



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : ELECTRONIC COMMUNICATION
AND SIGNALLING SYSTEM

COURSE CODE : BNT 20603

PROGRAMME CODE : BNT

EXAMINATION DATE : JULY 2022

DURATION : 2 HOURS 30 MINUTES

INSTRUCTIONS :
1. ANSWERS 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

- Q1**
- (a) Before a train is given the authority to move along a section of line, the section of line needs to be proved to be secure and clear of other traffic to avoid derailment or collision. Detail out the measures that can be taken in order to avoid derailment or collision. (5 marks)
- (b) Differentiate between Fixed and Moving Block Signalling in railway. (5 marks)
- (c) Track circuit is a type of train detection system to monitor the movement of the train on the railway track. Outline the function and operation of the track circuit in order to have fail safe operation. (8 marks)
- (d) Headway is termed as minimum time or distance between two following trains that the signalling permits. For the given parameters below, differentiate the headway time when the train speed is altered from 80 km/hr to 100 km/hr.
- | | |
|---|------------------------|
| Train deceleration = 0.85 m/s^2 | Train length = 200 m |
| Signal sighting = 10 seconds | Overlap length = 183 m |
| Brake delay = 6 seconds | |
- (7 marks)
- Q2**
- (a) Operational telecom system have **FOUR (4)** roles in railway. Explain them in detail. (4 marks)
- (b) Distinguish the advantages of optical fibre cables compared to other cable bearers. (4 marks)
- (c) Plesiochronous Digital Hierarchy (PDH) and Synchronous Digital Hierarchy (SDH) are data transmission system known as circuit switched transmission. Describe the major differences between PDH and SDH transmission. (8 marks)
- (d) By referring to **Figure Q2(d)** (Open System Interconnection (OSI) model), explain all IP protocols and its' layers which is used to map the TCP/IP supporting protocols. (9 marks)
- Q3**
- (a) Describe **FOUR (4)** key requirements for a good Public Address (PA) system. (4 marks)
- (b) Train operators have a duty to ensure the safety of passengers at all times. When an emergency takes place, explain in detail the operation of Voice Alarm System. (4 marks)

- (c) Closed-circuit television (CCTV) system should be included in the planning and design stage of any new facility, building or asset.
- (i) List out the factors that need to be considered for a good CCTV system design. (5 marks)
- (ii) Design and explain basic CCTV operation for a typical railway station. (8 marks)
- (d) A Transmission/Radio Based Signalling (TBS) system uses a communication system to transmit a movement authority to the train, without the need for trackside signals. Describe the fundamental elements of a TBS system. (4 marks)
- Q4** (a) Differentiate between Reliability, Availability, Maintainability and Safety (RAMS). (4 marks)
- (b) Secondary system in railway signalling is meant to provide independent means to continue to move the trains (in a degraded mode), pending recovery from service-affecting failures of the primary signalling system. Explain in detail the **FIVE (5)** secondary systems which is termed as Grade of Secondary System (GoSS). (10 marks)
- (c) Describe the concept of Electromagnetic Compatibility (EMC) and Electromagnetic Interference (EMI) in railway signalling. (4 marks)
- (d) Identity some common techniques that can be employed to reduce or protect from EMI emissions. (7 marks)

- END OF QUESTIONS -

FINAL EXAMINATION

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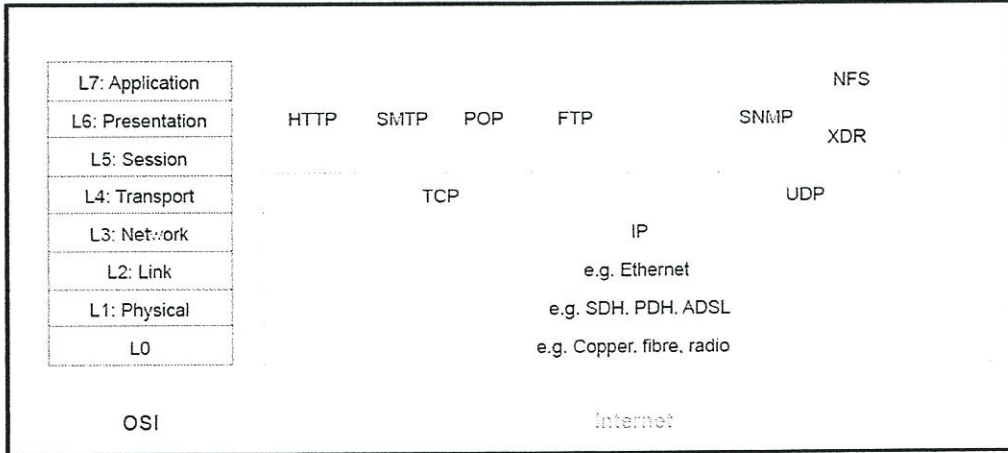


Figure Q2(d)