UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	ROAD SAFETY ENGINEERING
COURSE CODE	:	BFT 4063 / BFT 40603
PROGRAMME	:	BFF
EXAMINATION DATE	:	JUNE 2012
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **FOUR (4)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **NINE (9)** PAGES

Q1 (a) Environment factor is one of the main contributing factors of road accident occurrence and typically being catered by a Civil Engineer. Explain **THREE (3)** elements in environment factor.

(6 marks)

(b) Functionally, traffic signs are generally classified into Regulatory, Warning, Temporary or Roadwork and Guide signs. Describe **FIVE (5)** examples of Warning Sign.

(5 marks)

(c) Road safety management and strategy is a structured approach to accident prevention and casualty reduction both in the urban and rural area. Explain Accident Prevention approach in detail.

(4 marks)

(d) The United Nations General Assembly has proclaimed the period 2011-2020 as the Decade of Action for Road Safety, "with a goal to stabilize and then reduce the forecast level of road traffic fatalities around the world by increasing activities conducted at the national, regional and global levels". Describe **FIVE (5)** reasons to act on road death as mentioned in the Decade of Action for Road Safety.

(10 marks)

Q2 (a) Describe **TWO (2)** responsible agencies in accident database system.

(4 marks)

(b) Explain briefly the steps of accident database collection before forwarding the POL27 forms to the Highway Planning Unit (HPU), Ministry of Works Malaysia.

(9 marks)

(c) Johor Bahru – Melaka Federal Road (F005) is known as accident prone area in Johor State. As traffic safety engineer, you have to carry out accident data analysis based on given accident data record in Table 1. Fill in Table 1 by calculating:

(i) Total number of accident

(3 marks)

(ii) Accident Point Weightage (APW)

(6 marks)

(iii) Rank

(3 marks)

Q3 (a) Explain briefly blackspot ranking by using the following techniques

(i) Accident maps

(3 marks)

(ii) Accident point

(3 marks)

(b) List **SIX (6)** steps after blackspot prioritization in preliminary accident analysis.

(6 marks)

2

(c) The site visit is a very important element of any accident investigation. Explain the main purpose of preliminary visit.

(4 marks)

(d) There is suspected of poor skid resistant road surface at a particular Sri Lalang junction (site) and other similar junction (control) along Jalan Kluang road. Table 2 shows the accident record related to skidding and no skidding report. Determine whether poor skid resistant road surface is a significant accident problem or not.

(9 marks)

Q4 (a) Based on collision diagram in Figure Q4(i), list your preliminary diagnosis.

(12 marks)

(b) Referring to signalised intersection at Jalan Sungai Jeluk in Figure Q4(ii),

(i) Determine the number of collision according to accident group.

(5 marks)

(ii) Determine the cause of accidents.

(8 marks)

Q5 (a) List TWO (2) types of effectiveness analysis carried out for the treated blackspots.

(2 marks)

(b) Table 3 shows the number of accident at blackspot and control site with the remedial treatment. Determine the effectiveness of remedial treatment.

(3 marks)

(c) Define Road Safety Audit.

(4 marks)

(d) Referring to Figure Q5, identify at least FIVE (5) deficiencies on the drawing concerning to safety issues in the Road Safety Audit Stage 3.

(10 marks)

(e) Describe SIX (6) objectives of traffic management in Road Safety Audit Stage 4.

(6 marks)

S1 (a) Faktor persekitaran adalah salah satu daripada factor penyumbang utama kepada berlakunya kemalangan jalan raya dan selalunya diatasi oleh Jurutera Awam. Jelaskan **TIGA (3)** elemen dalam faktor persekitaran.

(6 markah)

(b) Secara umumnya, tanda-tanda trafik dikelaskan kepada tanda-tanda Peraturan, Amaran, Sementara atau Kerja Jalan dan Penunjuk. Terangkan **LIMA (5)** contoh Tanda Amaran.

(5 markah)

(c) Pengurusan dan strategi keselamatan jalan raya adalah suatu pendekatan berstruktur kepada pencegahan kemalangan dan pengurangan kematian di kawasan Bandar dan luar Bandar. Jelaskan pendekatan Pencegahan Kemalangan secara terperinci.

(4 markah)

(d) Perhimpunan Umum Pertubuhan Bangsa-Bangsa Bersatu telah mengistiharkan bahawa tempoh 2011-2020 sebagai *Decade of Action for Road Safety*, "dengan satu matlamat untuk menstabilkan dan kemudiannya mengurangkan aras ramalan kematian disebabkan kemalangan jalan raya di seluruh dunia dengan meningkatkan aktiviti di peringkat kebangsaan, setempat dan global". Terangkan **LIMA (5)** sebab untuk bertindak ke atas kematian jalan raya seperti yang disebutkan dalam *Decade of Action for Road Safety*.

(10 markah)

S2 (a) Terangkan **DUA (2)** agensi bertanggungjawab dalam sistem data kemalangan jalan raya.

(4 markah)

(b) Jelaskan secara ringkas langkah-langkah pengumpulan data kemalangan jalan raya sebelum boring POL27 dimajukan ke Unit Perancang Lebuh Raya (HPU), Kementerian Kerja Raya Malaysia.

(9 markah)

(c) Jalan Persekutuan Johor Bahru – Melaka (F005) dikenali sebagai kawasan paling banyak berlaku keamalangan jalan raya di Johor. Sebagai seorang jurutera trafik, anda perlu menjalankan analisis data kemalangan berdasarkan rekod data kemalangan dalam Jadual 1. Isikan Jadual 1 dengan menghitung:

(i) Jumlah bilangan kemalangan jalan raya

(3 markah)

(ii) *Accident Point Weightage* (APW)

(6 markah)

(iii) Kedudukan *ranking*

(3 markah)

S3 (a) Jelaskan secara ringkas kedudukan *blackspot* menggunakan teknik-teknik berikut:

(iii) Peta Kemalangan

(3 markah)

(iv) Mata Kemalangan

(3 markah)

(b) Senaraikan **ENAM (6)** langkah selepas *blackspot prioritization* dalam analisis awal kemalangan jalan raya.

(6 markah)

(c) Lawatan tapak adalah elemen penting dalam penyiasatan kemalangan jalan raya. Jelaskan tujuan utama lawatan awalan.

(4 markah)

(d) Terdapat dakwaan bahawa permukaan jalan di persimpangan Sri Lalang (site) dan di persimpangan lain (control) sepanjang Jalan Kluang mempunyai rintangan gelinciran yang rendah. Jadual **2** menunjukkan rekod kemalangan disebabkan oleh laporan gelinciran dan bukan gelinciran. Tentukan sama ada permukaan jalan dengan rintangan gelinciran rendah tersebut merupakan masalah kemalangan yang ketara atau sebaliknya.

(9 markah)

S4 (a) Berdasarkan rajah perlanggaran dalam Rajah **Q4(i)**, senaraikan diagnosis awalan anda.

(12 markah)

(b) Merujuk kepada rajah persimpangan berlampu isyarat di Jalan Sungai Jeluk dalam Rajah **Q4(ii)**, tentukan:

(iii) Bilangan perlanggaran mengikut kumpulan kemalangan.

(5 markah)

(iv) Sebab-sebab kemalangan.

(8 markah)

S5 (a) Senaraikan **DUA (2)** jenis analisis keberkesanan yang dijalankan ke atas kawasan *blackspot* yang ditambahbaik.

(2 markah)

(b) Jadual **3** menunjukkan bilangan kemalangan jalan raya di kawasan *blackspot* dan tapak kawalan berserta tindakan penambahbaikan. Tentukan keberkesanan tindakan penambaikan tersebut.

(3 markah)

(c) Berikan definisi Audit Keselamatan Jalan Raya.

(4 markah)

(d) Merujuk Rajah **Q5**, kenalpasti sekurang-kurangnya **LIMA (5)** kekurangan di atas lukisan yang melibatkan isu keselamatan dalam Audit Keselamatan Jalan Raya Peringkat 3.

(10 markah)

(e) Terangkan **ENAM (6)** objektif pengurusan trafik dalam Audit Keselamatan Jalan Raya Peringkat 4.

(6 markah)

FINAL EXAMINATION

SEMESTER/SESSION : II / 20011/12   PROGRAMME : 4 BFF
COURSE : ROAD SAFETY   COURSE CODE : BFT4063/BFT40603
           ENGINEERING

APPENDIX I

Matric Card No. : ___ ___ ___ ___ ___ ___ ___ ___

Table **1**: Accident data record for F005

Section	Fatal	Serious injury	Slight injury	Total of accident	APW	Rank
122.0	3	2	13			
137.0	3	1	4			
93.0	2	2	20			
101.0	4	0	5			
123.0	2	1	20			
120.0	3	0	11			

Note: Accident Point Weightage (APW): Fatal=6, Serious=3, Minor= 0.8, Damage= 0.2

Please submit this sheet together with your answer script booklet

FINAL EXAMINATION

SEMESTER/SESSION : II / 20011/12   PROGRAMME : 4 BFF
COURSE : ROAD SAFETY   COURSE CODE : BFT4063/BFT40603
         ENGINEERING

Table 2: Accident related to skidding and no skidding report

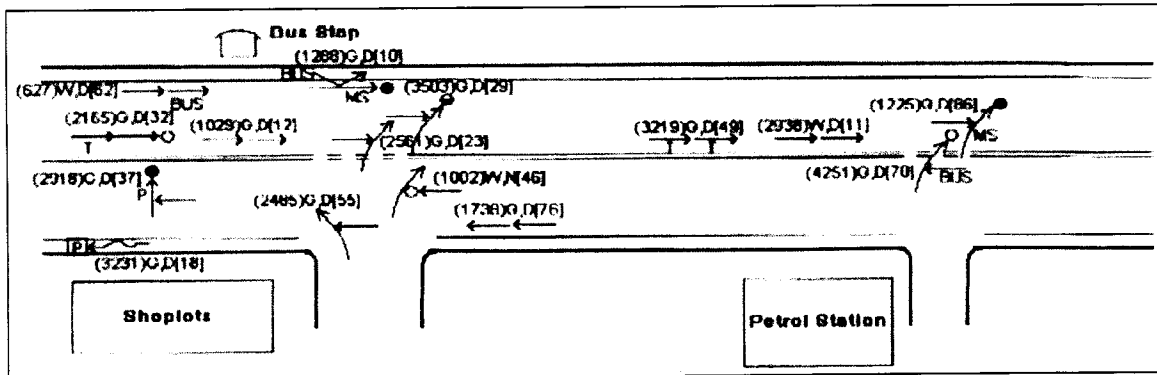|	Site	Control
Skidding	9	39
No Skidding	7	188

Figure Q4(i): Collision Diagram at Study Area
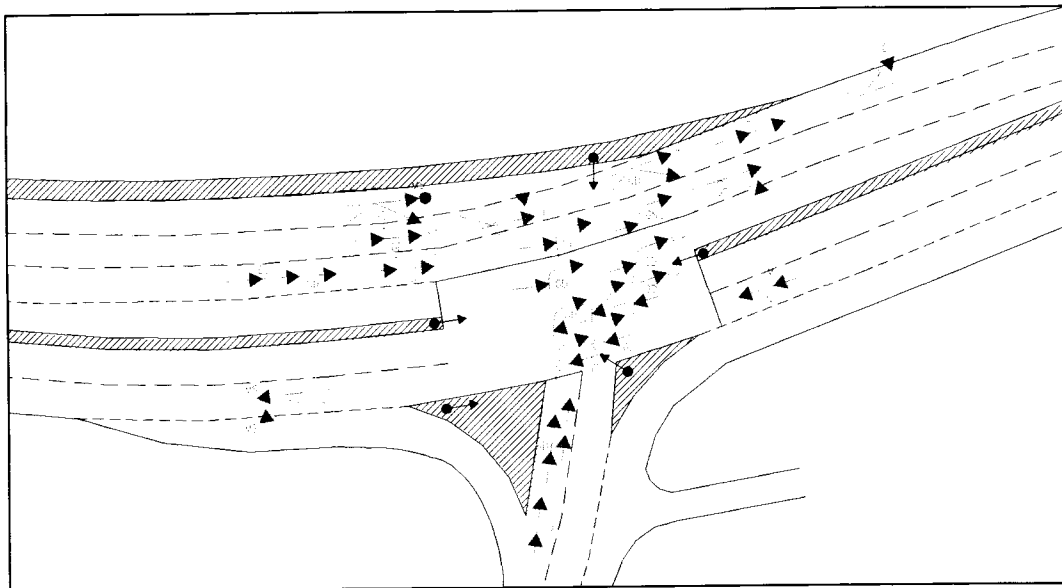

Figure Q4(ii): Collision Diagram at Jalan Sungai Jeluk Intersection

8

FINAL EXAMINATION

SEMESTER/SESSION : II / 20011/12   PROGRAMME   : 4 BFF
COURSE   : ROAD SAFETY   COURSE CODE   : BFT4063/BFT40603
                         ENGINEERING

Table 3

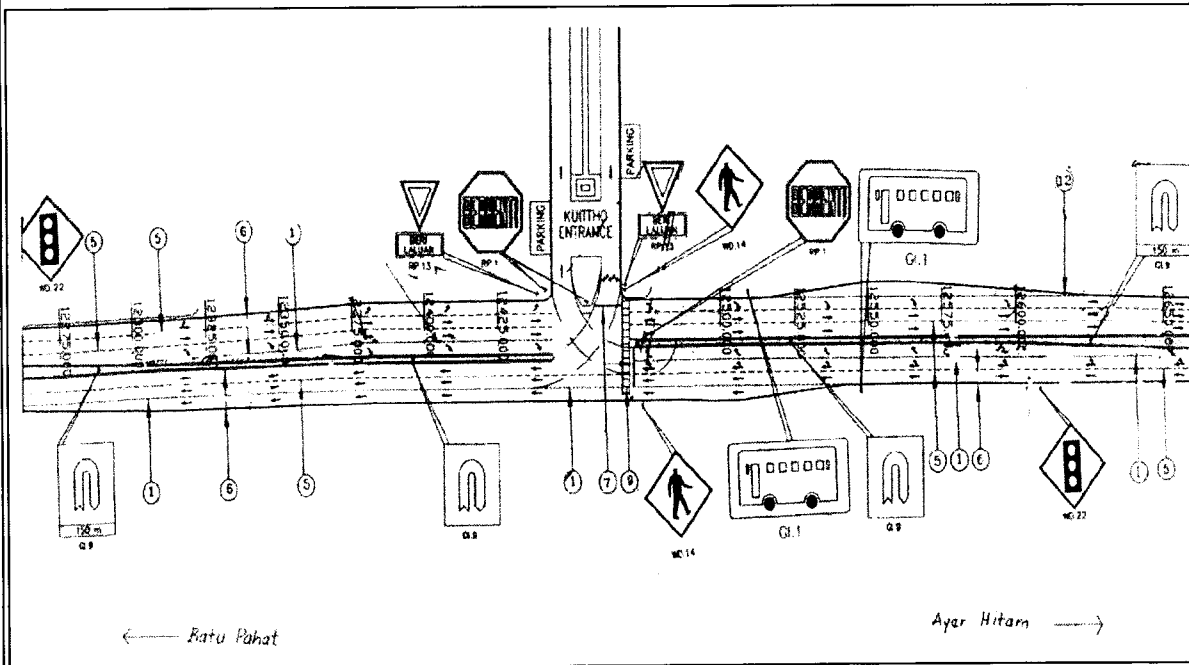|	No. of accident	
	Blackspot	**District**
Before (3 years)	30	120
After (3 years)	38	180

Figure **Q5**

FORMULAE

$$\sigma = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n-1}}$$

$$\chi^2 = \frac{\left(\left|ad-bc\right|-\dfrac{n}{2}\right)^2 n}{efgh}$$

$$C_v = \frac{\sigma}{\bar{x}}$$