

SULIT



Second Semester Examination
2021/2022 Academic Session

July/August 2022

EAL338 – Transportation and Road Safety

Duration : 2 hours

Please ensure that this examination paper consists of **SEVEN (7)** pages of printed material before you begin the examination.

Instructions: This paper contains **FOUR (4)** questions. Answer **ALL** questions.

All questions **MUST BE** answered on a new page.

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1. **Table 1** shows the road safety statistics for the year 2018. You are required to use the given statistics to provide your views on the state of sustainable transport in the different states of Malaysia. The vehicle registration and the road safety performance are indicators to be used to ascertain the state of sustainable transport.

Table 1

State in Malaysia	Fatalities	Crashes	Vehicle Registration	Population (000)
Perlis	64	2,093	119,190	253.5
Kedah	509	23,239	1,416,646	2,163.0
Penang	390	45,734	2,716,345	1,762.8
Perak	693	38,278	2,307,093	2,503.5
Selangor	1046	16,3078	3,013,444	6,475.0
Wilayah Persekutuan	229	722,284	6,536,568	10,741.3
Negeri Sembilan	362	25,123	985,728	1,122.9
Melaka	191	19,120	876,406	922.4
Johor	977	78,812	3,695,261	3,479.4
Pahang	485	20,641	1,086,288	1,664.7
Kelantan	420	10,983	916,108	1,860.5
Terengganu	275	10,607	661,812	1,228.3
Sabah	310	18,006	1,273,165	3,898.4
Sarawak	333	20,600	1,841,212	2,791.7
TOTAL	6284	548,598	27,445,986	41,137.4

- (a) Vehicle registration has been growing exponentially in the country, and this may indicate that the transport system is not sustainable. Explain why this trend is not desirable for sustainable transport.

[5 marks]

- (b) Based on the given statistics, Wilayah Persekutuan, Johor, and Selangor are states with the highest number of vehicle registration, followed by Penang, Perak, and Sarawak. To provide a more accurate situation, the vehicle registration should be divided by the respective state's population to give the (vehicle registration/ population) index.

- i) Calculate the (vehicle registration/population) index for the top six states mentioned earlier.

[5 marks]

- ii) Argue, whether the ranking of the six states are still the same.

[2 marks]

- iii) Discuss their position in terms of sustainable transport among the six states.

[3 marks]

- (c) Choose the state where you were born or where you are living now. Using all the given statistics, calculate **THREE (3)** other indices and argue the situation of your chosen state in terms of sustainable transport. (state clearly the name of the state in your answer).

[10 marks]

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2. (a) i) Describe the “Safe System Approach”, and argue why it is preferable compared to the “Haddon Matrix of Road Safety Interventions”.
- ii) Provide examples for the “Safe System Approach” and the “Haddon Matrix”, and make comparison between them.

[10 marks]

- (b) The recent Hari Raya “Balik Kampung” experience had witnessed very high road casualties on the Malaysian roads. According to the police, the first six days of OPS SELAMAT, which began on 29th April 2022, had 9,816 crashes and 113 fatalities on the Malaysian roads. Using your knowledge of the safe system approach, identify **TWO (2)** reasons for the high road casualties, and provide **TWO (2)** recommendations to the police and the Malaysian public for next year’s “Balik Kampung” to see an improvement in terms of road safety performance.

[5 marks]

- (c) Public Works Department (PWD) and local authorities strive to play their parts by stressing further on engineering aspects in the design, construction and maintenance activities.

- i) Discuss **TWO (2)** approaches with regards to road devices and signages that could be considered to improve the safety of at-grade intersections.

[4 Marks]

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- ii) Clogged drain is a perennial problem for major cities in Malaysia. Justify **THREE (3)** consequences as a result of ignoring the provision of a good drainage system and maintenance.

[6 marks]

3. (a) Elasticity in transportation is a measure to show the effects on demand as a result of changes in any parameters or variables to the supply side of transport. Explain briefly **THREE (3)** concepts for elasticity of demand. Give one example for each concept.

[9 marks]

- (b) There are two possible methods to measure elasticity of demand, which are point elasticity and arc elasticity. Explain the differences between both methods with the aid of appropriate diagrams and equations.

[6 marks]

- (c) A long distance bus company with an existing fleet of one hundred forty(140) -seater buses reduces its fleet size by 20% and increases its fare from RM30 to RM35 per ride. Assume that the existing buses had a load factor of 90% and it is anticipated that the regression will result in a 80% load factor. The vehicle load factor is a measure of seat availability, and a load factor of 1.0 means that every seat is occupied.

- i) Calculate the change in number of customers using the price elasticity of demand.

[4 marks]

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- ii) Based on the condition given above, determine whether the company will lose any profit by considering the total revenue.

[6 marks]

- 4. (a) Identification of study area is required before data acquisition for TIA can proceed. It is necessary to understand several terminologies that relate to the survey area. With the aid of sketches, describe the meaning of the following terminologies:

- i) Urban Growth Boundary
- ii) Traffic Analysis Zone
- iii) Links
- iv) Nodes
- v) Origin – Destination

[5 marks]

- (b) Chuping is a small town located in the northeast of Kangar, Perlis. Chuping is now facing rapid development towards the year of 2025 to cater for the demand due to increasing population. **Table 2** shows the land use developments for Phase 1 and Phase 2 at Kampung Chuping starting at 2018. Using **Table 3**, calculate the estimated trip generation for land use developments at Kampung Chuping for morning peak and afternoon peak for both phases.

[20 marks]

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Table 2

Development	Phase 1	Phase 2
Terrace Houses	450 units	140 units
Semi - Detached houses	140 units	145 units
Shop houses	15 units	10 units

Table 3

Land Use	Peak	Figures	Var	In %	Out %	pcu/veh
Terrace house	AM	$y = 0.6529x + 33.5021$	Unit	29	71	0.90
	PM	$y = 0.7008x + 31.5582$	Unit	61	39	0.87
Shop house	AM	$y = 8.06x + 11.9$	Unit	59	41	0.90
	PM	$y = 10.68x + 34.7$	Unit	52	48	0.87
Detached/ Semi-detached	AM	$y = 1.51x$	Unit	42	58	0.88
	PM	$y = 1.54x$	Unit	56	44	0.91

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