



UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE : PWB40103
COURSE TITLE : RAILWAY WELDING
PROGRAMME NAME : BACHELOR OF ENGINEERING TECHNOLOGY (RAILWAY SYSTEM)
WITH HONOURS
DATE : 25 JUNE 2026
TIME : 2:00PM - 5:00PM
DURATION : 3 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 TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

Track Competent Person has to be familiar with track design. Draw out neatly a typical single rail track line and name its basic components.

(10 marks)

Question 2

Track structure consists of various structures and components. Draw out the cross section. Identify the components and briefly describe its function.

(10 marks)

Question 3

Draw out steel phase transformation diagram and describe the transformation that take place.

(10 marks)

Question 4

Explain why rail corrugation and wheel burns are classified differently, even though both appear on the rail surface. Support your explanation with sketch

(10 marks)

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Advances in rail welding and material technologies have significantly improved the safety, durability, and performance of modern railway infrastructure.

- (a) Describe FOUR technological advancements in rail welding that have been applied in modern railway systems and explain their contributions to railway operations.

(10 marks)

- (b) Material technology has developed tremendously in the railway industry. Explain how advancements in rail and welding materials have positively impacted the performance and service life of welded railway tracks.

(10 marks)

Question 2

Railway track construction and maintenance involve rail welding and inspection to ensure safe and reliable operation

- (a) Ultrasonic Testing (UT) is widely used in railway maintenance and quality assurance. Explain why UT is classified as a Non-Destructive Testing (NDT) method and discuss FIVE advantages of using Ultrasonic Testing for rail and weld inspection.

(10 marks)

- (b) Rails are supplied in short lengths and are welded in workshops to form Long Welded Rails (LWR). These LWRs are subsequently welded together at site to form Continuous Welded Rails (CWR). Describe the process used to weld LWRs into CWR at site.

(10 marks)

Question 3

Effective rail welding and track stability management are critical for maintaining safe and reliable railway infrastructure.

- (a) Compare and discuss FIVE advantages of Flash Butt Welding (FBW) over Alumino-Thermit Welding (ATW).

(10 marks)

- (b) A welded rail section buckles during hot weather. Inspection reveals: Poor shoulder ballast, rail temperature significantly above the stress-free temperature, and previous destressing records are unavailable.

Analyze THREE probable causes and propose THREE corrective actions.

(10 marks)

Question 4

Railway track maintenance activities must be carried out in accordance with established safety procedures and technical standards to ensure track integrity and safe train operations.

- (a) Before any track work is to be done, it has to abide to the correct working procedures. Explain three common mistakes that may occur during track work procedures.

(10 marks)

- (b) There are various types of rail welding. Determine the type of welding commonly use in Malaysia and briefly

(10 marks)

END OF EXAMINATION PAPER