UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION

MARCH 2026 SEMESTER

COURSE CODE	:	PWB20303
COURSE TITLE	:	ERGONOMICS IN RAILWAYS
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY (RAILWAY SYSTEM) WITH HONOURS
DATE	:	26 JUNE 2026
TIME	:	9:00AM - 11:00AM
DURATION	:	2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 6 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

Ergonomics is the science of designing workplaces, tools, equipment, and tasks to fit the capabilities and limitations of the human body.

(a) Define ergonomics with the importance of it in the workplace to improve employee performance and safety.

(5 marks)

(b) Explain the origin of the term ergonomics.

(4 marks)

(c) What are the main categories of ergonomics? Explain each category with a suitable workplace example.

(8 marks)

(d) Describe how ergonomics is related to anthropometry, biomechanics, physiology, and psychology.

(8 marks)

Question 2

Ergonomics is a multidisciplinary field that combines knowledge from various sciences such as anthropology, biomechanics, physiology, and psychology to design work systems that improve human comfort, safety, and performance.

(a) Explain the historical development and application of anthropometry, including its early usage and its role in military and industrial design.

(6 marks)

(b) Describe anthropometric measurements and provide THREE (3) examples of common anthropometric data used in ergonomics.

(8 marks)

(c) Based on the following figure of standard anthropometric measurements shown below, identify and write the correct name of EACH measurement.

Refer Below - Figure1 : Standard anthropometric measurements .

(11 marks)

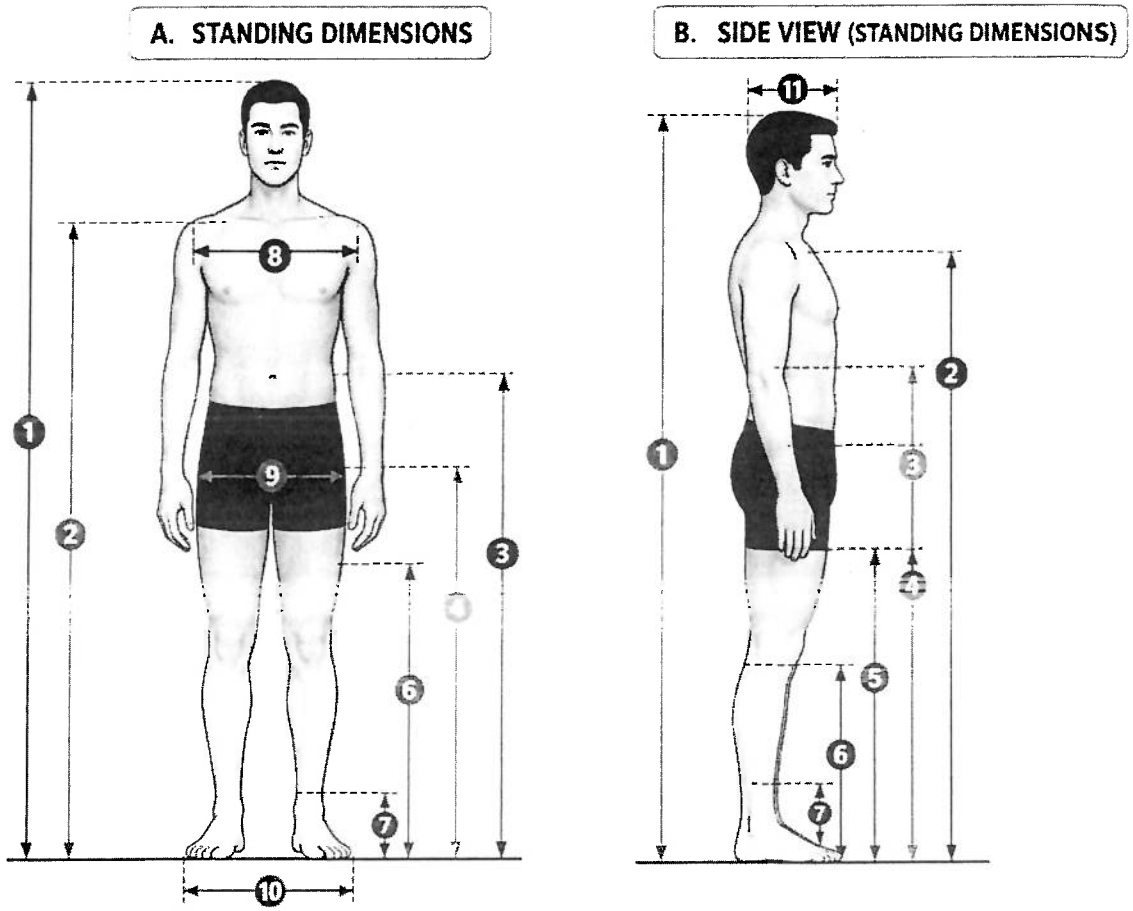


Figure 1: Standard anthropometric measurements

Question 3

Ergonomics in product design is the application of human factors knowledge to create products that fit the users' physical, cognitive, and functional needs.

(a) Describe FIVE (5) factors that influence ergonomic comfort in office furniture.

(10 marks)

(b) Explain how designers can accommodate different user body sizes in product design.

(10 marks)

(c) Discuss TWO (2) ergonomic issues in a poorly designed school chair and propose improvements.

(5 marks)

Question 4

Musculoskeletal disorders (MSDs) are common workplace health problems that affect the muscles, bones, joints, and related tissues.

(a) Define musculoskeletal disorders (MSDs) then list THREE (3) common causes of MSDs in the workplace.

(5 marks)

(b) An office employee suffers from wrist pain due to computer use. Identify THREE (3) possible MSD causes and propose suitable design solutions for them.

(9 marks)

(c) A cashier reports neck and shoulder pain after long shifts. Suggest FOUR (4) ergonomic interventions to reduce MSD risk.

(8 marks)

(d) Briefly describe THREE (3) ways of how technology and ergonomics work together to prevent musculoskeletal disorders.

(3 marks)

Question 5

Heavy work in ergonomics refers to tasks that involve high physical effort, such as lifting, carrying, pushing, or pulling loads.

(a) Describe why is manual lifting considered a risk in workplaces?

(5 marks)

(b) Compare THREE (3) safe and unsafe lifting practices in the workplace.

(9 marks)

(c) A worker lifts objects from the floor repeatedly during a shift. Suggest THREE (3) design changes to reduce injury risk.

(6 marks)

(d) A factory requires workers to carry loads manually for long distances. Evaluate the risks and propose TWO (2) improvements.

(5 marks)

END OF EXAMINATION PAPER