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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(TAKE HOME)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : RAILWAY IMPACT ASSESSMENT
COURSE CODE : BNT 30402
PROGRAMME CODE : BNT
DATE : JANUARY/FEBRUARY 2021
DURATION : 6 HOURS
**INSTRUCTION : ANSWER ALL (FOUR) QUESTIONS
OPEN BOOK EXAMINATION**

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THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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Q1 Sustainable transport is a part of the sustainability development in such countries. It refers to any means of transportation that is 'green' and has low impact on the environment. Sustainable transportation is also about balancing our current and future needs.

(a) There are **THREE (3)** main most fundamental elements for the development of sustainable transportation. Briefly explain the elements.

(3 marks)

(b) Sustainable transport is also involved in identifying the impacts of transport infrastructures development areas which relate to environment, economy and society.

(i) Briefly explain the impact on each of the area (environment, economy, society).

(3 marks)

(ii) Identify and briefly explain the factors involved in each of the area.

(3 marks)

(c) The environmental dimensions of transportation are sequentially involving the process of cause, activities, outputs and end results.

(i) Illustrate each of the process.

(5 marks)

(ii) Briefly explain with examples each of the process

(6 marks)

(d) Energy efficiency by transportation mode is based on the relationship between energy-cost and speed of vehicles mode. Illustrate and sketch the relationship for the mode of train, bus and plane.

(5 marks)

Q2 A signal crossing lies close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for the signal crossing is 8 a.m. to 9 a.m. The Sound Exposure Level (SEL) measurement is referred to **Figure Q2(a)** which the train length is 210 m and the speed is 120 km/h (**Figure Q2(b)**). The duration of one event is 25 seconds and the number of events that occur during one-hour is 22.

(a) Determine the hourly $L_{eq}(1 \text{ hour})$ at 50 m.

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- (b) If the same signal crossing lies close to a residential area with the following operating; 200 events during the daytime (5 a.m. – 8 p.m.) and 12 events during the night-time (8 p.m. – 5 a.m.)

(i) Calculate the daytime $L_{eq}(1 \text{ hour})$ (2 marks)

(ii) Calculate the night-time $L_{eq}(1 \text{ hour})$. (2 marks)

(iii) Calculate the day night $L_{eq}(1 \text{ hour})$. (2 marks)

- (c) The following features are between the rail corridor and a receiver of interest:

- A 15-foot high noise barrier is 40 m from the closest track and 130 m from the receiver
- A dense tree zone 100 m thick that extends 15 m above the line-of-sight.
- $H_s = 8 \text{ m}$ and $H_r = 5 \text{ m}$
- Barrier dimensions, A – 40.6 m, B – 130.38 m and C – 170.0 m

(i) Calculate H_{eff} with and without the barrier. (5 marks)

(ii) Determine the ground factor with and without the barrier. (5 marks)

(iii) Calculate the barrier insertion loss. (2 marks)

(iv) Determine the total shielding of the barrier. (3 marks)

- Q3** The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train pass by per day. Calculate the ground-borne vibration and assess for impact.

(a) Select the base curve for Ground Surface Vibration (5 marks)

(b) Calculate the ground borne vibration based on the appropriate source, path and receiver adjustments. (10 marks)

(c) Estimate the vibration impact (10 marks)

Q4 (a) Market equilibrium is a situation when quantity demanded and quantity supplied are equal and there is no tendency for price or quantity to change. Based on the above definition

(i) Discuss briefly how the equilibrium quantity and equilibrium price are determined (use figure to assist your discussion)

(3 marks)

(ii) Briefly discuss the changes in equilibrium as effects of changes in demand when supply remains unchanged (increase in demand and decrease in demand). Use figures to illustrate your discussion.

(3 marks)

(b) The following **Table Q4(b)** shows the market demand and supply for diesel fuel. The initial quantity demanded and quantity supplied are QD_0 and QS_0 , respectively

(i) Draw the demand and supply curves for diesel.

(4 marks)

(ii) Determine the initial equilibrium price and quantity.

(4 marks)

The government decided to reduce the pollution by imposing a tax of RM1 on every liter of diesel. Thus, the supply schedule shifts from the initial QS_0 to QS_1

(iii) Show the effects of this condition on the same diagram drawn for Q3(b)(i).

(3 marks)

(iv) Justify the new equilibrium price and the equilibrium quantity.

(4 marks)

(v) Determine the tax paid by the producers, the consumers and the total government tax revenue.

(4 marks)

- END OF QUESTIONS -

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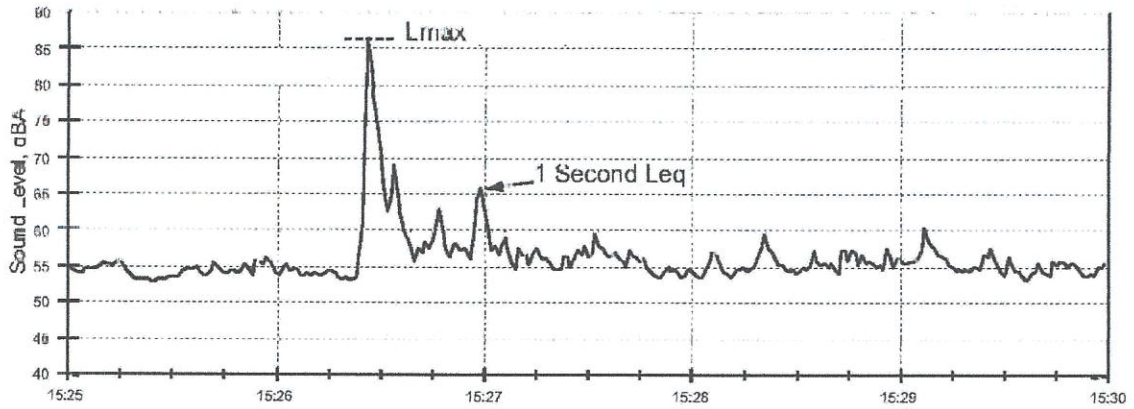


Figure Q2(a)

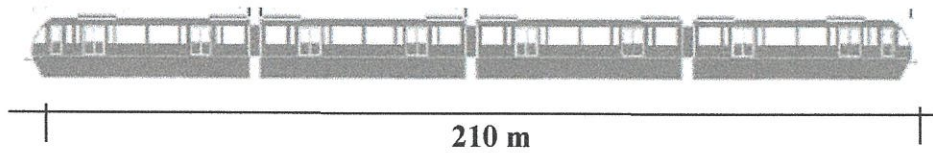


Figure Q2(b)

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Table Q3(b): Market Demand and Supply Diesel Fuel

Price (RM/litre)	QD ₀	QS ₀	QD ₁	QS ₁
0.50	40	0	50	0
1.00	35	5	45	0
1.50	30	10	40	0
2.00	25	15	35	5
2.50	20	20	30	10
3.00	15	25	25	15
3.50	10	30	20	20
4.00	5	35	15	25
4.50	0	40	10	30