



**PROGRAM** : NATIONAL DIPLOMA  
ENGINEERING : INDUSTRIAL

**SUBJECT** : **PRODUCTION ENGINEERING 1**

**CODE** : **BEP121**

**DATE** : SUMMER EXAMINATION  
29 NOVEMBER 2016

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

**WEIGHT** : 40 : 60

**TOTAL MARKS** : 100

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**ASSESSOR** : MR F CHIROMO

**MODERATOR** : MR P DUBE

**NUMBER OF PAGES** : 4 PAGES

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**INSTRUCTIONS TO STUDENTS:**

- ANSWER ALL QUESTIONS.
  - A STUDENT IS EXPECTED TO MAKE REASONABLE ASSUMPTIONS FOR DATA NOT SUPPLIED.
  - NUMBER YOUR QUESTIONS CLEARLY.
  - ANSWERS WITHOUT UNITS WILL BE IGNORED.
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**QUESTION 1**

- 1.1 There are basically four perspectives associated with formulation of operations strategy; top-down, operations resources, market requirements and bottom-up perspectives.

Discuss in detail the operations resources strategy formulation perspective.

(10)

- 1.2 Discuss when the following processes are relevant to a manufacturing environment:

1.2.1 mass process;

(4)

1.2.2 continuous process.

(4)

**[18]****QUESTION 2**

Briefly discuss any two materials-processing technologies. In your discussion pay attention to; what the technologies do, how they do it, advantages associated with the technologies and the constraints associated with the exploitation of the technologies.

(10)

**[10]****QUESTION 3**

- 3.1 Use Johnson's rule to find the optimum sequence for processing jobs 'A' to 'F', in Table Q3, through centres 1 and 2. The times at each centre are in hours.
- 3.2 Illustrate the throughput time and idle time at the two work centres by constructing a time-phased chart.

(6)

(10)

**Table Q3**

Job	Work centre 1	Work Centre 2
A	6	12
B	3	7
C	18	9
D	15	14
E	16	8
F	10	15

- 3.3 Planning and control activities are associated with loading, scheduling, sequencing, and monitoring and control activities. Explain what each one entails.

(8)

**[24]**

**QUESTION 4**

DisChem in West Rand needs to locate its central office from which to conduct internal audits and other periodic reviews of its facilities. Its facilities are scattered throughout the West Rand Region. The coordinates for the facilities are shown in Table Q4.

Each site, except for "C", will be visited three times each year by a team of workers, who will drive from the central office to the site. Site "C" will be visited five times a year. Which coordinates represent a good central location for this office Table Q4 gives the map coordinates and the truck loads for a set of cities that we wish to connect through a central distribution centre.

Table Q4

Location	Map Coordinates	
	x	y
A	9.2	3.5
B	7.3	2.5
C	7.8	1.4
D	5.0	8.4
E	2.8	6.5
F	5.5	2.4
G	5.0	3.6
H	3.8	8.5

- 4.1 Determine the coordinates for the central office, assuming that each site facility is visited once per year. (8)
- 4.2 Consider that all site, except for 'C' are visited three times each year by a team of workers from the central office and 'C' is visited five times by the same team. Determine the recommended new location of the central office. (8)
- [16]**

**QUESTION 5**

Table Q5 shows twelve work elements that constitute the total work content of an assembly task. Answer the following questions based on the data given in Table Q5.

## (Question 5 -continued)

Table Q5

Element Number	Duration (minutes)	Preceding (element(s))
1	2	-
2	3.5	-
3	2.5	1
4	3	1,2
5	2	2
6	1.5	2
7	2	3
8	3	4, 5
9	2	5, 6
10	2	9
11	3	8, 10
12	3	7, 11

- 5.1 What must the cycle time be if 4 units have to be produced per hour? (2)
- 5.2 How many stages will be required in the layout? (2)
- 5.3 Draw a precedence diagram for the data. (6)
- 5.4 Calculate the balancing loss for the line. (2)
- [12]**

**QUESTION 6**

- 6.1 If Mashuga has time of 8.4, 8.6, 8.3, 8.5, 8.7 and 8.5 and a performance rating of 110%, determine: (4)
- 6.1.1 the normal time for this operation; (4)
- 6.1.2 whether Mashuga is faster or slower than normal. (4)
- 6.2 Refer to 6.1
- 6.2.1 If the allowance factor is 15%, determine the standard time for this operation. (6)
- 6.2.2 If the allowance factor is 18% and the performance rating is now 90%, determine the standard time for this operation. (6)
- [20]**

**TOTAL = 100**