



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

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| COURSE NAME | : | RAILWAY TECHNOLOGY AND APPLICATIONS |
| COURSE CODE | : | BNT 42103 |
| PROGRAMME CODE | : | BNT |
| EXAMINATION DATE | : | JULY / AUGUST 2023 |
| DURATION | : | 3 HOURS |
| INSTRUCTION | : | <ol style="list-style-type: none">1. ANSWER ALL QUESTIONS.2. THIS FINAL EXAMINATION IS CONDUCTED VIA 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 **FOUR (4)** PAGES

CONFIDENTIAL

TERBUKA

- Q1** (a) Tunneling work is an important stage in the railway construction. There are several methods to perform this tunneling work. Technology in this field is also constantly evolving over time.
- (i) Briefly explain about **TWO (2)** method of tunneling works that commonly used in railway construction
(8 marks)
 - (ii) Compare between the two method in **Q1(i)** in term of concept, suitability, location and method of execution
(12 marks)
 - (iii) Explain **FOUR (4)** risk and hazard in tunneling work and the control measures.
(5 marks)
- Q2** (a) Building Integrated Modelling (BIM) is a digital model that can be presented in three dimensions (3D). This model contains a variety of geometric and non-geometric information used for the purpose of analysis through several related software.
- (i) Briefly explain the advantages of BIM that associated to the railway industry.
(5 marks)
 - (ii) There are a lot of applications of BIM that benefit the railway industries. Choose and investigate **TWO (2)** applications that give impact to cost project.
(5 marks)
- (b) Industrialized Building System (IBS) is a construction system or method which its components are manufactured in a controlled condition at the factory or construction site. Show the comparison between conventional construction method with the IBS method.
(5 marks)
- (c) A railway station, is a railway facility where trains stop to load or unload passengers, freight, or both. It generally consists of at least one platform, one track, and a station building providing such ancillary services as ticket sales, waiting rooms, and baggage/freight service. Briefly explain and analyse the design approaches taken to produce a function station.
(10 marks)

- Q3** (a) As a Project Scheduler for a Railway Station Project, you have been given a task to perform a work scheduling using the Critical Path Method (CPM).
- (i) Show your CPM network, analyze and calculate the sequence of each activities given in **Table Q3(a)(i)**.
(20 marks)
 - (ii) Show the critical path of the overall activities
(2 marks)
 - (iii) Calculate the overall project duration
(3 marks)
- Q4** (a) Deep Learning has created significant contributions in railway industries, especially in computer vision-based applications such as object detection and recognition systems.
- (i) Show 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.
(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) Describe the cause of failure in applying CMMS
(4 marks)

- END OF QUESTIONS -

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Table Q3(a)(i) : Sequence of Activities

| Activities | Durations (Days) | Successor (Start to Finish) |
|---------------------|-------------------------|--|
| A)Piling | 50 | B,C,D |
| B)Ground Works | 20 | E,F |
| C)Frames Strcuture | 38 | F,G |
| D) Slab Works | 42 | F,G |
| E) Internal Wall | 52 | H |
| F) Door and Windows | 34 | H |
| G) Finishes | 18 | H |
| H) External Works | 40 | - |