

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)**

**CLASS: BTECH
BRANCH: PROD AND IND ENG**

**SEMESTER : VI
SESSION : SP/2025**

SUBJECT: PE345 WORK SYSTEM DESIGN

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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| Q.1(a) | What is work-study? How are its two constituents, 'method study' and 'work measurement', work to improve the productivity of an enterprise? | [2] 01 | 02 |
| Q.1(b) | What do you understand about the "scientific method"? Examine some work-study techniques in light of the above discussion and point out areas where work-study lacks scientific methodology. | [3] 01 | 02 |
| Q.2(a) | Ergonomics is interdisciplinary in character". What are the various disciplines from which the concept of ergonomics was developed? | [2] 01 | 02 |
| Q.2(b) | Draw man-machine charts for a case where there is a scope for one operator to operate three adjacent lathes instead of having a separate operator for each of them as per current practice. | [3] 01 | 04 |
| Q.3(a) | What is a SIMO chart? What are its advantages and limitations? Explain the procedure of making a SIMO chart with a suitable example. | [2] 02 | 02 |
| Q.3(b) | Define the following: (i) operation (ii) elements (iii) observed time (iv) Normal time (v) Standard time (vi) Qualified worker | [3] 02 | 02 |
| Q.4(a) | Why are relaxation allowances included in time study techniques? What factors should be taken into account when deciding the level of relaxation allowances given to a worker? | [2] 02 | 02 |
| Q.4(b) | A job has been sub-divided into five elements. The time for each element and respective rating are given below : | [3] 02 | 04 |

Element Number	Observed Time	Rating Factor %
1	0.7	80
2	0.8	100
3	1.3	120
4	0.5	90
5	1.2	100

Calculate the normal time and standard time for each element and for the job if the allowance is 15%.

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| Q.5(a) | Define work sampling. Explain the procedural steps of making work sampling. What are its advantages and disadvantages? | [2] 02 | 02 |
| Q.5(b) | Construct a flow process chart and flow diagram for, Making a tapered shaft from a long bar. | [3] 01 | 04 |

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