Mansoura University
Faculty of Engineering
Prod. Eng. Dept.

M.Sc. Prod. Eng. Courses
Work Study
Final Exam Sep. 2013

Time: 3 Hours
Marks: 100

Answer the following questions, assume any missing data :-

Q1:

(a) Explain why work study is considered a valuable tool for raising productivity? Then discuss the basic procedure of work study.

(b) Define and summarize the advantages and limitations of 3 basic forms of productivity.

(c) The data concerning the output produced and input consumed by a manufacturing plant in a period of 150 hours are as follows :

- 750 units of output type A, $ 20 / unit.
- 1200 units of output type B, $ 15 / unit.
- 5 operators, $ 8 / man-hour.
- 2 supervisors, $ 10 / man-hour.
- 1 engineer, $ 20 / hour.
- 4500 KWH electricity, $ 0.6 / KWH.
- 2000 Kg raw material, $ 2.5 / Kg.
- $ 2000 capital input cost.
- $ 1000 over-head expense.

Your task is to calculate the values of the 3 forms of productivity.

Q2:

(a) Give examples of how to economize in the different elements of work; that is: operation, transportation, delay, inspection, and storage.

(b) In planning of a face milling operation on a vertical milling machine, the present method was found to consist of the following elements and their observed time values :

1-	Pickup a casting, locate casting	0.40 min.
2-	Machine preparation	0.20 "
3-	Machining surface (automatic feed)	5.00 "
4-	Stop machine unlock clamp	0.25 "
5-	Clean casting	0.30 "
6-	Place casting in box	0.15 "
7-	Clean fixture	0.40 "

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Assume: average rating of worker 125%, allowance 10%, and the worker need 0.1 min. to move from m/c to m/c.

Required:

i- Plot man machine chart.

ii- Plot man two m/c chart.

iii- Calculate utilization factors in both cases.

iv- Work out the standard time in both cases.

Q3:

(a) Explain what is meant by flow diagram then, draw with a suitable scale a hospital inpatient word with 9m width, 15m length, and 17 beds to show, diagrammatically, 2 different methods of serving dinners.

(b)

	Man		M/c
(1 Min.)	Fix work piece & operate to M/c		Idle
(6Min.)	Idle		Automatic cutting
(2 Min.)	Remove work piece.		Idle

The figure given above shows a Man-M/C chart.

i- Theoretically, how many M/Cs can one operator operates?

ii- If the average operator cost is $ 10 / hr and the average machine cost is $ 50 / hr, in both cases, what will be the output in an 8-hour shift and the cost per unit?

Q4:

(a) To achieve economy of motion, there are number of principles to be followed. List 3 principles in each of the following sectors:

i- Use of the human body.

ii- Arrangement of the work place.

iii- Design of tools and equipment.

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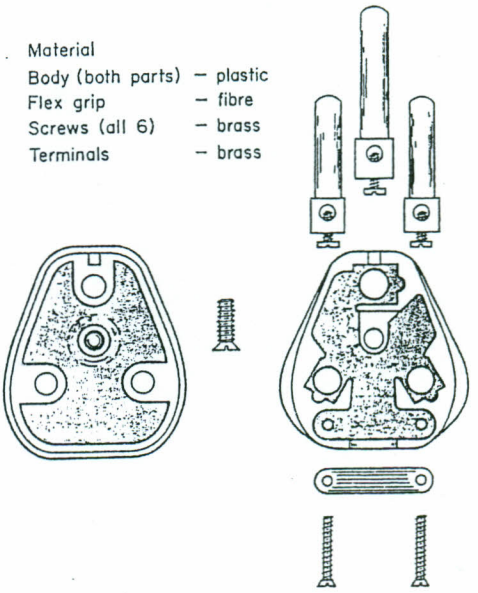
(b) The electrical plug shown in the figure is to be assembled manually in large quantities. Develop a method of assembling the nine components of the plug and sketch the most productive work place layout. Use a two handed chart to indicate your method.

You may approximate the element times.

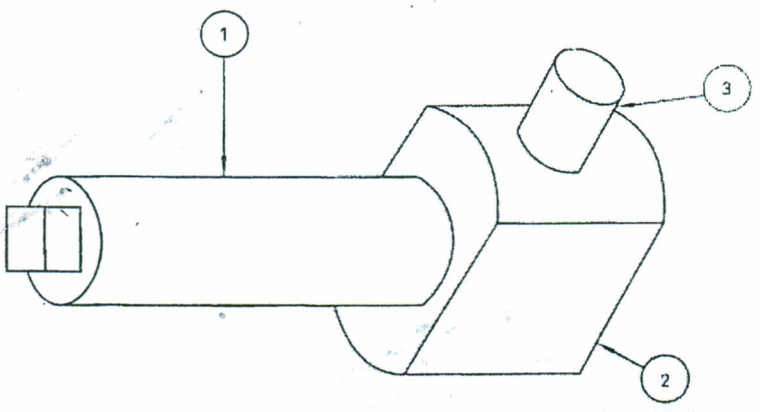


Q5:

(a) Discuss how management techniques can be used to reduce:

i- The work content due to product and process.
ii- Ineffective time due to management and worker.

(b) The assembly drawing given below shows the rotor for a slow make- and- break switch. It consists of a spindle **(1)**, a plastic moulding **(2)**, and a stop pin **(3)**.
Use the information given and your production engineering experience to show through an example how a work study engineer can construct an outline process chart.



Switch rotor assembly