U.S.N ⬜⬜⬜⬜⬜⬜⬜⬜⬜⬜

P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Fifth Semester, B.E. - Industrial and Production Engineering
Semester End Examination; Feb. - 2021
Work Study and Ergonomics

Time: 3 hrs   *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Understanding the fundamentals of the Productivity, Work study and various types of Wages and Incentives.
CO2: Analyze the present method and develop the best method.
CO3: Compute the standard time for a work.
CO4: Understanding the Ergonomics and its principles.
CO5: Design the Man/machine system on basis of principles of Ergonomics.

<u>*Note:*</u> **I) PART - A** *is compulsory.* **Two** *marks for each question.*
       II) PART - B: *Answer any* <u>**Two**</u> *sub questions (from a, b, c) for Maximum of* **18 marks** *from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Define productivity and partial productivity.	2	L1	CO1	
b.	Difference between string diagram and travel chart.	2	L1	CO2	
c.	Define work sampling.	2	L1	CO3	
d.	List the two main characteristics of man-machine system.	2	L1	CO4	
e.	List the impact of climate on the human efficiency.	2	L1	CO5	
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Define work content. With a bar chart, explain how the manufacturing time is made up?	9	L2	CO1	
b.	Explain the relationship between method study and work measurement.	9	L2	CO1	
c.	Explain Halsey plan briefly. Calculate the total earnings of a worker and the effectively rate of labour wages per hour, where payment of bonus is under according to Halsey plan. Basic wage rate per hour is Rs. 10.80, time allowed for the job is 48 hours and actual time taken is 36 hours.	9	L3	CO1	
	UNIT - II	**18**			
2 a.	Prepare a man-machine chart for a cycle time of 20 min from the following observation and find the utilization factor of both man and machines:	9	L3	CO2	

Sl. No.	Observation	Time taken in minutes
1.	Pick up the casting, place it in fixture, clamp it, start the milling machine	02
2.	Mill 40 mm × 100 mm, surface by power feed (automatic feed)	10
3.	Stop the machine and remove the casting	01
4.	Inspect the casting and keep it aside	02
5.	Pick up the casting, place it in the fixture, clamp it, start milling machine	02

b.	Explain the principles of motion economy with reference to arrangement of work place.	9	L2	CO2
c.	Discuss the primary questions used in the critical examination of work.	9	L2	CO2

UNIT - III   **18**

3 a.	An operator was observed for 15 cycles to perform a job as follows: 0.62 mins for 5 cycles 0.68 mins for 6 cycles 0.64 mins for 4 cycles The average performance index was 97%, a regular allowance was 6% and contingency allowance of 4% was given. Calculate the standard time for the job. Assuming six hour shift, what would be the production per shift?	9	L2	CO3
b.	List the systems of Rating. Explain any two of them.	9	L2	CO3
c.	Define element. Explain any five elements.	9	L2	CO3

UNIT - IV   **18**

4 a.	Discuss the various areas of study under Ergonomic. State objectives and goals of this study.	9	L2	CO4
b.	Explain a man-machine system and its characteristics. How can you say, if the fit is poor or good? Explain.	9	L2	CO4
c.	Discuss the importance of system design process. How would you carryout work station analysis?	9	L2	CO4

UNIT - V   **18**

5 a.	Discuss the various displays used in a man-machine system and also enumerate the functional requirement and criteria used for their design.	9	L2	CO5
b.	Explain the influence of lighting system on human performance.	9	L2	CO5
c.	Explain the influence of thermal comfort on the performance of a man in a man-machine system and discuss the important factors.	9	L2	CO5

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