SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2016

CC503 : TRAFFIC ENGINEERING

TARIKH : 22 OKTOBER 2016
TEMPOH : 11.15 AM – 1.15 PM (2 JAM)

Kertas ini mengandungi **TUJUH (7)** halaman bercetak.
Bahagian A: Soalan Pendek (10 soalan)
Bahagian B: Soalan Struktur (4 soalan)
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION A: 40 MARKS

BAHAGIAN A: 40 MARKAH

INSTRUCTION:

This section consists of **TEN (10)** structured questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **SEPULUH (10)** soalan berstruktur. Jawab **SEMUA** soalan.*

CLO1
C1

QUESTION 1

SOALAN 1

State **FOUR (4)** types of traffic studies.

*Nyatakan **EMPAT (4)** jenis kajian trafik.*

[4 marks]

[4 *markah*]

CLO1
C2

QUESTION 2

SOALAN 2

Transportation refers to the means of moving people and goods from one place to another. Identify **FOUR (4)** importance of transportation.

*Pengangkutan merujuk kepada menggerakkan manusia dan barangan dari satu tempat ke tempat yang lain. Kenalpasti **EMPAT (4)** kepentingan pengangkutan.*

[4 marks]

[4 *markah*]

CLO1
C1

QUESTION 3

SOALAN 3

List **FOUR (4)** components of Geometrical Design.

*Senaraikan **EMPAT (4)** Rekabentuk Geometri.*

[4 marks]

[4 *markah*]

CLO1
C2

QUESTION 4

SOALAN 4

A lorry is driving uphill on a road with 3.0% gradient at 60 km/h. The friction coefficient is 0.18 and the reaction time is 2.6 seconds. Calculate the Stopping Sight Distance (SSD).

Sebuah lori sedang mendaki jalan berkecerunan 3.0% pada 60km/j. Pekali geseran adalah 0.18 dan masa tindak balas adalah 2.6 saat. Kirakan Jarak Penglihatan Berhenti.

[4 marks]

[4 *markah*]

CLO1
C3

QUESTION 5

SOALAN 5

A horizontal curve is designed with a 609.6 m radius. The curve has a tangent length of 121.92 m and the value of deflection angle, θ is 22.62°. Calculate the length of curve, L.

Satu lengkung ufuk direkabentuk dengan jejari 609.6m. Panjang tangen ialah 121.92m dan sudut pesongan ,θ sebanyak 22.62°. Kirakan panjang lengkung, L.

[4 marks]

[4 *markah*]

CLO2
C1

QUESTION 6

SOALAN 6

State **FOUR (4)** factors that affect the junction load.

*Nyatakan **EMPAT (4)** faktor yang mempengaruhi muatan persimpangan.*

[4 marks]

[4 *markah*]

CLO2
C2

QUESTION 7

SOALAN 7

Explain briefly how conflicts occur at an intersection.

Terangkan dengan ringkas bagaimana konflik berlaku di persimpangan.

[4 marks]

[4 *markah*]

CLO2
C3

QUESTION 8

SOALAN 8

Sketch **FOUR (4)** types of movement at a junction.

*Lakarkan **EMPAT (4)** jenis pergerakan di persimpangan.*

[4 marks]

[4 *markah*]

CLO1
C2

QUESTION 9

SOALAN 9

Identify **FOUR (4)** traffic management techniques.

*Kenalpasti **EMPAT (4)** teknik pengurusan lalu lintas.*

[4 marks]

[4 *markah*]

CLO1
C2

QUESTION 10

SOALAN 10

Explain briefly the importance of Act and Law enforcements which are related to roads.

Terangkan dengan ringkas kepentingan penguatkuasaan Akta dan undang-undang yang berkaitan dengan jalan raya.

[4 marks]

[4 *markah*]

SECTION B : 60 MARKS

BAHAGIAN B : 60 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **THREE (3)** questions only.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **TIGA (3)** soalan sahaja.*

QUESTION 1

SOALAN 1

CLO1 C2

a) Explain clearly **FOUR (4)** functions of transportation.
*Terangkan dengan jelas **EMPAT (4)** fungsi pengangkutan*

[8 marks]
[*8markah*]

CLO1 C4

b) Draw a flow diagram of Transportation Planning.
Lukiskan carta aliran Perancangan Perangkutan

[12 marks]
[*12 markah*]

QUESTION 2

SOALAN 2

CLO2 C2

(a) Determine **FOUR (4)** purposes of geometric design.
*Tentukani **EMPAT (4)** tujuan rekabentuk geometrik.*

[4 marks]
[*4 markah*]

CLO2 C4

(b) A 275m equal tangent sag vertical curve has a VPI station of 185+00 at 1500 elevation. The entering grade is -4.5% and the existing grade is 1.0%. Determine:
Satu lengkung lendut mempunyai panjang tangen yang sama iaitu 275m dengan station VPI 185+00 pada ketinggian 1500m. Nilai cerun awal dan akhir masing-masing 4.5% dan 1.0%. Tentukan:

i. The Station of VPC and VPT
Ketinggian Stesyen VPC dan VPT

ii. The VPC and VPT elevation
Ketinggian VPC dan VPT

iii. The lowest point of the curve
Titik terendah pada lengkung tersebut.

[16 marks]
[*16 markah*]

QUESTION 3

SOALAN 3

CLO2 C3

(a) List **THREE (3)** factors that affect junction load.
*Senaraikan **TIGA (3)** faktor yang memberi kesan kepada kesesakan persimpangan.*

[6 marks]
[6 markah]

CLO2 C5

(b) A two-phase system is usually adopted if through traffic is significant compared to the turning movements. Based on **Table B3,** prove that the critical flow ratio of two phase traffic signal for Junction X is less than 0.85. Design the traffic signal for junction X. Given k = 3s, I = 5s and ℓ= 2s.
*Sistem dua fasa biasanya diterima pakai jika lalu lintas yang melalui adalah ketara berbanding dengan pergerakan membelok. Berdasarkan **Jadual B3**, buktikan kadar penggunaan persimpangan lampu isyarat dua fasa untuk Persimpangan X kurang daripada 0.85. Rekabentuk lampu isyarat bagi persimpangan X. Diberi k = 3s, I = 5s and ℓ = 2s*

Table B3

Jadual B3

	North/ *Utara*	South/ *Selatan*	East/*Timur*	West/ *Barat*
Design hour (q) in PCU's/hour	950	722	1100	1000
Road width(m)	4.5	4.5	5.5	5.5
Saturation flow(s) in PCU's/hour	2175	2175	2900	2900

[14 marks]

[14 markah]

QUESTION 4

SOALAN 4

CLO1 C2

(a) Explain **FOUR (4)** traffic management techniques.

*Terangkan **EMPAT (4)** teknik pengurusan lalulintas.*

[8 marks]

[*8 markah*]

CLO1 C4

(b) Explain **FOUR (4)** types of air pollutants caused by transportation.

*Terangkan dengan jelas **EMPAT (4)** jenis bahan pencemar udara yang disebabkan oleh pengangkutan.*

[12 marks]

[*12 markah*]

SOALAN TAMAT

a. $M = R\left[1 - cos\left(\frac{28.65S}{R}\right)\right]$

b. $S = \frac{R}{28.65} cos^{-1}\left(\frac{R-M}{R}\right)$

c. $R = \frac{S^2}{8M}$

Case S > L

d. $M = L\frac{(2S-L)}{8R}$

e. $S = \frac{8MR}{2L} + \frac{L}{2}$

f. $R = \frac{L(2S-L)}{8M}$

Vertical Alignment

a. $Y_m = e = \frac{AL}{8} \quad or \quad = \frac{AS}{8}$

Case S < L

b. $L = \frac{AS^2}{2\left(\sqrt{h_1}+\sqrt{h_2}\right)^2}$

c. $L = \frac{NS^2}{2\left(\sqrt{h_1}+\sqrt{h_2}\right)^2}$

Case S > L

d. $L = 2S - \left[\frac{2\left(\sqrt{h_1}+\sqrt{h_2}\right)^2}{A}\right]$

GEOMETRIC DESIGN

Geometrical Alignment

a. $d_1 = 0.28tV$

b. $d_2 = \frac{V^2}{254f} \quad or \quad d_2 = \frac{v^2}{2fg}$

c. $d_b = d_1 + d_2$

d. $d_u = \frac{V^2}{254(f-G)} \quad ord_t = \frac{V^2}{254(f+G)}$

e. $T = R\ tan\left(\frac{\Delta}{2}\right)$

f. $AB = 2\left(R\ sin\left(\frac{\Delta}{2}\right)\right)$

g. $E = R\left(sek\left(\frac{\Delta}{2} - 1\right)\right)$

h. $M = R\left(1 - cos\left(\frac{\Delta}{2}\right)\right)$

i. $L = \frac{100\Delta}{D}$

j. $D = \frac{5729.6}{R}$

k. $R = \frac{v^2}{gf}$

l. $\frac{v^2}{gR} = e + f$

m. $\frac{V^2}{127R} = e + f$

Horizontal Alignment

Case S < L

$$L = 2S\left[\frac{8\left(h + \frac{1}{2}(h_1 + h_2)\right)^2}{N}\right]$$

INTERSECTION DESIGN

a. $S = 525\ W \quad or\ S = 160\ W$

b. $y = \frac{Q}{S}$

c. $L = \sum l + \sum(I - k)$

d. $C_o = \frac{1.5L+5}{1-Y}$

e. $g_{phase} = (C_o - L)\left(\frac{y_{phase}}{Y}\right)$

f. $G_{phase} = g_{phase} + l - k$