BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : V**
BRANCH: PRODUCTION **SESSION : MO/17**

SUBJECT: PE5007 WORK STUDY AND ERGONOMICS

TIME: 3 Hours **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) What are the contributions of Gilbreth in the field of work study? [2]
Q.1(b) What are the objectives of work study and ergonomics? [4]
Q.1(c) How the techniques work study and ergonomics enhances the industrial productivity? [6]

Q.2(a) What are the advantages and limitations of operation process chart? [2]
Q.2(b) Explain flow diagram with the help of neat sketch. What are its limitations? [4]
Q.2(c) Explain two hand process charts with the help of a suitable example. What are the objectives of this chart? [6]

Q.3(a) What is cyclegraph? What is its purpose? [2]
Q.3(b) Explain MEMO chart. What are its application possibilities? [4]
Q.3(c) Explain the principles of motion economy related to design of work place as well as design of tools and equipments. [6]

Q.4(a) Explain the concept of objective rating. [2]
Q.4(b) For a particular elemental task 20 observations were taken by a time study observer. Check whether the this number of observations are sufficient for ± 5% accuracy with 95% confidence level. Also find out the minimum number of observations required. [4]

Time, min	0.06	0.07	0.08	0.09	0.1
Frequency	2	3	10	3	2

Q.4(c) Define standard time. Explain the procedure of measurement of standard time with the help of stop watch. Why activities are being broken in terms of small elements? [6]

Q.5(a) What is contingency allowance? What for it is being provided? [2]
Q.5(b) Define work sampling. What are its advantages and limitations? [4]
Q.5(c) Explain the procedural steps involved in performing work sampling analysis. [6]

Q.6(a) Define job evaluation and merit rating. [2]
Q.6(b) What are different methods of merit rating? Explain any one stating its advantages. [4]
Q.6(c) Explain the following wage incentive plans: [6]
(i) Straight line method with guaranteed minimum (ii) Taylor differential piece rate system

Q.7(a) What do you mean by semi - financial and non - financial incentives? [2]
Q.7(b) Explain the concept for the ergonomic design of a machine - man system. [4]
Q.7(c) Define material handling. State and explain the principles of material handling. Enumerate various materials handling devices. [6]

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