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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.

Semester: V

Branch: Industrial Engineering and Management

Duration: 3 hrs.

Course Code: 22IM5PCHFE

Max Marks: 100

Course: Human Factors Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)	Discuss the significance of Ergonomics in the context of workplace design and product development.		CO1	PO1	10
	b)	Trace the historical development of ergonomics / human factors, highlighting key milestones and their impact on contemporary practices.		CO1	PO1	10
OR						
2	a)	How are ergonomics and human factors connected to engineering?		CO1	PO1	10
	b)	Illustrate the working roles in which an engineer can use ergonomics and human factors knowledge to positively impact a work place.		CO1	PO1	10
			UNIT - II			
3	a)	Explain how posture, force, and time interact to influence physical loading in various occupational settings.		CO2	PO4	10
	b)	Provide examples of how biomechanical principles can be used to optimize occupational tasks.		CO3	PO2	10
OR						
4	a)	Describe the three components of physical loading. Also represent the relation between them.		CO2	PO4	10
	b)	Describe the non-anatomical factors that influence the human body postures.		CO2	PO4	10
			UNIT - III			
5	a)	Define anthropometry and elaborate on its significance in design with suitable examples.		CO2	PO4	10
	b)	Explain the difference between static (structural) and dynamic (functional) anthropometric measurements.		CO3	PO4	10

10Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

OR					
6	a)	How can designers use the statistical information to develop product design for a target population?		<i>PO2</i>	10
	b)	Discuss the principles of designing for adjustability and designing for extremes in anthropometry.	<i>CO3</i>	<i>PO2</i>	10
UNIT - IV					
7	a)	How can understanding of human capabilities and limitations contribute to designing cognitive ergonomic work environments?	<i>CO3</i>	<i>PO3</i>	10
	b)	Discuss SRK model and the types of mistakes that can occur and how the design of systems can mitigate these errors.	<i>CO3</i>	<i>PO3</i>	10
OR					
8	a)	How does Poka yoke contribute to error prevention in manufacturing, and what are its key principles?	<i>CO3</i>	<i>PO4</i>	10
	b)	Discuss the importance of clear and user-friendly instructions in optimizing human cognitive processes in the workplace.	<i>CO3</i>	<i>PO4</i>	10
UNIT - V					
9	a)	Explain the concept and key principles of Heuristic Evaluation (HE) in ergonomics.	<i>CO4</i>	<i>PO4</i>	10
	b)	How do Multi-aspect Methods in ergonomics evaluation integrate various factors, and state their advantages?	<i>CO4</i>	<i>PO3</i>	10
OR					
10	a)	Review the three broad categories for evaluating physical loading.	<i>CO2</i>	<i>PO6</i>	10
	b)	Explain the NIOSH Lifting Equation with an example.	<i>CO4</i>	<i>PO3</i>	10
