SULIT

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI DISEMBER 2017

DCC2082 : ENGINEERING SURVEY 1

TARIKH : 05 APRIL 2018
MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas ini mengandungi **SEPULUH(10)** halaman bercetak.

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

Dokumen sokongan yang disertakan : Lampiran (Appendix)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION A: 50 MARKS

BAHAGIAN A: 50 MARKAH

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO1
C1

(a) Define Plane Survey.

Takrifkan Ukur Satah.

[5 marks]

[*5 markah*]

CLO1
C2

(b) Explain briefly the following Leveling Survey terms:

Terangkan secara ringkas terma Ukur Aras berikut:

i. Change point

Titik pindah

ii. Intermediate Sight

Pandangan Antara

iii. Fore Sight

Pandangan Hadapan

iv. Back Sight

Pandangan Belakang

v. Bench Mark

Batu Aras

[10 marks]

[*10 markah*]

CLO1
C3

(c) **Table A1** shows the data of observed leveling work for the construction road in Kulim. Calculate the entries marked (x).

Jadual A1 *menunjukkan data cerapan kerja ukur aras bagi pembinaan jalan raya di Kulim. Kirakan bacaan yang bertanda* (x).

BS	IS	FS	Rise	Fall	Reduced Level	Remarks
2.191					x	BM
	x			0.314	49.556	A
	2.325		x		49.736	B
x		1.496	0.829		x	C (Change Point)
	2.513		0.506		51.071	D
	x			0.298	x	E
1.752		x	0.855		51.628	F (Change Point)
		3.824		x	x	TBM

Table A1/ Jadual A1

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

(a) State **FIVE (5)** types of classification in surveying based on the instrument used.
*Nyatakan **LIMA(5)** klasifikasi ukur berdasarkan peralatan yang digunakan.*

[5 marks]
[*5 markah*]

CLO1
C2

(b) **Table A2 (b)** shows the data of adjusted value of latitude and departure. Calculate the coordinates of each station where the starting coordinate at station 1 is (N 1500.00, E 1500.00).

Jadual A2 (b) *menunjukkan data nilai latit dan dipat yang telah dibetulkan. Kirakan koordinat bagi setiap stesen dengan permulaan koordinat pada stesen 1 (N 1500.00, E 1500.00).*

Line	Latitude		Departure		Coordinate	
From / To	N	S	E	W	N/S	E/W
1						
2	83.635		284.325			
3		374.428		110.543		
4	45.345			210.890		
5	250.700		72.262			
1		5.252		34.154		

Table A2 (b) / Jadual A2 (b)

[10 marks]

[*10 markah*]

CLO1
C3

(c) **Table A2 (c)** shows the bearing and distance for a closed traverse. Calculate the latitude and departure of each line.

Jadual A2 (c) *menunjukkan nilai bering dan jarak bagi terabas tertutup. Kirakan latit dan dipat bagi setiap garisan.*

Line	Bearing	Distance (m)
AB	65° 30' 30"	65.135
BC	87° 20' 00"	85.555
CD	189° 45' 00"	87.125
DE	245° 55' 30"	82.353
EA	330° 25' 30"	118.855

Table A2 (c)/ Jadual A2 (c)

[10 marks]

[10 *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 **THREE (3)** purposes of leveling work.
*Senaraikan **TIGA (3)** tujuan kerja ukur aras.*

[3 marks]
[*3 markah*]

CLO1
C2

(b) There are two types of level calculation, which are Rise & Fall Method and Height of Collimation Method. Describe **TWO (2)** advantages and **TWO (2)** disadvantages for each methods.
*Terdapat dua jenis pengiraan ukur aras, iaitu Kaedah Turun Naik dan Kaedah Tinggi Garis Kolimatan. Jelaskan **DUA (2)** kelebihan dan **DUA (2)** kekurangan bagi setiap kaedah tersebut.*

[8 marks]
[*8 markah*]

CLO1
C3

(c) Calculate the reduced level at every point of the data at **Table B1** by using the Height of Collimation Method (HOC) and also show the arithmetic check for the calculation. The leveling work start at the bench mark **BM 2201 JPJ** with reduced level 37.740m, and finished at **TBM PUH_01** with reduced level 48.006m.

*Kirakan nilai aras laras pada setiap titik bagi data pada **Jadual B1** berikut dengan menggunakan kaedah Tinggi Garis Kolimatan (TGK) dan tunjukkan semakan arithmetik bagi pengiraan tersebut. Kerja-kerja ukur aras tersebut telah bermula pada **BM 2201 JPJ** dengan nilai aras laras 37.740m, dan berakhir pada **TBM PUH_01** dengan nilai aras laras 48.006m.*

BS	IS	FS	HOC	Reduced Level	Remarks
1.625				**37.740**	**BM K 2201 JPJ**
2.041		1.014			CP10
2.305		0.886			CP 9
1.433		1.493			CP 8
1.310		1.435			CP 7
1.401		1.266			CP 6
4.605		1.503			CP 5
2.390		0.761			CP 4
1.597		0.085			CP 3
1.395		1.325			CP 2
1.936		1.417			CP 1
		0.589			**TBM PUH_01**

Table B1 / Jadual B1

Note : CP – Change Point

[14 marks]

[*14 markah*]

QUESTION 2

SOALAN 2

CLO1 C1 (a) There are several types of level instrument that are different in terms of cost, time and measurement accuracy. List **THREE (3)** types of the level instrument.
*Terdapat beberapa jenis alat ukur aras yang berbeza dari segi kos, masa dan ketepatan pengukuran. Senaraikan **TIGA (3)** jenis alat ukur aras tersebut.*

[3 marks]
[*3 markah*]

CLO1 C2 (b) Describe the terms in leveling below:
Jelaskan berkenaan istilah-istilah dalam ukur aras di bawah:

i. Temporary Bench Mark (BM)
Batu Aras Sementara (BAS)

ii. Reduced Level (RL)
Aras Laras (AL)

iii. Datum
Datum

iv. Level Line
Garis Aras

[8 marks]
[*8 markah*]

CLO1
C3

(c) **Table B2** shows the leveling data which was carried out from a temporary bench mark, **TBM PUH_02** (RL = 48.000m) to a bench mark, **BM 2202 JPJ** (RL = 37.736m). Calculate the Reduced Level at every point by using the Rise and Fall Method and include the arithmetic check for the calculation.

Jadual B2 menunjukkan data ukur aras yang telah dijalankan bermula pada batu aras sementara, **TBM PUH_02** (AL = 48.000m) ke batu aras, **BM 2202 JPJ** (AL = 37.736m). Kirakan nilai Aras Laras bagi setiap titik dengan menggunakan Kaedah Turun Naik dan sertakan semakan arithmetik bagi pengiraan tersebut.

BS	IS	FS	Rise	Fall	Reduced Level	Remarks
0.600						**TBM PUH_02**
1.370		1.954				A
1.320		1.345				B
0.081		1.595				C
0.759		2.384				D
1.516		4.600				E
1.315		1.411				F
1.412		1.364				G
1.479		1.410				H
0.853		2.290				I
1.043		2.005				J
		1.656				**BM 2202 JPJ**

Table B2 / Jadual B2

[14 marks]

[14 markah]

QUESTION 3

SOALAN 3

CLO1
C1

(a) State the function of theodolite components below.
Berikan fungsi komponen teodolit seperti di bawah.

(i) Face Left
Penyilang Kiri

(ii) Trivet
Trivet

(iii) Tribrach
Tribrak

[3 marks]
[3 markah]

CLO1
C2

(b) Explain briefly the following terms with illustration.
Terangkan dengan ringkas istilah berikut berserta gambarajah.

(i) Open Traverse
Terabas Terbuka

(ii) Closed Traverse
Terabas Tertutup

[7 marks]
[7 markah]

CLO1
C3

(c) **Table B3** shows bearing and distance for closed traverse theodolite. Calculate the latitude and departure using the transit method.

Jadual B3 *menunjukkan bering dan jarak bagi satu terabas tertutup. Kirakan latit dan dipat dengan menggunakan Kaedah Transit.*

Line	Bearing	Distance (m)
1-2	063° 30′ 00″	63.264
2-3	077° 25′ 00″	75.119
3-4	173° 43′ 30″	82.147
4-5	231° 55′ 00″	87.273
5-1	322° 19′ 00″	114.829

Table B3 / Jadual B3

[15 marks]
[15 markah]

QUESTION 4

SOALAN 4

CLO1
C1

(a) List **THREE (3)** types of modern electronic theodolite.

*Senaraikan **TIGA (3)** jenis teodolit elektronik moden.*

[3 marks]
[3 markah]

CLO1
C2

(b) Explain clearly temporary adjustment procedure.

Terangkan dengan jelas prosedur pelarasan sementara.

[7 marks]
[7 markah]

CLO1
C3

(c) From **Table B4**, calculate the final bearing for each line.
*Berdasarkan **Jadual B4**, kirakan bering muktamad bagi setiap garisan.*

Station	Bearing		Average	From Station	Line	To Station
	Face Left	Face Right			Final Bearing	
1	262°30'00"	82°30'00"				
2						
3	132°25'10"	312°25'15"				
2						
3						
4	209°03'20"	29°03'40"				
3						
4						
5	290°25'55"	110°25'25"				
4						
5						
1	339°31'30"	159°31'10"				
5						
1						
2	82°32'20"	262°31'20"				

Table B4 / Jadual B4

[15 marks]
[15 markah]

SOALAN TAMAT

APPENDIX

LEVELLING BOOKING FORM (HEIGHT OF COLLIMATION)

Back Sight	Inter Sight	Fore Sight	Height of Collimation	Reduced Level	Correction	Final Reduced Level	Marks

APPENDIX

LATITUDE AND DEPARTURE FORM

Line	Bearing	Distance	Latitude		Departure		Final Latitude		Final Departure		2 x Latitude @ 2 x Departure	2 x Latitude x Departure @ 2 x Departure x Latitude	Coordinate	
			N	S	E	W	N	S	E	W			N/S	E/W

APPENDIX

Traverse Booking Form

Station	Bearing		Mean Bearing	From Stn	Line	To Stn	Distance
	Face Left	Face Right			Final Bearing		

APPENDIX

LEVELLING BOOKING FORM (RISE AND FALL)

Back Sight	Inter Sight	Fore Sight	Rise	Fall	Reduced Level	Correction	Final Reduced Level	Marks