

Total No. of Questions :5]

[Total No. of Printed Pages : 3

Roll No .....

**ME/AU - 701 (D)**  
**B.E. VII Semester**  
Examination, December 2012  
**Work Study & Ergonomics**

*Time : Three Hours*

*Maximum Marks : 100*

*Minimum Pass Marks :35*

*Note:* Attempt all the five questions.  
All questions have internal choice. Attempt any two parts  
out of three parts given in each question.

1. (a) What is the purpose of work study? Describe the procedure for carrying out a method study. 10
- (b) Name the various recording techniques used in method study. Given the following information construct a multiple activity chart for the machining operation.  
The operator engaged on the machine performs the following operations :
- (i) Pick up the job, place it between the jaws of a hydraulic vice (0.2 min).
  - (ii) Make the switch 'ON' to tightly hold the part (0.8 min)
  - (iii) Make the switch 'ON' to start automatic cycle of the operation (0.08 min)
  - (iv) Machining of the part on auto cycle (1.5 min).
  - (v) Wait till the vice opens automatically (0.08 min)
  - (vi) Pick up the machined job from the vice (0.05 min)

ME/AU - 701 (D)

PTO

[2]

(vii) Keep it on the tray (0.05 min)

Comment on the utility of the chart. 10

- (c) What are cycle graphs and Chrono cycle graphs? Under what situations they are used? Explain the procedure of conducting a chrono cycle graph study. 10

2. (a) How is a job selected for time study? Why is it necessary to break job into elements? How does one determine the number of cycles to be timed? 10

- (b) The following data refers to the study conducted for an operation. Table shows actual time for elements in minutes.

Cycle	1	2	3	4	5
Elements					
1	2.5	2.1	2.2	5.4	2.5
2	6.2	6.00	6.1	5.9	5.9
3	2.3	2.0	2.1	2.1	2.2
4	2.4	2.1	2.8	3.0	2.3

- (i) Element 2 is a machine element.

- (ii) Consider the observations as abnormal and delete the same if they are more than 25% of average time of that element.

- (iii) Take performance rating as 120

- (iv) Take following allowances.

Personal allowance : 30 minutes in a shift of 8 hrs.  
fatigue allowance = 15%, contingency allowance = 2% . Estimate the standard time of operation and production per 8 hrs shift. 10

- (c) Explain the steps in Work Sampling Study. What are its merits and limitations? Describe the situations where such a study is useful. 10

[3]

3. (a) What is job evaluation? What are its objectives? Describe any two methods of job evaluation and compare them. 10
- (b) What are incentives? Name the different types of incentives. Explain Merrick's differential piece rate system. 10
- (c) How can standard time for a job or an operation be established with the help of predetermined motion time analysis? Explain the different types of predetermined motion time systems. 10
4. (a) Explain the term 'Ergonomics'. Also state its objectives and advantages. 10
- (b) What do you understand by 'man - machine system'? How are man - machine systems classified? 10
- (c) What is information theory? Explain the factors that affect information reception and processing. 10
5. (a) Define anthropometry and explain its importance. 10
- (b) From anthropometric considerations, how will you arrive at the suitable work surface for (i) Seated (ii) Standing operations. 10
- (c) What are visual displays? Explain general principles of auditory and tactual displays. 10

\*\*\*\*\*