

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN KEJURUTERAAN AWAM

**PEPERIKSAAN AKHIR
SESI DISEMBER 2017**

DCC3093 : ENGINEERING SURVEY 2

**TARIKH : 05 APRIL 2018
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)**

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.

Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)

Dokumen sokongan yang disertakan : Kertas Graf & Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

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

This section consists of **TWO (2)** structure questions. Answer **ALL** questions.

ARAHAN :

Bahagian ini mengandungi **DUA (2)** soalan berstruktur. Jawab **SEMUA** soalan.

QUESTION 1**SOALAN 1**

a) With the aid of a diagram, explain types of curve as below:

CLO1
C2

- i. Simple curve
- ii. Compound curve
- iii. Reverse curve
- iv. Spiral curve

Dengan bantuan gambarajah, terangkan jenis lengkung di bawah:

- i. *Lengkung mudah*
- ii. *Lengkung majmuk*
- iii. *Lengkung berbalik*
- iv. *Lengkung lingkaran*

[8 marks]

[8 markah]

b) One circular curve of radius 250 meter will be built to connect two straight roads. The chainage of intersection point, I is 2942 meter and the deflection angle is $60^{\circ}00'00''$. The curve will be marked at every offset of 20 meter. Calculate the setting out data with **offset method from tangent line**.

CLO1
C3

Satu lengkung bulat berjejari 250 meter akan dibina untuk menyambungkan dua jalan yang lurus. Nilai rantaian pada titik persilangan, I adalah 2942 meter dan sudut pesongan adalah $60^{\circ}00'00''$. Lengkungan akan ditanda pada setiap perentas 20 meter. Sediakan jadual perancangan lengkungan menggunakan Kaedah Offset Dari Garisan Tangen.

[17 marks]

[17 markah]

QUESTION 2

SOALAN 2

CLO1
C2

- a) Explain the usage of offset pegs in setting out a small building and draw a suitable diagram for the explanation.

Terangkan penggunaan piket offset dalam pemancangan tanda bangunan yang kecil dan gunakan lakaran yang sesuai untuk penerangan ini.

[8 marks]
[8 markah]

CLO1
C3

- b) A pipeline of 120 m long will be laid with a slope of 1:120 from point A to point B. Reduce level for starting point which is point A is 10.102 m and point B is 10.105 m. Invert level for excavation at point A is 8.123m. The length of the traveller is 3 meter. Calculate;

Satu laluan paip 120 m panjang akan dibina dengan kecerunan 1: 120 dari titik A ke titik B. Aras laras bagi titik permulaan iaitu titik A adalah 10.102m dan titik B ialah 10.105m. Aras terbalik bagi penggalian di titik A ialah 8.123m. Panjang bagi rod pengembara adalah 3 meter.

Kirakan :

- i. Invert level at the end of point B
Aras laras terbalik di titik B
- ii. Height of rail level needed to be set up on the ground at point A and B.
Tinggi bagi rel aras yang perlu diset diatas titik A dan B
- iii. The depth needed to be cut at point A and B
Kedalaman yang perlu dikorek di titik A dan B.

[17 marks]
[17 markah]

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

This section consists of **FOUR (4)** structured questions. Answer **TWO (2)** questions only

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab DUA (2) soalan sahaja.

QUESTION 1**SOALAN 1**

CLO1
C1

- a) List down **FIVE (5)** uses of EDM / Total Station in survey and civil work.
Senaraikan LIMA (5) kegunaan EDM / Total Station dalam kerja ukur dan kejuruteraan awam.

[5 marks]
[5 markah]

CLO1
C2

- b) Describe clearly **THREE (3)** errors occurred on EDM instrument.
Terangkan dengan jelas TIGA (3) selisih yang terdedah kepada alat EDM / Total Station.

[10 marks]
[10 markah]

CLO1
C3

- c) The wave travelled from station A to station B with a frequency of 6Hz and velocity of 4.0 m/s. The counter shows 12 numbers of waves detected approaching station B.
Satu gelombang bergerak dari stesen A ke stesen B dengan frekuensi 6Hz dan halaju 4.0 m/s. Mesin pembilang menunjukkan 12 bilangan gelombang dikesan di stesen B.

- i. Calculate the horizontal distance from station A to station B.
Kirakan jarak mendatar stesen A ke stesen B.

[4 marks]
[4 markah]

- ii. Sketch a diagram to explain the measurement principle of EDM / Total station instrument.

Lakarkan gambarajah untuk menerangkan prinsip pengukuran jarak dengan menggunakan alat EDM/Total station.

[6 marks]
[6 markah]

QUESTION 2

SOALAN 2

CLO1
C1

- a) State FIVE (5) methods to calculate the irregular area.

Nyatakan LIMA (5) kaedah untuk menghitung keluasan yang di lingkari garisan tidak lurus.

[5 marks]
[5 markah]

CLO1
C3

- b) The following offsets were taken at 15 m intervals from a survey line to an irregular boundary line:

Berikut adalah ofset yang diambil pada sela 15 meter pada garis ukur kepada garis sempadan yang tidak teratur:

3.50, 4.30, 6.75, 5.25, 7.50, 8.80, 7.90, 6.40, 4.40, 3.25

Calculate the area enclosed between the survey line, the irregular boundary line, and the offsets, by:

Kirakan keluasan kawasan di antara garis ukur dan garis sempadan dan ofset menggunakan :

- i. Trapezoidal Rule
Kaedah Trapezoidal
- ii. Simpson's Rule
Kaedah Simpson

[10 marks]
[10 markah]

CLO1
C3

- c) Calculate the area in **Figure 2C** with Trapezoid and Simpson method. Given distance from R to S is 320 meter.

*Kirakan luas pada Rajah 2C dengan menggunakan kaedah Trapezoid dan Simpson.
Diberi jarak dari R ke S adalah 320 meter.*

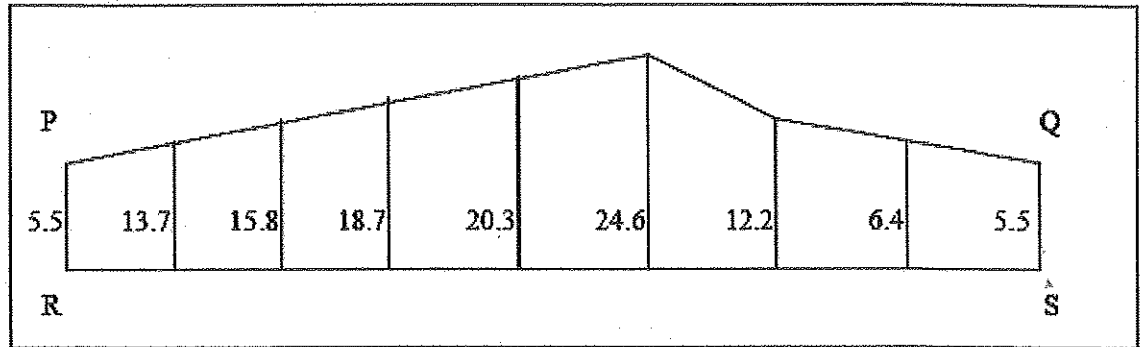


Figure 2C / Rajah 2C

[10 marks]

[10 markah]

QUESTION 3

SOALAN 3

CLO1
C1

- a) Define phrases of Shrinkage and Waste in mass haul diagram.

Takrifkan istilah-istilah bagi Penyusutan dan Buangan dalam gambarajah urungan padu.

[3 marks]

[3 markah]

CLO1
C2

- b) Describe FIVE (5) characteristics of mass haul diagram.

Terangkan LIMA (5) sifat-sifat gambarajah urungan padu.

[10 marks]

[10 markah]

CLO1
C3

- c) Cut volume and fill volume along a suggestion road given in Table 3C below. From the data given;

Isipadu korekan dan timbusan di sepanjang suatu cadangan jalan adalah seperti Jadual 3C di bawah. Daripada data berikut;

- i. Calculate the accumulated volume table if the shrinkage factor is 0.1.

Kirakan jadual isipadu berkelompok dengan mengambil kira faktor penyusutan timbusan sebanyak 0.1.

[7 marks]

[7 markah]

- ii. Plot a mass haul diagram using a suitable scale.

Plot graf gambarajah urungan padu menggunakan skala yang bersesuaian.

[5 marks]

[5 markah]

Table 3C / Jadual 3C

Chainage (m) <i>Rantaian (m)</i>	Cut volume (m ³) <i>Isipadu korekan (m³)</i>	Fill volume (m ³) <i>Isipadu Timbusan (m³)</i>
0		
100	8325	
200	7304	
300		2268
400		1744
500		1256
600		900

QUESTION 4

SOALAN 4

CLO1
C1

- a) State the formula used for the following terms in circular Curve.

Nyatakan formula bagi terma berikut yang digunakan dalam lengkung bulat.

- i) Tangent length, T

Panjang tangen, T

- ii) Length of curve, L

Panjang lengkung, L

- iii) Deflection angle, θ

Sudut Pesongan

[3 marks]

[3 markah]

CLO1
C2

- b) Two straight lines intersect at an angle of $30^{\circ} 20' 00''$ are connected by a circular curve with 300 m radius. Given chainage of Intersection Point is 1500 m. Calculate:

Dua garis lurus yang bersilang pada sudut pesongan $30^{\circ} 20' 00''$ disambungkan oleh satu lengkung bulat berjari 300 m. Diberi nilai rantaian pada Titik Persilangan ialah 1500m. Kirakan :

- i) Tangent length, T

Panjang tangen, T

- ii) Length of curve, L

Panjang lengkung, L

- iii) Chainage of beginning curve, T_1

Rantaian titik awal, T_1

- iv) Chainage of end curve, T_2

Rantaian titik akhir, T_2

[10 marks]

[10 markah]

CLO1
C3

- c) By using the data in **Question 4(b)** prepare a suitable table setting out curve using the **Deflection Angle Method**, given the chord is 20 m interval.

Menggunakan data pada Soalan 4(b), sediakan jadual pemancangan lengkung yang sesuai menggunakan Kaedah Sudut Pesongan, diberi sela ialah 20 m.

[12 marks]

[12 markah]

SOALAN TAMAT

FORMULA DCC3093 [£] ENGINEERING SURVEY 2

AREA AND VOLUME

i. Area = $\sqrt{[S(S-a)(S-b)(S-c)]}$ where $S = \frac{1}{2}(a+b+c)$

ii. Area = $\frac{1}{2}(b \times h)$

iii. Area = $\frac{1}{2}(a \times b \times \sin c)$

iv. Area = $(a \times b)$

v. Area = $\frac{1}{2}(a+b) \times h$

Trapezoidal rule = $\frac{D}{2}(O_1 + O_n + 2 \sum O_{\text{of remaining ordinate}})$

Mid ordinate rule = $D (\text{sum of mid-ordinate})$

Simpson Rule = $\frac{D}{3}(O_1 + O_n + 4 \sum \text{even.ordinate} + 2 \sum \text{odd.ordinate})$

Cross Sectional Area

$$= h(b + sh)$$

$$= \frac{1}{2} m \left[\left(\frac{b}{2} + mh \right) (w_1 + w_2) - \frac{b^2}{2} \right]$$

$$= \frac{1}{2} \left[\left(\frac{b}{2} + kh \right)^2 / (k - m) \right] \& = \frac{1}{2} \left[\left(\frac{b}{2} - kh \right)^2 / (k - n) \right]$$

$$= \frac{1}{2} m \left[(w_1 + w_2) \left(mh + \frac{b}{2} \right) - \frac{b^2}{2} \right]$$

MASS HAUL DIAGRAM

$$\text{Haul} = \frac{\text{Haul.volume} \times \text{average.haul.distance}}{100} \text{ stn.m}$$

$$\text{Freehaul} = \frac{\text{Freehaul.volume} \times \text{freehaul.distance}}{100} \text{ stn.m}$$

$$\text{Overhaul} = \frac{\text{Overhaul.volume} (\text{average.overhaul.distance} - \text{freehaul.distance})}{100} \text{ stn.m}$$

CURVE

$$\text{Tangent length} = R \tan \frac{\theta}{2}$$

$$\text{Long chord length} = 2R \sin \frac{\theta}{2}$$

$$\text{Arc length} = \pi \times R \times \frac{\theta}{180} \quad @ \quad = 2\pi \times R \times \frac{\theta}{360}$$

$$\text{Chainage } T_1 = \text{Chainage I} - \text{tangent length}$$

$$\text{Chainage } T_2 = \text{Chainage } T_1 + \text{arc length}$$

$$\text{Offset from tangent line, } X = R - \sqrt{R^2 - Y^2}$$

$$\text{Offset from long chord line, } X = \sqrt{R^2 - Y^2} - \sqrt{R^2 - \left(\frac{W}{2}\right)^2}$$

$$\text{Deflection angle method} \quad \delta_{I(\text{xxx})} = \frac{1718.9 \times C}{60R} \quad @ \quad \delta_{I(\text{xxx})} = \frac{1718.9 \times C}{R}$$

Sub chords line method

$$\text{Offset}_1 = \frac{a^2}{2R} \quad \text{Offset}_2 = \frac{b(b+a)}{2R} \quad \text{Offset}_{\text{either}} = \frac{b^2}{R} \quad \text{Offset}_n = \frac{c(b+c)}{2R}$$

$$\text{Setting out transition curves} = \frac{573I^2}{60RL}$$

$$\text{Length of transition curve} = \frac{V^3}{3.6^3 Cr}$$

$$\text{Shift of Cubic Parabola} = \frac{L^2}{24R}$$

$$\text{Length of Tangent Spiral angle} = (R+S) \tan \frac{\theta}{2} + \frac{L}{2} \quad @ \quad = \frac{L}{2R} (180/\pi)$$

$$\text{Vertical Curves ;} \quad RL = RL_{T_2} + \left[\left(\frac{my}{100} \right) - \left(\frac{Ay^2}{200L} \right) \right]$$

i. $A = m - n$

ii. Length of vertical curves = KA

iii. Chainage $T_1 = \text{Chainage I} - L/2$

iv. Chainage $T_2 = \text{Chainage I} + L/2$

v. Difference of height $m = mL/200$

vi. Reduced Level $T_2 = RL_1 - \Delta h_m$

vii. $Y_{\text{max/min}} = Lm/A$

viii. Reduced Level max/min =

$$RL_{T_1} + \left(\frac{Lm^2}{200A} \right)$$