

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2018

DCB2072 : PLUMBING SERVICES

TARIKH : 01 NOVEMBER 2018

MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.

Bahagian A: Esei Berstruktur (2 soalan)

Bahagian B: Esei Berstruktur (4 soalan)

Dokumen sokongan yang disertakan : Ada

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) structured essay questions. Answer ALL questions.

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO1
C1

- (a) List FIVE (5) processes the hydrologic cycle.

Senaraikan LIMA (5) proses kitaran hidrologi.

[5 marks]

[5 markah]

CLO1
C2

- (b) Explain the processes of water treatment below.

Terangkan proses-proses rawatan air mentah di bawah;

- i. Filtering

Penyaringan

[2 marks]

[2 markah]

- ii. Aeration

Pengudaraan

[2 marks]

[2 markah]

- iii. Flocculation

Penggentalan

[2 marks]

[2 markah]

- iv. Sedimentation

Pemendapan

[2 marks]

[2 markah]

CLO2
C3

(c) A copper cold water distributing pipe has an actual length of 15 m, with four elbows in the run and under a constant head of water of 6 m. Assuming the pipe diameter is 32 mm with frictional resistant for elbow is 1.4, calculate the loss of head per meter run of pipe.

Satu paip agihan air sejuk jenis tembaga mempunyai panjang sebenar 15 m, dengan empat sesiku larian bawah dengan kepala air stabil ialah 6 m. Dengan menganggarkan diameter paip ialah 32 mm dan sesiku tahan geseran adalah 1.4, kira kehilangan turus pada paip larian per meter.

[12 marks]

[12 markah]

QUESTION 2

SOALAN 2

CLO1
C1

(a) List FIVE (5) characteristics that need to be existed at all sanitary appliances.

Senaraikan LIMA (5) ciri bahan yang sesuai digunakan untuk perkakasan sanitasi.

[5 marks]

[5 markah]

CLO1
C2

(b) Identify the functions and the uses of sanitary appliances as follows.

Kenalpasti fungsi dan kegunaan perkakasan sanitasi seperti berikut;

i. Water closet / *Mangkuk tandas*

[4 marks]

[4 markah]

ii. Urinal / *Urinal*

[4 marks]

[4 markah]

CLO2
C3

(c) Interpret the characteristics of the following pipe works in a building;

Terangkan ciri-ciri kerja paip berikut yang boleh digunakan pada sesebuah bangunan.

i. One pipe system / *Sistem satu paip*

[4 marks]

[4 markah]

ii. Two pipe system / *Sistem dua paip*

[4 marks]

[4 markah]

iii. Single stack system / *Sistem paip tunggal*

[4 marks]

[4 markah]

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

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

ARAHAN:

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

QUESTION 1**SOALAN 1**CLO1
C1

- (a) The purpose of the water distribution system is to deliver water to users with the appropriate quality, quantity and pressure. List **THREE (3)** requirements of a good water distribution system.

Tujuan sistem pengagihan air adalah untuk menyalurkan air kepada pengguna dengan kualiti, kuantiti dan tekanan yang sesuai. Nyatakan THREE (3) keperluan sistem pengagihan air yang baik.

[3 marks]

[3 markah]

CLO1
C2

- (b) Identify **THREE (3)** advantages and **FOUR (4)** disadvantages of the indirect water supply system.

Kenalpasti THREE (3) kebaikan dan EMPAT (4) keburukan bagi sistem bekalan air secara tidak langsung.

[7 marks]

[7 markah]

CLO2
C3

(c) A house requires the installation of a cold water supply system, therefore calculate:

Sebuah rumah kediaman memerlukan pemasangan sistem bekalan air, oleh itu kirakan:

- i. The diameter of pipe to discharge 2 L/s if a constant head of water is 4 m and effective length of pipe is 20.6 m, by using the Thomas Box formula.

Dengan menggunakan formula Thomas Box, diameter paip yang berkadar alir 2 L/s jika turus tetap air adalah 4 m, panjang berkesan paip adalah 20.6 m.

[5 marks]

[5 markah]

- ii. The capacity of a cold water storage cistern. This house contains 2 baths, 2 basins, 2 WC's and a sink.

Kapasiti simpanan air sejuk. Rumah ini mengandungi 2 bilik mandi, 2 besen, 2 WC dan singki.

[5 marks]

[5 markah]

- iii. Calculate the loss of head per meter run of pipe. A cold water distributing pipe has an actual length of 15m, with 4 elbows in the run and under a constant head of water of 4 m. Assuming the pipe diameter is 32 mm with frictional resistant for elbows is 1.4.

Hitung kehilangan turus per meter aliran paip. Paip agihan air sejuk mempunyai panjang sebenar 15m, dengan 4 sesiku dalam larian dan di bawah turus tekanan air tetap 4 m. Dengan mengandaikan diameter paip adalah 32 mm dengan rintangan geseran untuk siku adalah 1.4.

[5 marks]

[5 markah]

QUESTION 2

SOALAN 2

CLO1
C1

(a) Define boiler.

Takrifkan dandang.

[3 marks]

[3 markah]

CLO1
C2

(b) Explain direct centralized hot water system.

Terangkan sistem berpusat air panas secara langsung.

[7 marks]

[7 markah]

CLO2
C3(c) By referring to **Table B1**, calculate the boiler power required for hospital hot water storage using the data below.*Dengan merujuk kepada **Jadual B1**, kirakan kuasa dandang bagi simpanan air panas yang diperlukan untuk hospital berdasarkan data di bawah.*

- Sanitary appliances: 25 basins used 4 times, 15 baths used twice, 15 shower used 3 times and 10 sinks used 3 times / *Perkakas kebersihan : 25 besen digunakan 4 kali, 15 bilik mandi digunakan dua kali, 15 pancuran mandian digunakan 3 kali dan 10 singki digunakan 3 kali*
- Temperature rise of water = 55°C / *Kenaikan suhu air = 55°C*
- Heating up time or recovery period = 2 hours / *Masa pemanasan atau tempoh pemulihan = 2 jam*
- Efficiency of plant = 60 percent / *Kecekapan loji = 60 peratus*
- Specific heat capacity of water = 4.2 kJ/kg K / *Muatan haba tentu air = 4.2 kJ / kg K*

Table B1 / Jadual B1

Appliance / Peralatan	Capacity (liters) / Kapasiti
Wash basin (WB) / besen	1.5
Bath / bilik mandi	70
Shower / pancuran mandian	13
Sink / Singki	15

[15 marks]

[15 markah]

QUESTION 3

SOALAN 3

CLO1
C1

- (a) List
- THREE (3)**
- components in a drainage system.

Senaraikan TIGA (3) komponen sistem saliran.

[3 marks]

[3 markah]

CLO1
C2

- (b) Explain separate drainage system.

Terangkan sistem saliran berasingan.

[7 marks]

[7 markah]

CLO2
C3

- (c) Based on
- Figure B1**
- , calculate the size of manhole.

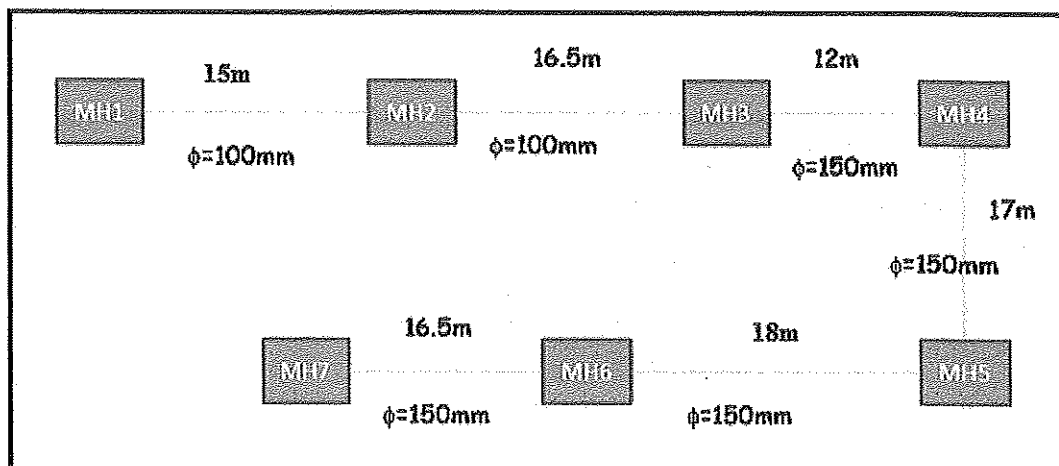
Berdasarkan Rajah B1 di bawah, kirakan saiz lurang.

Figure B1 / Rajah B1

[15 marks]

[15 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- (a) State **THREE (3)** characteristics of materials that are suitable for sanitary appliances.

Nyatakan TIGA (3) ciri-ciri bahan yang sesuai untuk peralatan sanitasi.

[3 marks]

[3 markah]

CLO1
C2

- (b) Explain fully vented one pipe system used in a building, where there are a large number of sanitary appliances in range.

Terangkan sistem satu paip dialihudara sepenuhnya, yang digunakan dalam bangunan yang mempunyai jumlah perkakas sanitasi yang banyak pada rangkaiannya.

[7 marks]

[7 markah]

CLO2
C3

- (c) Draw sanitary pipes for:

Lukiskan paip sanitasi berikut:

- (i) Single stack system
Sistem tumpu tunggal
- (ii) One pipe system
Sistem satu paip
- (iii) Two pipe system
Sistem dua paip

[15 marks]

[15 markah]

SOALAN TAMAT

Table of Determine of Pipe Diameter

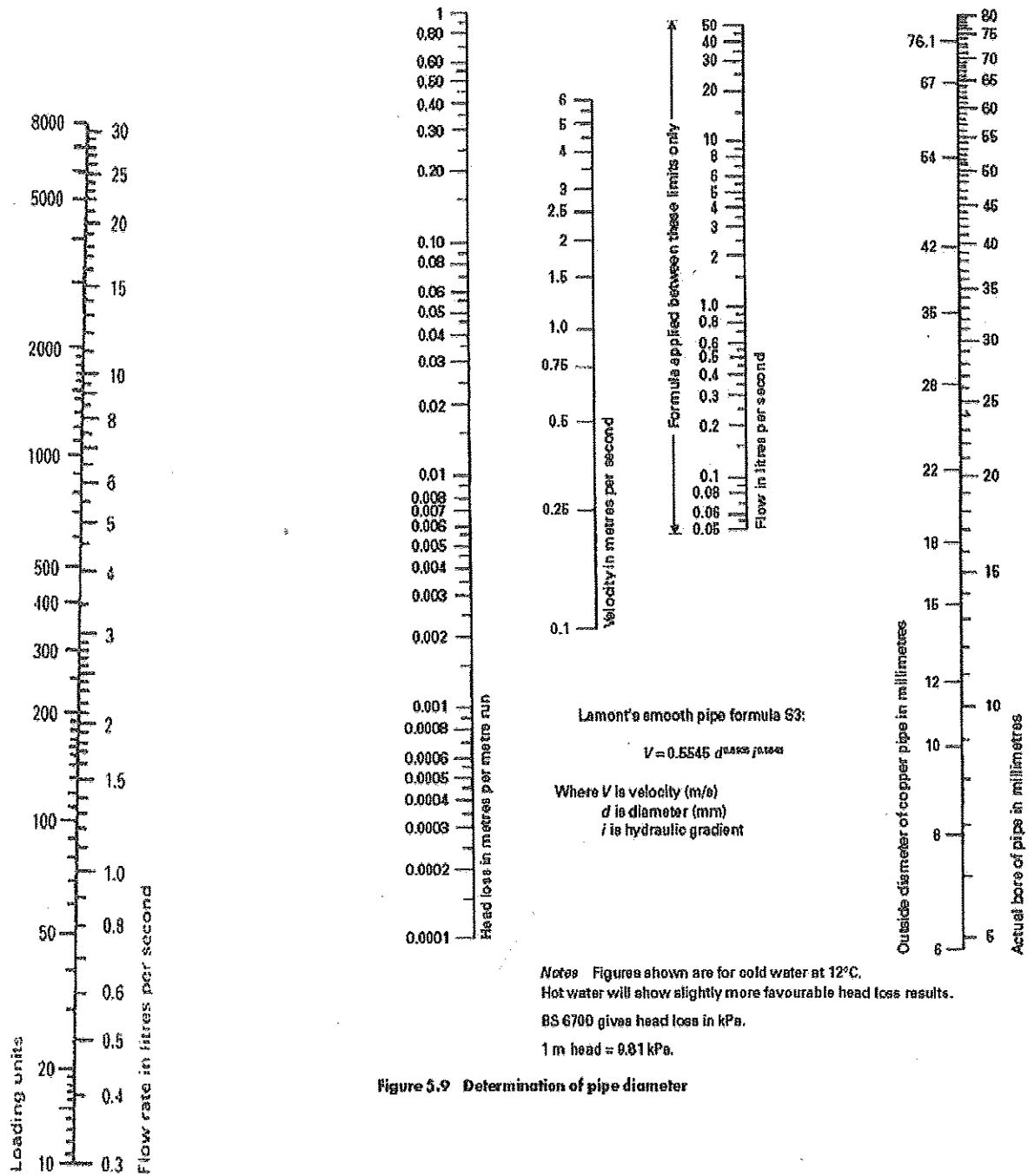
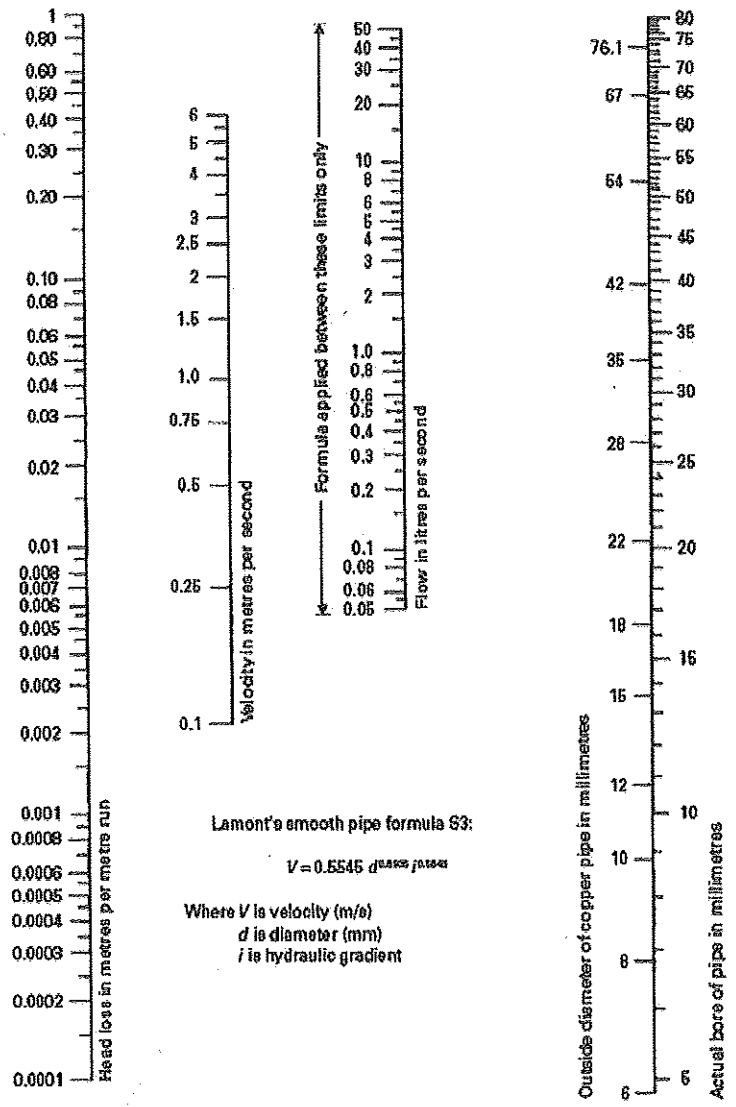


Figure 5.2
Conversion
chart - loading
units to flow rate



Notes Figures shown are for cold water at 12°C.
 Hot water will show slightly more favourable head loss results.
 BS 6700 gives head loss in kPa.
 1 m head = 0.01 kPa.

Figure 5.9 Determination of pipe diameter

Table of Capacities of Cold Water Storage

Table 13.2 Capacities of hot and cold water added together, required for single use of appliances

Appliance	Capacity in litres
Wash basin	
hand wash	5
hand and face wash	10
hair wash	20
Shower	40
Bath	110
WC	10
Washing machine	150
Sink	
wash-up	15
cleaning	10

Table of Loading Units (LU)

Fitment	Loading units
Wash basin	1.5-3, depending on size
WC cistern	2
Washing machine	3
Dishwasher	3
Shower	3
Sink ($\frac{1}{2}$ in. tap)	3
Sink ($\frac{3}{4}$ in. tap)	5
Bath ($\frac{3}{4}$ in. tap)	10
Bath (1 in. tap)	22

Table of Discharge Unit Values (DU)

Appliance	Application	Discharge unit value
WC	Domestic	7
	Commercial	14
	Congested/public	28
Basin	Domestic	1
	Commercial	3
	Congested/public	6
Sink	Domestic	6
	Commercial	14
	Congested/public	27
Washing machine	-	4

Table of Discharge Unit and Stack Diameter

Nominal bore (mm)	Approximate no. of DUs.
50	10
65	60
75	200
100	750
125	2500
150	5500

Table of General Guide for Sizes of Ventilating Pipes

Branch or stack diameter (D)	Ventilating pipe min. diameter
Up to 75 mm bore	$\frac{2}{3}$ D (min. 25mm)
Over 75 mm bore	$\frac{1}{2}$ D

Table of Manhole Depth

Manhole pipe size (mm) / <i>Saiz paip lurang</i>	Slope / <i>Kecerunan</i>	Manhole depth / <i>Kedalaman lurang</i>
100	1:40	250
150	1:60	300
225	1:90	450
300	1:100	600

Table of Manhole Size

Manhole depth (mm) / <i>Kedalaman lurang</i>	Manhole Size / <i>Saiz lurang</i>	
	Length (mm) / <i>Panjang</i>	Width (mm) / <i>Lebar</i>
< 600mm	600	450
600 – 900mm	750	600
900 - 1500mm	750	750
1500 - 2400mm	900	1125