

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

Autonomous Institute Affiliated to VTU

## January / February 2025 Semester End Main Examinations

**Programme: B.E.**

**Branch: Industrial Engineering and Management**

**Course Code: 22IM5PCHFE**

**Course: Human Factors Engineering**

**Semester: V**

**Duration: 3 hrs.**

**Max Marks: 100**

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

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

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

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