PROGRAM : NATIONAL DIPLOMA
ENGINEERING : INDUSTRIAL

SUBJECT : PRODUCTION ENGINEERING 1

CODE : BEP 121

DATE : SUMMER EXAMINATION 2015
       9 NOVEMBER 2015

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

WEIGHT : 40 : 60

TOTAL MARKS : 100

ASSESSOR : MR F CHIROMO

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

The way in which operations should be managed and the objectives they should set themselves will change as the product or service ages in the market. Discuss the stages through which a typical product or service age in its market. (16) [16]

QUESTION 2

Most businesses expect their operations and their operations managers to improve over time. In doing this they progress from a state where they are contributing very little to the competitive success of the business to a point where they are directly responsible for its competitive success. This means that they should be able to master the skills to implement, support and then drive operations strategy.

2.1 Describe how the operations functions can support a business strategy. (4)

2.2 Flexibility means different things to different operations. Give four examples of what flexibility could mean to each of the following:

2.2.1 Helen Joseph Hospital; (4)
2.2.2 Rea Vaya Bus Company; (4)
2.2.3 Ford car assembly plant; and (4)
2.2.4 Checkers hypermarket. (4) [20]

QUESTION 3

A company that operates four regional warehouses decides to keep all its inventory in a single warehouse. The location coordinates of the four warehouses are as follows:

- Warehouse A (4;8)
- Warehouse B (8;3)
- Warehouse C (9;4)
- Warehouse D (6;10)

The monthly demand levels at each of the four warehouses is:

- Warehouse A (400 tons)
- Warehouse B (650 tons)
- Warehouse C (820 tons)
- Warehouse D (725 tons)

3.1 If a decision was made to have one central warehouse, determine the location that will result in minimum cost. (6)

3.2 Plot the locations of warehouses A, B, C, D and the central warehouse on the graph paper provided. (6) [12]
QUESTION 4

With the assistance of a diagram, discuss the stages of product/service design. (15)

QUESTION 5

Discuss the six (6) steps in the method study approach to job design. (10)

QUESTION 6

6.1 Define the following:

6.1.1 forward scheduling; (2)

6.1.2 backward scheduling. (2)

6.2 Discuss the advantages of:

6.2.1 forward scheduling; (4)

6.2.2 backward scheduling. (4)

[12]

QUESTION 7

The back room operations of a fast food restaurant have these tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Preceding Tasks</th>
<th>Task time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>0.39</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>0.25</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>0.40</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>0.05</td>
</tr>
<tr>
<td>E</td>
<td>A,B</td>
<td>0.49</td>
</tr>
<tr>
<td>F</td>
<td>C,D</td>
<td>0.65</td>
</tr>
<tr>
<td>G</td>
<td>E,F</td>
<td>0.39</td>
</tr>
<tr>
<td>H</td>
<td>-</td>
<td>0.90</td>
</tr>
<tr>
<td>I</td>
<td>-</td>
<td>0.60</td>
</tr>
<tr>
<td>J</td>
<td>H,I,G</td>
<td>0.40</td>
</tr>
<tr>
<td>K</td>
<td>J</td>
<td>0.30</td>
</tr>
<tr>
<td>L</td>
<td>K</td>
<td>0.25</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>5.07</td>
</tr>
</tbody>
</table>

If 100 burgers per hour must be prepared by the crew and 50 minutes per hour are productive:

7.1 draw a precedence diagram; (6)
7.2 compute the cycle time per burger in minutes; (3)
7.3 compute the minimum number of work stations required. (3)

4/...
(Question 7 – continued)
7.4 Could you use the longest-task-time heuristic to combine tasks into workstations that would minimize idle time? Why or why not? (3) [15]

TOTAL = 100