UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION

MARCH 2026 SEMESTER

COURSE CODE	:	PWB30403
COURSE TITLE	:	RAILWAY OPERATIONS MANAGEMENT
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY (RAILWAY SYSTEM) WITH HONOURS
DATE	:	24 JUNE 2026
TIME	:	2:00PM - 4:00PM
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

The railway industry has evolved from steam-powered transport systems into highly automated and digitally integrated networks. This evolution has transformed railway capacity, safety, economic contribution, and operational efficiency worldwide. However, modern railway systems continue to face challenges related to sustainability, urbanisation, and technological integration.

(a)
Critically evaluate the evolution of railway technology has transformed railway operations and management from the Industrial Revolution era to modern high-speed and automated railway systems. Your discussion should include operational efficiency, passenger mobility, infrastructure development, and economic impact. (15 marks)

(b)
Propose a future railway system suitable for Greater Kuala Lumpur in the year 2050. Justify emerging technologies and sustainable railway practices could address future transportation challenges and improve urban mobility. (10 marks)

(25 marks)

Question 2

Government policies, legislation, privatisation strategies, and international regulatory practices strongly influence railway systems. While nationalisation allows governments to control strategic infrastructure, privatisation and deregulation may encourage efficiency, innovation, and private investment.

(a)
Analyse the impact of government policy and legislation on the performance of railway systems. Your answer should compare nationalised and privatised railway models in terms of efficiency, public service obligations, investment, and operational flexibility. (15 marks)

(b)
Malaysia intends to introduce greater private-sector participation in future railway developments. Recommend a suitable policy and regulatory framework that balances public interest, railway safety, affordability, and commercial sustainability. (10 marks)

(25 marks)

Question 3

Case Study: Delhi Metro Rail Corporation (DMRC), India

Launched in 1995, the Delhi Metro Rail Corporation (DMRC) represents a transformative effort to alleviate traffic congestion and enhance urban mobility within India's capital. As an iconic case of Transit-Oriented Development (TOD), the Delhi Metro initiative was designed to meet the challenges of a rapidly growing population and an overburdened transportation network. The project required strategic planning to accommodate dense urban areas, limited land resources, and integration with other forms of public transit. By establishing an interconnected network of metro lines that seamlessly links with buses, auto-rickshaws, and cycle rickshaws, the DMRC created a cohesive system that provides a flexible and user-friendly travel experience. Additionally, mixed-use developments were built near metro stations to promote walkability and make essential amenities easily accessible, further strengthening the TOD approach.

The outcomes of the DMRC initiative reveal its substantial impact on the city's urban fabric and socio-economic landscape. Traffic congestion and pollution levels around metro corridors have markedly decreased, highlighting the effectiveness of TOD in managing urban transport challenges. Property values have risen significantly in areas near metro stations, emphasising the project's role in elevating the economic profile of its surroundings. The DMRC's success underscores key planning insights: transit-oriented models are critical to addressing mobility demands. At the same time, mixed-use developments around transport hubs play an essential role in fostering sustainable growth in rapidly urbanising areas. This model not only optimises transit systems but also aligns with broader urban planning objectives, serving as a vital reference for emerging cities aiming to balance mobility and development.

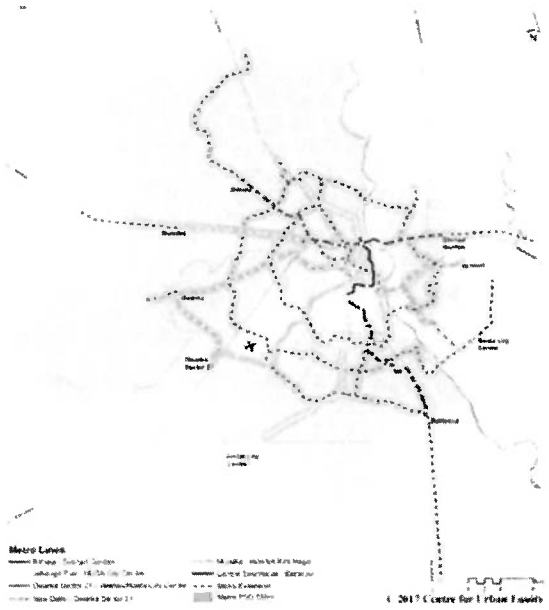


Figure 1: MRT network of Delhi

(a)

Critically analyse how the Transit-Oriented Development (TOD) approach adopted by the Delhi Metro Rail Corporation (DMRC) contributed to improving urban mobility and sustainable urban development in Delhi. Your discussion should include transportation integration, land use planning, socio-economic impact, and environmental benefits. (15 marks)

(b)

Assume that Kuala Lumpur plans to expand its urban railway system using a TOD approach similar to the Delhi Metro model shown in Figure 1.

Evaluate the major planning and management challenges that may arise during implementation in Malaysia and propose suitable strategies to ensure the successful execution of the project. (10 marks)

(25 marks)

Question 4

Modern railway operations increasingly depend on Automatic Train Control (ATC) technologies such as ATP, ATO, ATS, and CBTC to improve railway safety, reliability, and operational capacity. Despite these advantages, automation also introduces technical, operational, and cybersecurity challenges.

(a)
Critically analyse how the integration of ATP, ATO, ATS, and CBTC contributes to safer and more efficient railway operations. Your answer should explain the relationship between these sub-systems and their role in modern railway management. (15 marks)

(b)
If the Keretapi Tanah Melayu Berhad (KTMB) decides to adopt the Computer-Based Train Control (CBTC) to its rolling stock fleet, do you agree with the decision? As the CEO of KTMB, justify your stand. (10 marks)

(25 marks)

Question 5

Automatic Fare Collection Systems (AFCS) are widely used in modern railway systems to improve operational efficiency, revenue management, passenger convenience, and integration with digital transportation platforms. However, operators must balance efficiency, accessibility, cybersecurity, and passenger acceptance.

(a)
Evaluate the effectiveness of Automatic Fare Collection Systems in improving railway operations and passenger experience. Your discussion should include operational efficiency, revenue protection, data management, passenger flow, and system integration. (15 marks)

(b)
Malaysia is considering transitioning toward a fully open-loop and cashless AFC ecosystem integrated with banking systems and mobile applications. Recommend an implementation strategy for this transition while addressing cybersecurity, inclusivity, operational reliability, and passenger acceptance issues. (10 marks)

(25 marks)

END OF EXAMINATION PAPER