UNIVERSITI KUALA LUMPUR

UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE	:	PWB 20604
COURSE NAME	:	RAILWAY TRACK ENGINEERING
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	BACHELOR OF ENGINEERING TECHNOLOGY IN RAILWAY SYSTEM
DATE	:	25 JUNE 2026
TIME	:	09.00 AM – 11.30 AM
DURATION	:	2 HOURS 30 MINS

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of ONE (1) sections.
4. Section A consists of FIVE (5) questions. Answer FOUR (4) question only.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English language ONLY.

SECTION A (Total: 100 Marks)

INSTRUCTION: Answer 4 questions ONLY.
Please use the answer booklet provided.

QUESTION 1

Turnout systems are essential railway components that provide operational flexibility and enable safe train movement between railway tracks.

(a) Evaluate the operational importance of turnout systems in railway networks and discuss their influence on railway efficiency and safety.

(10 Marks)

(b) Analyze the operational differences between facing movement and trailing movement in turnout operations and explain their impact on train safety.

(10 Marks)

(c) Propose suitable safety procedures and precautions that should be implemented when working within fouling areas, switch zones, or railway track environments.

(5 Marks)

QUESTION 2

Railway maintenance tools and equipment are essential in ensuring effective inspection, maintenance, and renewal activities within railway infrastructure systems.

(a) Analyze the operating procedures, safety requirements, and maintenance considerations when using railway maintenance equipment such as portable impact wrenches and rail drilling machines.

(15 Marks)

(b) Recommend an effective inspection and maintenance strategy for railway track tools and equipment to improve operational reliability and workplace safety.

(10 Marks)

QUESTION 3

Railway track systems are fundamental elements in railway engineering that ensure safe, reliable, and efficient railway operations. Proper understanding of track geometry, railway infrastructure, and operational safety is essential for modern railway systems.

(a) Evaluate the importance of railway track geometry design in ensuring safe train operations, passenger comfort, and operational efficiency.

(5 Marks)

(b) Explain the engineering functions of the rail head, rail web, and rail foot in a running rail system.

(5 Marks)

(c) Compare the operational characteristics of ballasted track systems and slab track systems in railway infrastructure.

(5 Marks)

(d) Discuss the importance of railway safety systems and Personal Protective Equipment (PPE) in minimizing hazards during railway maintenance activities.

(10 Marks)

QUESTION 4

Modern railway maintenance practices require systematic inspection, maintenance planning, and engineering analysis to ensure safe and sustainable railway operations.

(a) Evaluate the purpose, operational procedure, and engineering significance of ballast tamping and sleeper replacement activities in railway maintenance.

(15 Marks)

(b) Critically discuss the importance of running rail inspection and preventive maintenance in improving railway safety, reducing operational failures, and extending rail service life.

(10 Marks)

QUESTION 5

Railway maintenance activities are essential to ensure track stability, operational safety, passenger comfort, and infrastructure reliability. Ballast tamping and sleeper replacement are among the most important maintenance practices used to maintain track geometry and structural integrity.

(a) Critically evaluate the engineering purpose and operational significance of ballast tamping activities in maintaining railway track geometry, stability, and ride quality.

(10 Marks)

(b) Analyze the procedures involved in railway sleeper replacement and discuss how improper sleeper conditions can affect railway safety, track performance, and maintenance costs.

(10 Marks)

(c) Justify the importance of integrating ballast tamping and sleeper replacement into preventive maintenance programs to improve railway infrastructure reliability and service life.

(5 Marks)

END OF EXAMINATION PAPER