES

INSTRUCTIONS :

- A CALCULATOR OF ANY MAKE OR MODEL IS PERMITTED.
- ANSWER ALL QUESTIONS.
- NUMBER YOUR QUESTIONS CLEARLY.

QUESTION 1

1.1 The three core functions of any organisation are the marketing functions, product/service development function and the operation function. Discuss their contribution to the success of an organisation. (6)

1.2 All operations are similar in that they all transform input resources into output products and services. They differ in a number of ways, four of which are volume, variety, variation and visibility. All these dimensions have implications for the cost of creating the products of services. Explain how this is so. (4)

[10]

QUESTION 2

Flexibility means different things to different operations. Give two examples of what flexibility means to each of the following:

2.1 Johannesburg general Hospital; (4)

2.2 Metro bus services; (4)

2.3 Shoprite; (4)

2.4 Ford assembly plant. (4)

[16]

QUESTION 3

3.1 With the help of a schematic diagram, describe the product/service life cycle. (12)

3.2 Explain the relationship of each stage of the product/service cycle to the expected sales volumes. (4)

[16]

QUESTION 4

A company that assembles garden furniture obtains its components from three suppliers. Supplier "A" provides all the boxes and packaging material; Supplier "B" provides all metal components; Supplier "C" provides all plastic components. Supplier "A" sends one truck load of the materials per week to the factory and is located at (1,1) on a grid reference which covers the local area. Supplier "B" sends four truckloads of components per week to the factory and is located at point (2,3) on the grid. Supplier "C" sends three truckloads of components per week to the factory and is located at point (4, 3) on the grid.

4.1 Determine the location of the factory for the company that will result in minimum transportation costs. (6)

Assumptions:

1. There is little or no waste generated in the process.

Question 4 - Continued

2.   Transportation costs are directly proportional to the number of truckloads of parts transported per week.

[6]

QUESTION 5

5.1   Explain the three important design decisions one considers when designing a supply network.   (6)

5.2   Discuss issues that are considered before an organization makes a decision to outsource an activity.   (8)

[14]

QUESTION 6

The flow of jobs through eight workstations of a machineshop is show in Table Q6.

Table Q6

To From	D1	D2	D3	D4	D5	D6	D7	D8
D1	-	30						
D2	10	-	15	20				
D3		5	-	12	2		15	
D4		6		-	10	20		
D5				8	-	8	10	12
D6	3				2	-	30	
D7	3					13	-	2
D8				10	6		15	-

Assume that the direction of the flow of jobs if not important.

6.1   Construct the relationship chart.   (4)

6.2   Construct the most appropriate layout, given that each department is the same size and the eight workstations should be arranged four along each side of a corridor.   (8)

[12]

QUESTION 7

7.1   Explain what flexible manufacturing systems (FMSs) are, in terms of:
7.1.1   what the technology does;   (2)
7.1.2   how it does what it is designed to do;   (2)
7.1.3   the advantages associated with it;   (2)
7.1.4   the disadvantages associated with it.   (2)
                                                                            [8]

QUESTION 8

Table Q8 illustrates the precedence relationships and element times for a specific product.

Table Q8

Work Element	Time (min)	Intermediate Predecessors
1	0.5	-
2	0.6	1
3	0.8	-
4	0.2	3
5	0.1	2
6	0.6	4 and 5
7	0.4	-
8	0.5	6 and 7
9	0.3	8
10	0.6	9 9

8.1   Construct the precedence diagram for this job.   (6)
8.2   Calculate the cycle time needed to obtain an output of 400 units per day. Assume an eight hour day.   (2)
8.3   Determine the minimum number of workstations required.   (4)
8.4   Assign tasks to workstations according to the greatest number of following tasks. In case of a tie use the tiebreaker of assigning the task with the longest processing time first.   (5)
8.5   Calculate the percentage idle time for the line.   (1)
                                                                            [18]

TOTAL = 100