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

Autonomous Institute Affiliated to VTU

## May 2023 Semester End Make-Up Examinations

**Programme: B.E.**

**Semester: V**

**Branch: Industrial Engineering and Management**

**Duration: 3 hrs.**

**Course Code: 22IM5DCHFE**

**Max Marks: 100**

**Course: Human Factors Engineering**

**Date: 17.05.2023**

**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

1	a) How are ergonomics and human factors connected to engineering?	06
	b) Why should you try to lift heavy objects with your leg muscles rather than your back?	07
	c) Why is it not considered ergonomically risky to perform strenuous physical exercise with maximal force exertions and working until fatigued, as you would at a gym?	07

### UNIT - II

2	a) Name some causes of bad posture that may arise from the work task and work environment.	06
	b) How to identify the physical loading, describe with suitable illustrations	07
	c) Mr. Rajesh, a factory worker frequently complains to have shoulder pain. Can you identify and state the possible reasons for his shoulder pain and injuries?	07

### OR

3	a) What assumptions will you make in biomechanical calculations during the product design process.	08
	b) Is it true that work environment factors have influence on body posture? Discuss	12

### UNIT - III

4	a) As an Ergonomics Engineer, why will you consider 5th to 95th percentile of a population anthropometric data for any product design.	06
	b) Why would it be a bad idea to design a workplace based on a fictive person with “average” measurements?	06
	c) While almost every human body has same biomechanical layout, but still you notice the variations between anthropometric data collected. State the reasons	08

**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.

## **UNIT - IV**

5 a) What are the four main cognitive processes that a workplace design can support? **08**

b) Discuss the factors influencing the vision of a person. **12**

## **UNIT - V**

6 a) What is heuristic evaluation? Discuss its procedure. **10**

b) What do the acronyms RULA and REBA stand for, and which work sectors did they originate from? **10**

## **OR**

7 a) When designing lifting tasks, what limitation in applicability does the NIOSH lifting equation have for a female population? **08**

b) Explain the color codification adopted in AFS 2012:2 provision (Swedish Work Environment Authority) for work conditions at different risk levels for sitting and standing work. **12**

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