***U.S.N*** | | | | | | | | | | |

# P.E.S. College of Engineering, Mandya - 571 401

***(An Autonomous Institution affiliated to VTU, Belgaum)***

**Fifth Semester, B.E. – Industrial and Production Engineering**

**Semester End Examination; Dec. - 2014**

## Work Study and Ergonomics

*Time: 3 hrs* *Max. Marks: 100*

***Note**: i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.*
*ii) Assume suitable missing data if any*

## PART – A

1. a. What are the resources used in the course of production in an industry? Explain them. 6

   b. What is "Ineffective time within the control of the worker"? How to reduce it? 8

   c. The following data is available ;

   Basic Rate = Rs. 10 per hour

   Allowed time for task = 8 hours

   Actual time taken = 6 hours 6

   Calculate

   i) Actual earning under Rowan plan.

   ii) Total earning for 8 hours shift.

2. a. "The savings resulting from properly applied work study start once and continue as long as the operation continuous in the improved form" Substantiate this statement. 6

   b. "Work study is a direct means of raising productivity". How? 8

   c. Name and explain the qualifications and qualities which are essential for work-study man for his success. 6

3. a. Define method study. Narrate its procedure. 8

   b. Distinguish clearly between the following: 6

   i) Delay activity and permanent storage activity.

   ii) Man type and Material type of flow process chart.

   c. Draw the flow process chart (man type) for an activity "Turning of a rod of material at your machine shop". State your assumptions. 6

4. a. Define the following: 6

   i) String diagram

   ii) Travel Chart

   iii) Multiple activity chart

   b. Discuss about the "Classification of movements". 6

   c. Make two handed process chart for an activity "Disassembly of a dot pen". State your assumptions. 8

## PART – B

5. a. State the purpose of work measurement. 6

   b. Narrate briefly the conduction of work sampling study. 8

   c. A sampling study was conducted in a workshop of a highly productive machines. Downtime was recorded as 30%. Determine the number of observations required for the study for a 95% confidence level and an accuracy of ± 5%. 6

6. a. List the general rules concerning the way in which a job should be broken down into elements. 8

   b. With the help of the example explain the "REACH" fundamental motion of the MTM. 6

   c. A Job involves five operations and the related data is given below. Assuming allowances as 20% of the basic time, find the standard time for completing the job. At 8 hours shift, What would be the production per shift? 6

| Operation No. | Observed time (Minutes) | Rating (0 – 100) |
|---|---|---|
| 1 | 0.25 | 100 |
| 2 | 0.30 | 110 |
| 3 | 0.27 | 105 |
| 4 | 0.38 | 85 |
| 5 | 0.20 | 80 |

7. a. List the characteristics of present day tools / machines. 6

   b. Sketch and explain the input – data for man job matching. 8

   c. Name the Anthropometric data required for the design of a "Readymade Shirt". 6

8. a. List and explain the causes of fatigue. 8

   b. Name some of the important "Displays and controls" in "Mobile phone Hand Set". 6

   c. Write a note on "Design of workplaces". 6

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