

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

**CLASS: B.TECH
BRANCH: PRODUCTION**

**SEMESTER : VI
SESSION : SP/2023**

SUBJECT: PE315 WORK STUDY AND ERGONOMICS

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 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.
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		CO	BL
Q.1(a)	Demonstrate the Role of Work Study in Improving Productivity.	[2]	01 03
Q.1(b)	Explain the evolution of Work Study briefly.	[3]	01 02
Q.1(c)	What are the different techniques for Productivity Improvement? If productivity increased from 80 to 84, what would be the growth rate?	[3]	01 02
Q.1(d)	A wrapping-paper company produced 2,000 rolls of paper one day. Labor cost was Rs.160, material cost was Rs.50, and overhead was Rs.320. Determine the productivity.	[2]	01 03
Q.2(a)	Explain the program (or project) evaluation and review technique.	[2]	02 02
Q.2(b)	Develop a worker machine chart for Mesra coffee store.	[5]	02 06
Q.2(c)	Construct the Ishikawa diagram and explain briefly.	[3]	02 03
Q.3(a)	An operator manufactures 50 jobs in 06 hours and 30 minutes. If this time includes the time for setting his machine. Calculate the operator's efficiency. The standard time allowed for the job was, Setting time: 35 minutes, Production time per piece: 08 minutes.	[3]	03 03
Q.3(b)	Calculate the number of observations for an accuracy of 5% and confidence level of 95% if the probability of the worker in idle is 0.3.	[3]	03 03
Q.3(c)	An Element is observed to be carried out in 0.8 minutes. Given pace rating is 110% and the secondary adjustment by 20%, find the time on any fair day. If 0.2 minutes per element is given as allowance, what is the standard time taken for 20 repeated actions?	[2]	03 02
Q.3(d)	What do you understand by PMTS? What is its importance in time study?	[2]	03 01
Q.4(a)	Demonstrate Merrick Emerson's wage determination plan.	[2]	04 03
Q.4(b)	For Job No.54, the standard time fixed is 50 hours. Standard rate of wages per hour of worker 'A' is Rs. 10. A has completed Job No.54 in 35 hours. Works overhead chargeable to the Job is 75% of the cost of its standard time. You are required to calculate:(a) the normal time wages, bonus of the worker for the job under rowan plan.	[3]	04 03
Q.4(c)	Calculate the total earnings from the following data under the Halsey-Weir plan and Halsey premium plan. If Standard Time is 10 hours, Time taken is 8 hours and Time rate is Rs.2.50 per hour.	[3]	04 03
Q.4(d)	Compute the different approaches of Job design.	[2]	04 03
Q.5(a)	Sketch the optimum sitting position with proper leveling and explanation.	[2]	05 03
Q.5(b)	Illustrate the general guidelines for designing the controlling devices	[3]	05 02
Q.5(c)	Explain all the fields referred to in ergonomics.	[2]	05 02
Q.5(d)	Demonstrate the design consideration of the computer workstation.	[3]	05 03