



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

- COURSE NAME : RAILWAY TECHNOLOGY AND APPLICATIONS
- COURSE CODE : BNT 42103
- PROGRAMME CODE : BNT
- EXAMINATION DATE : JULY 2024
- DURATION : 2 HOURS 30 MINUTES
- INSTRUCTION : 1. ANSWER ALL QUESTIONS.
2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 Open book
 Closed book
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

TERBUKA

- Q1** (a) The East Coast Railway Link (ECRL) project which involve a 640 km railway link connecting states in the east coast and west coast of Peninsular Malaysia. Therefore, tunnelling work is an important stage in the ECRL construction, which involves the construction of 41 tunnels with a total length of approximately 69 km along its route. There are several methods to perform this tunnelling work. As a railway engineer,
- (i) Demonstrate **TWO (2)** methods of tunnelling works that commonly used in railway construction. (8 marks)
 - (ii) Differentiate between the two methods in **Q1(a)(i)** in terms of concept, suitability, location, and method of execution with detail explanations. (12 marks)
 - (iii) Outlines **FOUR (4)** risk and hazards in tunnelling work and the control measures. (5 marks)
- Q2** (a) High Speed Rail (HSR) is a type of rail transport network utilizing trains that run significantly faster than those of conventional rail. HSR is well known for the excellence reputation including convenience, rapidity, safety, punctual operation, and environment friendly.
- (i) List **THREE (3)** the most common types of HSR systems. (3 marks)
 - (ii) Briefly explain **TWO (2)** category of train running speed in HSR. (4 marks)
 - (iii) As a railway design engineer, identifies **FIVE (5)** features that comply with rules and regulations specification of HSR design. (5 marks)
 - (iv) Briefly explain the difference features between TGV (France) and Shinkansen (Japan). (8 marks)
 - (v) From **Q2(a)(iii)** identify the benefits and drawbacks of the HSR Singapore-Kuala Lumpur project, which has significantly reduced travel time from 4 hours by car to just 90 minutes. (5 marks)

- Q3** (a) Deep Learning has created significant contributions in railway industries, especially in computer vision-based applications such as object detection and recognition systems. Identify the application of Deep Learning in pedestrian detection at railway station and railway track component maintenance in terms of concept and the area that can be improved/advantages. (9 marks)
- (b) A hydrogen train is a train that uses hydrogen as a fuel, either within a fuel cell or an internal combustion engine.
- (i) With aid of the diagrams, demonstrates the workflow of hydrogen train. (5 marks)
- (ii) In hydrogen production as fuels, describes the differences between brown hydrogen and green hydrogen. (4 marks)
- (iii) As a railway planning engineer, you are instructed to make a feasibility study for implementation of hydrogen train in Malaysia. Therefore, you are required to examine and understand the design and characteristics of the Coradia iLint, developed by Alstom as the world's first passenger train powered by a hydrogen fuel cell. (7 marks)
- Q4** (a) SWOT is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project, organization, or in a business venture. As a Project Manager, conduct the SWOT analysis for the HSR project feasibility from Kuala Lumpur to Singapore that can cut travel time to 90 minutes compared with more than four hours by car. (14 marks)
- (b) Computerized Maintenance Management System (CMMS) is a type of management software that support management and tracking of Operation and Maintenance (O&M) activities.
- (i) Explain the capabilities of CMMS in O&M activities. (7 marks)
- (ii) Analyse the cause of failure in applying CMMS. (4 marks)

- END OF QUESTIONS -