

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN KEJURUTERAAN AWAM

PENILAIAN ALTERNATIF

SESI 1 : 2021/2022

DCC3113 : HIGHWAY AND TRAFFIC ENGINEERING

NAMA PENYELARAS KURSUS : MAI AZUNA BT MEOR YUSUF

KAEDAH PENILAIAN : PEPERIKSAAN ATAS TALIAN

**JENIS PENILAIAN : SOALAN STRUKTUR DAN ESEI
(3 SOALAN)**

TARIKH PENILAIAN : 3 FEBRUARI 2022

TEMPOH PENILAIAN : 1 JAM 30 MINIT

LARANGAN TERHADAP PLAGIARISM (AKTA 174)

**PELAJAR TIDAK BOLEH MEMPLAGIAT APA-APA IDEA, PENULISAN, DATA ATAU
CIPTAAN ORANG LAIN. PLAGIAT ADALAH SALAH SATU PENYELEWENGAN
AKADEMIK. SEKIRANYA PELAJAR DIBUKTIKAN MELAKUKAN PLAGIARISM,
PENILAIAN BAGI KURSUS BERKENAAN AKAN DIMANSUHKAN DAN DIBERI GRED
F DENGAN NILAI MATA 0.**

**(RUJUK BUKU ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN
(Diploma) EDISI 6, JUN 2019, KLAUSA 17.3)**

SECTION A: 50 MARKS**BAHAGIAN A: 50 MARKAH****INSTRUCTION:**

This section consists of **TWO (2)** structured questions. Write your answers in the answer sheet form provided.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan struktur. Tulis jawapan anda di dalam helaian kertas yang disediakan.

QUESTION 1**SOALAN 1**

(a) Explain **TWO (2)** agencies involved in Malaysia highway construction.

Terangkan DUA (2) agensi yang terlibat dalam pembinaan jalan raya di Malaysia.

CLO1
C2

[5 marks]

[5 markah]

(b) There are five categories of a road in Malaysia. Write **TWO (2)** primary characteristics for each road category.

Terdapat lima kategori jalan di Malaysia. Tuliskan DUA (2) ciri utama bagi setiap kategori jalan tersebut.

CLO1
C3

[10 marks]

[10 markah]

(c) Explain the methods of construction for flexible pavement using materials as below:

Terangkan kaedah pembinaan turapan lentur menggunakan bahan seperti di bawah :

- i. crusher run
batu pecah
- ii. Wet bound Macadam
Macadam terikat basah

CLO1
C3

[10 marks]

[10 markah]

QUESTION 2**SOALAN 2**CLO1
C2

- (a) Compare between routine and periodic maintenance.
Bandungkan diantara penyenggaraan rutin dan berkala.

[5 marks]
[5 markah]

CLO1
C3

- (b) Road maintenance management is essential to ensure road safety.
Explain in sequence the duties carried out by road maintenance management.
Pengurusan penyenggaraan jalan adalah sangat penting untuk memastikan keselamatan jalan raya. Terangkan dalam turutan , tugas yang dijalankan oleh pihak pengurusan penyenggaraan jalan.

[10 marks]
[10 markah]

CLO1
C3

- (c) Signs on the road surface are the markings painted on the road surface to assist road users on actions or movements to be taken in the specific areas.
With the aid of a diagram, determine **FIVE (5)** road markings on the road surface.
*Penanda jalan merupakan tanda yang dicat pada permukaan jalan dan berfungsi untuk membantu pengguna jalan raya bertindak atau memilih arah di kawasan tertentu .Dengan bantuan lakaran ,tentukan **LIMA (5)** jenis penanda jalan pada permukaan jalan.*

[10 marks]
[10 markah]

SECTION B : 25 MARKS**BAHAGIAN B : 25 MARKAH****INSTRUCTION:**

This section consists of 1 essay question. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi 1 soalan esei. Jawab semua soalan.

QUESTION 1**SOALAN 1**

CLO2
C4

- (a) Among the six accident factors, driver condition is the most important because when he/she is driving in a good physical, mental and emotional condition, he/she can avoid accidents by adjusting his/her ~~in~~ self during emergencies and also able to avoid the negligence of other drivers. Explain **FIVE (5)** important precaution measures pertaining to the driver's condition.

*Di antara enam faktor kemalangan, keadaan pemandulah yang paling penting kerana memandu dalam keadaan fizikal, fikiran dan emosi yang baik boleh mengelakkan kemalangan dengan menyesuaikan diri dengan keadaan kecemasan dan juga mengelakkan diri daripada kelalaian pemandu-pemandu yang lain. Terangkan **LIMA (5)** perkara penting yang harus diambil perhatian tentang keadaan pemandu.*

[10 marks]
[10 markah]

- (b) Based on the data given, design the thickness of flexible pavement according to PWD manual for this R05 class road:

- i. Width of road = 7.5 m, Width of road shoulder = 2.0 m
 - ii. Initial Average daily traffic (1way) = 5750
 - iii. Percentage of commercial vehicle = 17 %
 - iv. Annual growth rate = 9 % , Subgrade CBR = 5 %
 - v. Type of terrain = Flat
 - vi. Surface pavement material = Asphaltic concrete
 - vii. Road base material = Wet-mix Macadam
- Any other assumptions made should be mentioned

CLO2
C5

Berdasarkan data yang diberikan, rekabentuk ketebalan turapan anjal bagi jalan raya kelas R 05 berikut dengan menggunakan kaedah JKR:

- i. Lebar jalan raya = 7.5 m, Lebar bahu jalan = 2.0 m*
 - ii. Purata lalulintas harian (1 hala) = 5750*
 - iii. Peratus kenderaan perdagangan = 17 %*
 - iv, Kadar pertumbuhan tahunan = 9 % , CBR subgrad = 5 %*
 - v. Bentuk rupa bumi = Mendatar.*
 - vi. Bahan lapisan Lapisan permukaan = Konkrit asphalt*
 - vi, Bahan Tapak Jalan = Macadam campuran basah.*
- Andaian lain yang dibuat perlu dinyatakan*

[15 marks]
[15 markah]

SOALAN TAMAT

PAVEMENT DESIGN FORMULA

Table 3.1 Guide for Equivalence Factor

Percentage of selected heavy goods vehicles*	0-15%		16-50%	51-100%
Type of road Equivalence Factor	local 1.2	trunk 2.0	3.0	3.7

Table 3.2 Maximum Hourly Capacity under ideal conditions

Road Type	Passenger Vehicle Units per hour
Multi lane	2000 per lane
Two lanes (bothways)	2000 total for bothways
Three lanes (bothways)	4000 total for bothways

Table 3.3 Carriageway Roadway Reduction Factor

Carriageway Width	Shoulder Width			
	2.00m	1.50m	1.25m	1.00m
7.5m	1.00	0.97	0.94	0.90
7.0m	0.88	0.86	0.83	0.79
6.0m	0.81	0.78	0.76	0.73
5.0m	0.72	0.70	0.67	0.64

Table 3.4 Traffic Reduction Factor

Type of Terrain	Factor*
Flat	$T = 100 / (100 + P_c)$
Rolling	$T = 100 / (100 + 2P_c)$
Mountainous	$T = 100 / (100 + 5P_c)$

Table 3.5 Structural Layer Coefficients

Component	Type of Layer	Property	Coefficient
Wearing and Binder Course	Asphalt Concrete		1.00
Base Course	Dense Bituminous Macadam	Type 1: Stability > 400 kg	0.80
		Type 2: Stability > 300 kg	0.55
	Cement Stabilized	Unconfined Compressive strength(7 days) 30-40 kg/cm ²	0.45
	Mechanically Stabilized crushed aggregate	CBR ≥ 80%	0.32
Subbase	Sand, laterite etc.	CBR ≥ 20%	0.23
	Crushed aggregate	CBR ≥ 30%	0.25
	Cement Stabilized	CBR ≥ 60%	0.28

Table 3.6 Minimum Layer Thickness

Type of layer		Minimum thickness
Wearing Course		4 cm
Binder Course		5 cm
Base Course	Bituminous	5 cm
	Wet Mix	10 cm
	Cement treated*	10 cm
Subbase Course	Granular	10 cm
	Cement treated	15 cm

Table 3.7 Standard & Construction Layer Thickness

Type of layer		Standard thickness	One layer lift
Wearing course		4-5 cm	4-5 cm
Binder course		5-10 cm	5-10 cm
Base Course	Bituminous	5-20 cm	5-15 cm
	Wet mix	10-20 cm	10-15 cm
	Cement treated	10-20 cm	10-20 cm
Subbase Course	Granular	10-30 cm	10-20 cm
	Cement treated	15-20 cm	10-20 cm

Table 3.8 Minimum thickness of Bituminous Layer

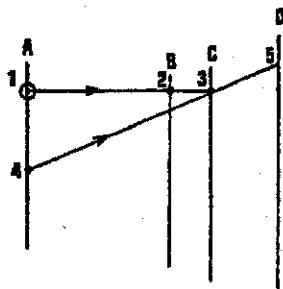
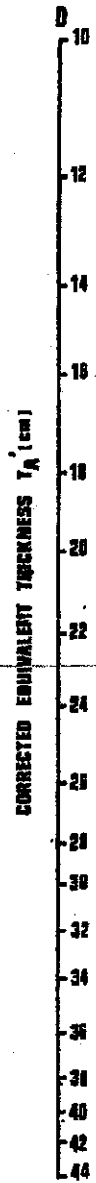
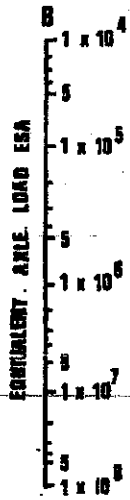
T _A	Total thickness of bituminous layer
< 17.5 cm	5.0 cm
17.5 - 22.5 cm	10.0 cm
23.0 - 29.5 cm	15.0 cm
> 30.0 cm	17.5 cm

Table 4.1: Conversion Factors to P.C.U's
 (Source Arahan Teknik (Jalan) 8/86)

Type of Vehicle	Equivalent Value in P.C.U's			
	Urban Standards	Rural Standards	Round About	Traffic Signal
Passenger Car	1.00	1.00	1.00	1.00
Heavy vehicles	2.00	3.00	2.80	1.75
Buses	3.00	3.00	2.80	2.25
Motorcycle	0.75	1.00	0.75	0.33
Bicycle	0.33	0.50	0.50	0.20

Table 4.2 : Saturated flow Determination

Broad access road (m)	3.00	3.50	4.00	4.50	5.00	5.50
Saturated flow (u.k.p/hour)	1850	1875	1975	2175	2550	2900



- 1. CBR = 3
- 2. ESA
- 3. T_A for CBR = 3
- 4. Design CBR
- 5. Required T_A

THICKNESS DESIGN NOMOGRAPH

LAMPIRAN DAN FORMULA

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INTERSECTION DESIGN

- a. $S = 525W$ OR $S = 160W$
- b. $y = \frac{Q}{S}$
- c. $L = \sum l + \sum (l - k)$
- d. $C_0 = \frac{1.5L+5}{1-Y}$
- e. $g_{\text{phase}} = (C_0 - L) \left(\frac{y_{\text{phase}}}{Y} \right)$
- f. $G_{\text{phase}} = g_{\text{phase}} + l - k$

FLEXIBLE PAVEMENT DESIGN

- a. $V_0 = \text{ADT} \times 365 \times (\text{Pc}/100) \times \text{Directional}$
- b. $V_c = V_0 [1+r]^n - 1 / r$
- c. $\text{ESA @ JBGP} = V_c \times e$
- d. $V_x = V_i (1+r)^x$
- e. $c = l \times R \times T$
- f. $C = 10 \times c$
- g. $\text{TA}' = \text{SN} = a_1 D_1 + a_2 D_2 + \dots \dots \dots a_n D_n$