

SULIT



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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI I : 2022 / 2023

DCB20053: PLUMBING SERVICES

TARIKH : 14 DISEMBER 2022

MASA : 2.30 PM – 4.30 PM (2 JAM)

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

Bahagian A: Esei (2 soalan)

Bahagian B: Esei (4 soalan)

Dokumen sokongan yang disertakan : Table

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 contains of **TWO (2)** essay questions. Answer ALL questions.

ARAHAN :

Bahagian ini mengandungi DUA (2) soalan esei. Jawab semua soalan.

QUESTION 1**SOALAN 1**CLO2
C2

- (a) Estimate the flow rate through a 100mm diameter pipe full of flow with a flow velocity of 10m/s.

Anggarkan kadar alir yang melalui sebatang paip bergaris pusat 100mm mengalir penuh dengan halaju aliran 10m/s.

[5 marks]

[5 markah]

CLO2
C2

- (b) Estimate the amount of cold water storage required to cover 24 hours interruption of supply in a combined hotel and restaurant. The number of hotel guests is 75 and the number of restaurant guests is 350.

Anggarkan jumlah simpanan air sejuk yang diperlukan untuk menampung gangguan bekalan selama 24 jam di hotel dan restoran gabungan. Bilangan tetamu hotel 75 dan bilangan tetamu restoran 350 orang.

[10 marks]

[10 markah]

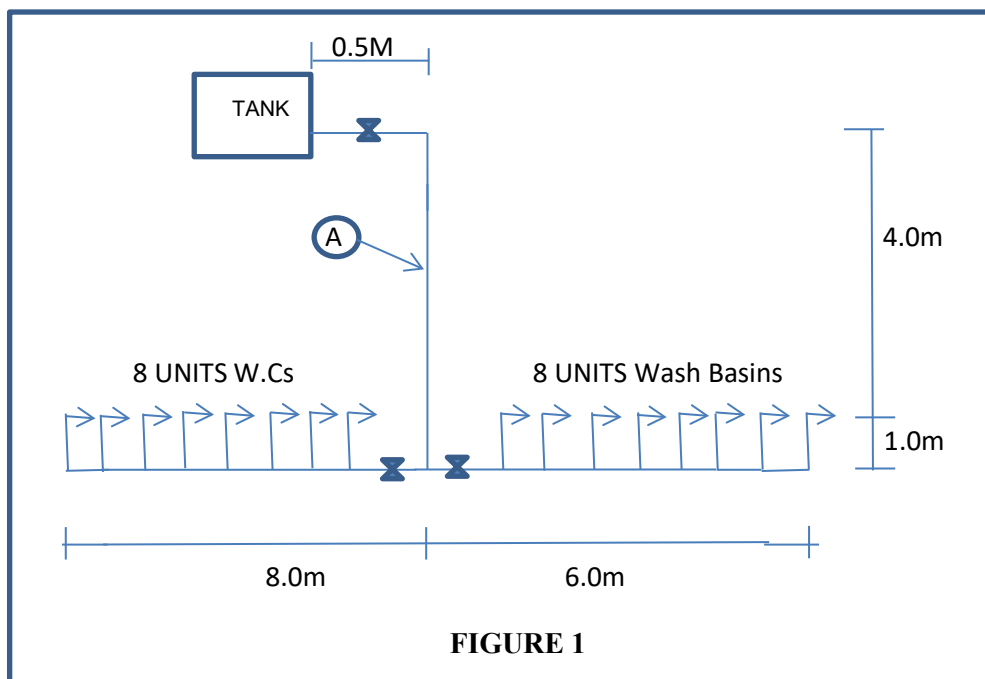
CLO2
C3

- (c) Calculate the diameter of the main pipe for cold water supply (A) for a single storey office block shown in Figure 1. (Refer Table A, B, C and D).

Hitungkan diameter paip utama bekalan air sejuk (A) bagi bangunan pejabat setingkat seperti mana ditunjukkan oleh gambarajah 1. (Rujuk Jadual A, B, C dan D).

[10 marks]

[10 markah]



QUESTION 2**SOALAN 2**CLO2
C2

- (a) Identify the total number of sanitary tools required for a day school with a student population of 1200 and a staff of 80. (refer table 6).

Kenalpasti jumlah bilangan alatan kebersihan yang diperlukan bagi sebuah sekolah harian dengan taburan pelajar 1200 orang dan kakitangan seramai 80 orang. (rujuk jadual 6).

[5 marks]

[5 markah]

CLO2
C2

- (b) Estimate the diameter of a discharge stack and ventilating pipe required to carry the discharge from 50 units of flats. Each flat has :- (refer table 1,2,3 &4).

Anggarkan diameter paip tumpu dan paip pengudaraan yang diperlukan untuk bahan buangan dari 50 unit rumah pangsa. Setiap rumah pangsa mempunyai :- (rujuk jadual 1,2,3,&4).

- i. 2 units of WC
- ii. 1 unit of WB
- iii. 1 unit of Bath Tab
- iv. 1 unit of Sink
- v. 1 unit of Washing Machine

[10 marks]

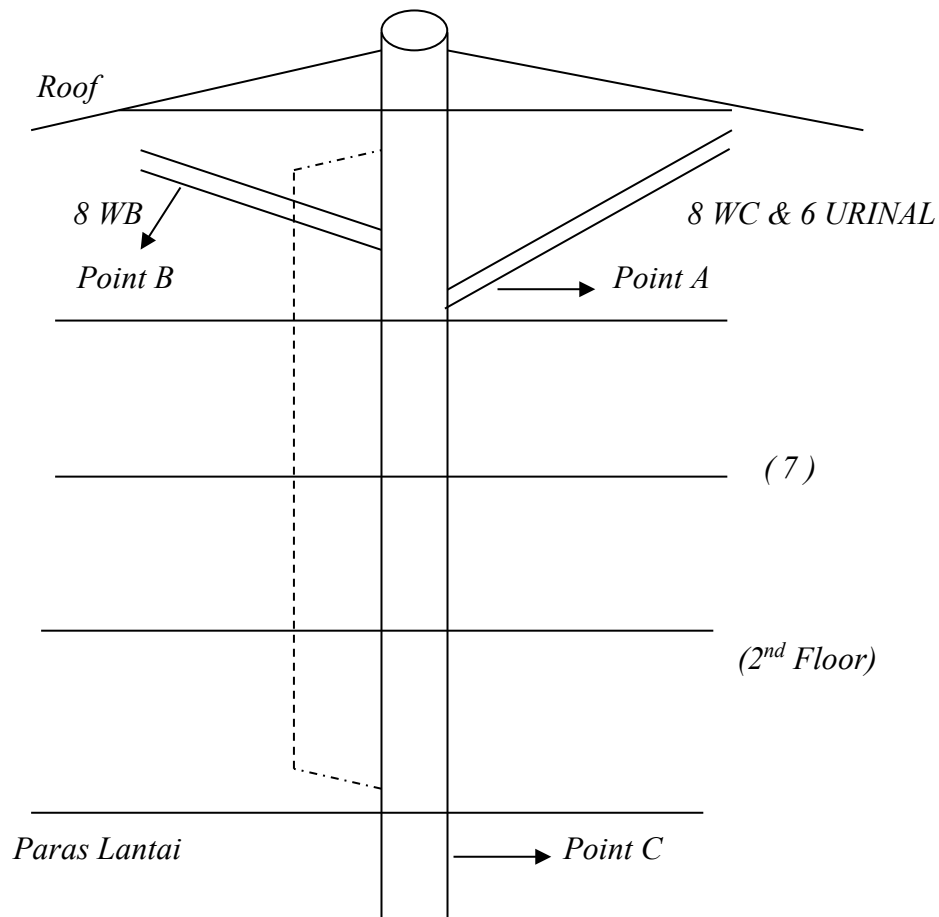
[10 markah]

CLO2
C3

- (c) The diagram below shows a schematic sketch of a disposal piping system for an 8-storey commercial building. Based on the sketch given, calculate :-
Gambarajah di bawah menunjukkan lakaran skematik sistem paip pelupusan

untuk bangunan kormersial 8 tingkat. Berdasarkan lakaran diberi, hitungkan:-

- i. The total discharge unit at points A, B and C
Jumlah unit luahan di titik A,B dan C
- ii. The size for branch pipe at points A and B
Saiz untuk paip cabang di titik A dan B
- iii. The size of stack pipe at point C
Saiz bagi paip tumpu di titik C
- iv. The size of ventilation stack pipe
Saiz bagi paip tumpu pengudaraan



*All equipment used are the same on each floor

*Semua peralatan yang digunakan untuk setiap tingkat adalah sama

[10 marks]

[10 markah]

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

This section contains **FOUR (4)** essay questions. Answer **TWO (2)** questions only.

ARAHAN :

Bahagian ini mengandungi EMPAT (4) soalan esei. Jawab DU(2) soalan sahaja.

QUESTION 1***SOALAN 1***

- (a) Describe the following types of valve.
Terangkan jenis – jenis injap di bawah ini.

CLO1
C2

- i. Safety Valve
Injap keselamatan
- ii. Ball valve
Injap bebola
- iii. Gate Valve
Injap pintu

[5 marks]

[5markah]

- (b) Compare the differences between direct and indirect water supply system.
Bezakan antara sistem bekalan air jenis langsung dan tidak langsung.

CLO1
C2

[8 marks]

[8 markah]

CLO1
C3

- (c) Sketch and label the direct and indirect cold water supply systems for a two-storey building.

Lakar serta labelkan sistem langsung dan tidak langsung bekalan air sejuk untuk bangunan dua tingkat.

[12 marks]

[12 markah]

QUESTION 2**SOALAN 2**CLO1
C2

- (a) Explain the precautions needed when installing electric water heaters in order to reduce the heat losses to the minimum.

Terangkan langkah-langkah keselamatan yang perlu diambil semasa memasang pemanas air elektrik untuk meminimumkan kehilangan haba.

[5 marks]

[5markah]

CLO1
C2

- (b) Illustrate the cross-section of an instantaneous hot water cylinder.

Gambarkankan keratan rentas selinder air panas segera.

[8 marks]

[8 markah]

CLO1
C3

- (c) Sketch the indirect system of a hot water supply.

Lakarkan sistem secara tidak langsung bekalan air panas.

[12 marks]

[12 markah]

QUESTION 3**SOALAN 3**CLO1
C2

- (a) Explain the terms below.
Jelaskan terma di bawah.
- i. Waste Appliances
Peralatan Sisa
 - ii. Soil Appliances
Peralatan Najis

[5 marks]

[5markah]

CLO1
C2

- (b) As a building engineer, you are asked to identify 3 advantages and 2 disadvantages of a one -pipe system that will be installed in a 4 -storey office building owned by Alibaba Sdn.Bhd.

Sebagai jurutera bangunan, anda diminta untuk mengenalpasti 3 kelebihan serta 2 kekurangan sistem satu paip yang akan dipasang pada bangunan pejabat 4 tingkat milik Alibaba Sdn.Bhd.

[8marks]

[8 markah]

CLO1
C3

- (c) Sketch the diagram of the squat type flushing cistern.
Lakarkan gambarajah tangki air simbah jenis cangkung.

[12 marks]

[12 markah]

QUESTION 4**SOALAN 4**CLO1
C2

- (a) Identify **FIVE (5)** conditions in a drainage system that require the construction of manholes according to the Uniform Building Regulations 1992.

*Kenalpasti **LIMA (5)** keadaan dalam sistem saliran yang memerlukan pembinaan lurang mengikut Undang-Undang Kecil Bangunan Seragam 1992.*

[5 marks]

[5 markah]

CLO1
C2

- (b) Illustrate and label the diagram of a manhole.

Lakar dan labelkan gambarajah sebuah lurang.

[8marks]

[8 markah]

CLO1
C3

- (c) Sketch a plan of a house showing the following drainage systems and state the advantages of each:

Lakarkan pelan untuk sebuah rumah dengan menunjukkan sistem-sistem saliran di bawah serta nyatakan kelebihanannya untuk setiap sistem tersebut.

- i. Combined system

Sistem bergabung

- ii. Separate system

Sistem berasingan

[12 marks]

[12 markah]

Notes

Assessment item for this course have covered elements of the Dublin Problem: DPB 1, DPB2 and DPB3 as mentioned in FEIST.

SOALAN TAMAT

Table A : Loading units rate at a variety of fitments for offices block

Fitment	Loading units
Wash basin	1.5
WC cistern	2

Table B : Frictional resistances of fittings expressed in equivalent pipe lengths

JADUAL 2.3 Panjang Setara Untuk Lekapan (Tee / Elbow)

Copper Pipe			Galvanised steel			
Nominal outside diameter (mm)	Meter run of pipe		Nominal outside diameter (mm)	Meter run of pipe		
	Elbow	Tee		Elbow	Bend	Tee
15	0.5	0.6	15	0.5	0.4	1.2
22	0.8	1.0	20	0.6	0.5	1.4
28	1.0	1.5	25	0.7	0.6	1.8
35	1.4	2.0	32	1.0	0.7	2.3
42	1.7	2.5	40	1.2	1.0	2.7
54	2.3	3.5	50	1.4	1.2	3.4
62	3.0	4.5	65	1.7	1.3	4.2
76	3.4	5.8	80	2.0	1.6	5.3
108	4.5	8.0	100	2.7	2.0	6.8

JADUAL 2.4 Panjang Setara Untuk Lekapan (Tap & Valve)

Types	Equivalent Length (m) for nominal dia. (mm)									
	12	18	25	32	38	50	62	75	100	
Taps and Globe valves	5	6	9	11	14	18	21	25	36	
Ball valve	75	40	40	35	21	20				

Table C : Conversion Chart

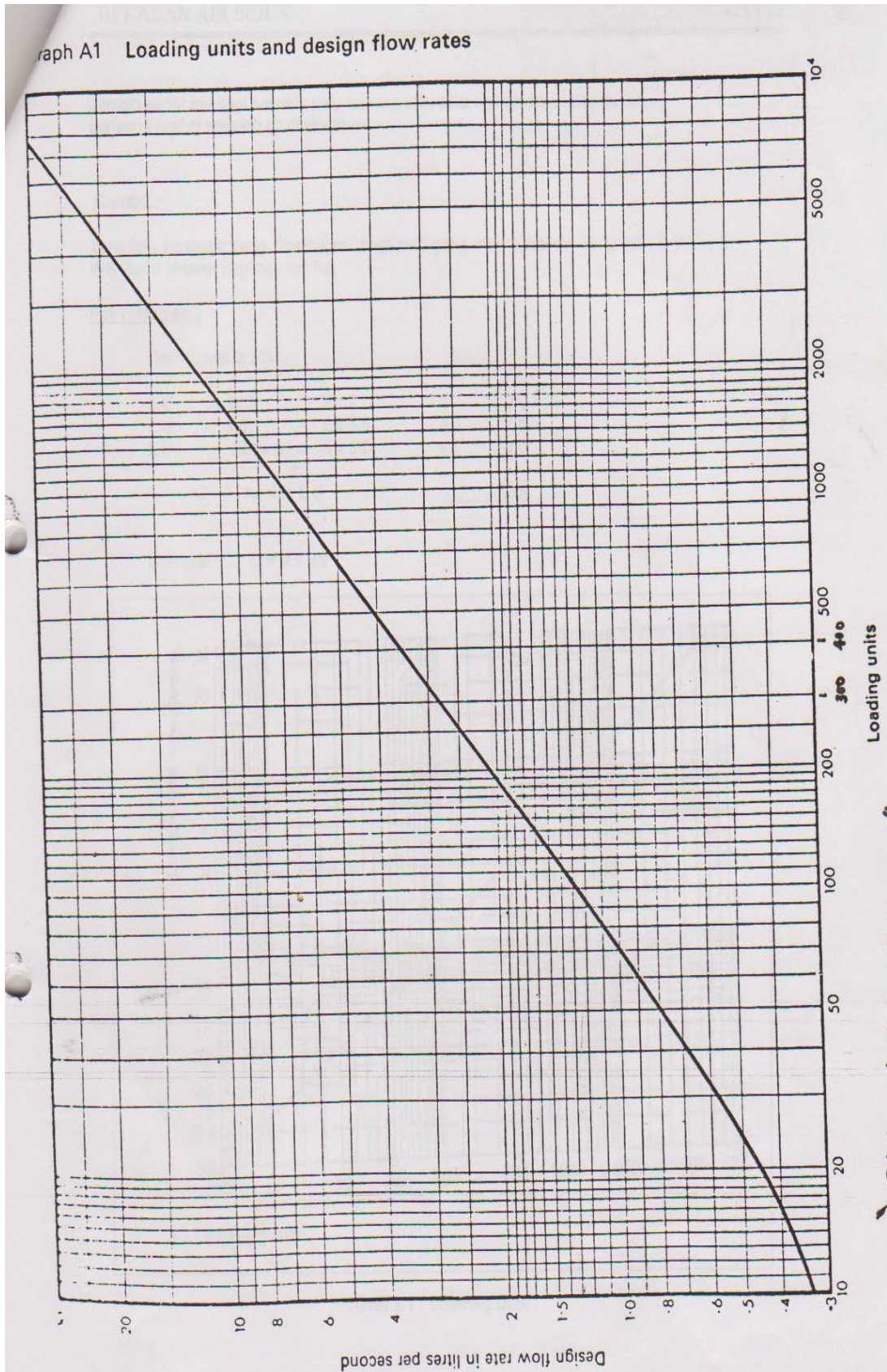


Table D : Pipe sizing graph

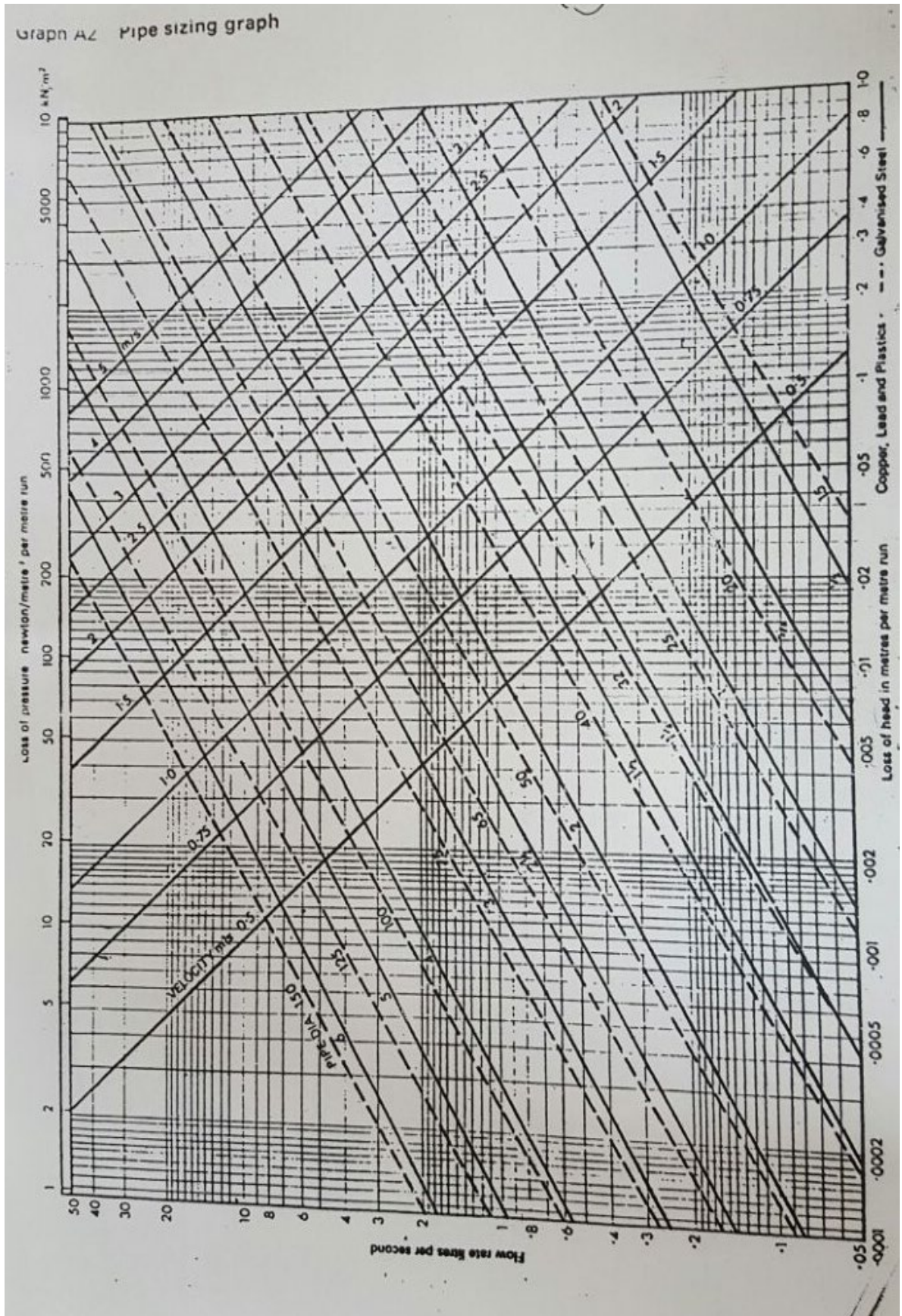


Table 1 : Discharge unit values for commercial building

Appliance	D.U
WC	14
WB	3
URINAL	0.3

Table 2 : Discharge units and stack diameter

Diameter pipe (mm)	D.U
50	10
65	60
75	200
90	350
100	750
125	2500
150	5500

Table 3 : Discharge units and branch diameter

Diameter pipe (mm)	D.U
65	35
75	100
90	230
100	430
125	1500
150	5500

Table 4: Diameter of vent pipe

Branch or stack diameter	Ventalating pipe min. diamater
Up to 75mm bore	2/3 D (min.25mm)
Over 75mm bore	½ D

Table 5: Recommended minimum storage of hot and cold water for domestic purposes

Type of building	Minimun cold water storage litres (l)	Minimum hot water storage litres (l)
Hostel	90 per bed space	32 per bed space
Hotel	200 per bed space	45 per bed space
Office premises:		
• With canteen facilities	45 per employee	4.5 per employee
• Without canteen facilities	40 per employee	4.0 per employee
Restaurant	7 per meal	3.5 per meal
Day school :		
• Nursery	15 per pupil	4.5 per pupil
• Primary	15 per pupil	
• Secondary	20 per pupil	5.0 per pupil
• Technical	20 per pupil	
Boarding school	90 per pupil	23 per pupil

Table 6 : Jadual Bilangan Peralatan Kebersihan

Jenis barangan	Peralatan						
	Water Closet		Urinal	Wash Basin		Shower	
	L	P		L	P	L	P
Dewan@ Pawagam @	1 : 1 - 100	3 : 1 - 100	1 : 1 - 100	1 : 1 - 200	1 : 1 - 200	-	-
Auditorium	2 : 101 - 200	6 : 101 - 200	2 : 101 - 200	2 : 201 - 400	2 : 201 - 400	-	-
	3 : 201 - 400	8 : 201 - 400	3 : 201 - 400	3 : 401 - 650	3 : 401 - 750	-	-
			4 : 401 - 600				
Sekolah atau berasrama (pelajar)	1/10	1/8	1/25	1/12	1/12	1/8	1/8
Sek Harian Pelajar.						-	-
. Sek Rendah	1/30	1/25	1/75	1/35	1/35		
. Sek Menengah	1/40	1/30	1/35	1/40	1/45	-	-