

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

Autonomous Institute Affiliated to VTU

May 2023 Semester End Make-Up Examinations

Programme: B.E.

Branch: Industrial Engineering and Management

Course Code: 22IM5DCHFE

Course: Human Factors Engineering

Semester: V

Duration: 3 hrs.

Max Marks: 100

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**
