Examiner: Tamer Khalaf, PhD Spring 2012

Work Analysis and Design IE 342

Time Allowed: 60 minutes 1st Midterm

***Student Name:*** **KEY** ***Student ID: ##########***

***Instructions:*** this is a closed book closed notes exam.

***Student Grade:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Question #1***  (26 points) | ***Question #2***  (26 points) | ***Question #3***  (20 points) | ***Question #4***  (28 points) | ***Total***  (100 points) |
|  |  |  |  |  |

***Comments by student:***

***Comments by instructor:***

***Question #1***

A manufacturing facility having a workgroup of 10 workers in a certain month produced 7200 units of output, working 22 days for 8 hours a day.

Solution:

1. Determine the labor productivity ratio using units of output per worker-hour. ***(10 points)***

LPR = 7200 / (10 \* 22 \* 8) = 4.09 unit / hr.

1. Suppose that in the next month, the same manufacturing facility with only 8 workers of the same workgroup of workers produced 6800 units, working only 20 days for 10 hours a day; determine the labor productivity ratio using units of output per worker-hour; also, determine the labor productivity index for this month using the prior month as a base period. ***(16 points)***

LPR = 6800 / (8 \* 20 \* 10) = 4.25 unit / hr.

LPI = 4.25 / 4.09 = 1.0389

***Question #2***

1. Name the four broad categories of worker occupations. ***(8 points)***
2. Production workers
3. Logistics workers
4. Service
5. Knowledge workers
6. Labor is one input factor that determines productivity. What are two other factors that are more important than labor in improving productivity? ***(4 points)***
7. Capital
8. Technology
9. A given task performed by a worker can be considered to consist of the basic productive work content and excess nonproductive activities.
10. What is meant by the term basic productive work content? ***(2 points)***

Theoretical minimum amount of work required to accomplish the task

1. What is meant by the term excess nonproductive activities? ***(6 points)***
2. Extra physical and mental actions of worker
3. Do not add value to the task
4. Do not facilitate the productive work content
5. Take time
6. What are the three categories of excess nonproductive activities? ***(6 points)***
7. Excess activities due to poor design of product or service
8. Excess activities caused by inefficient methods, poor workplace layout, and interruptions
9. Excessive activities cause by the human factor

***Question #3***

1. Choose the correct Answer.

The principal objectives of methods engineering are: ***(4 points)***

1. to increase productivity and efficiency.
2. to reduce cycle time.
3. to reduce product cost.
4. to reduce labor content.
5. all of the above.
6. Complete the missing.

The six steps of the systematic approach in methods engineering are the following: ***(12 points)***

1. Define the problem and objectives
2. Analyze the problem
3. Formulate alternatives
4. Evaluate alternatives and select the best solution
5. Implement the best method
6. Audit the study
7. True or false.

A company would want to use manual production methods instead of automated methods at the beginning of production of a new product because it could start production sooner with manual methods. Designing automated equipment takes time, and the window of opportunity in the market for the product may be small. ***(4 points)***

True

***Question #4***

John Smith has been sitting on his porch, decides to **water his garden**. He leaves the porch, walks 85 feet to garage door (transportation). He opens the garage door (operation). He walks 10 feet to locker to get hose. He removed hose from locker. He carries hose and walks 15 feet to rear garage door. He open rear garage door. He walks 10 feet to faucet at rear of the garage. He attaches hose to faucet and then open faucet. He begins the main operation of watering garden.

1. Represent the above mentioned activity in the flow process chart work sheet below (show symbols for each activity and the distances travelled). ***(25 points)***
2. Summarize the whole activities in the bottom of the work sheet below. ***(3 points)***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Work Sheet # 1 | | | | | | | | | |
| Present Method √  Proposed Method | | **Process Chart** | | | | | | | |
| Activity Charted | | water garden | | | | Date: | 1 / 3 / 2012 | | |
|  | | | |  |  |  |
| Department | | Home | | | | Chart By: | Student | | |
|  | | | |  |  |  |
| Operator | | John Smith | | | | Chart No: | 1 |  |  |
|  | | | |  |  |  |
| Dist. | Time | Chart Symbol | | Process Description | | | | | |
| 85 ft. |  |  | | leaves the porch, walks 85 feet to garage door | | | | | |
|  |  | O | | opens the garage door | | | | | |
| 10 ft. |  |  | | walks 10 feet to locker to get hose | | | | | |
|  |  | O | | removed hose from locker | | | | | |
| 15 ft. |  |  | | carries hose & walks 15 feet to rear garage door | | | | | |
|  |  | O | | open rear garage door | | | | | |
| 10 ft. |  |  | | walks 10 feet to faucet at rear of the garage | | | | | |
|  |  | O | | attaches hose to faucet and then open faucet | | | | | |
|  |  | O | | begins the main operation of watering garden | | | | | |
|  |  |  | |  | | | | | |
|  |  |  | |  | | | | | |
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|  |  |  | |  | | | | | |
| **Summary** | | | | | | | | | |
|  | | | Present Method | | Proposed Method | | Difference | | |
| Operation O | | | 5 | |  | |  | | |
| Transportation | | | 4 | |  | |  | | |
| Inspection | | | 0 | |  | |  | | |
| Storage ∇ | | | 0 | |  | |  | | |
| Delay D | | | 0 | |  | |  | | |
| Dist. Travelled | | | 120 ft. | |  | |  | | |