5

SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI DISEMBER 2015

DCC5152 : WATER SUPPLY & WASTE WATER ENGINEERING

TARIKH : 08 APRIL 2016
MASA : 3.00 PM – 5.00 PM (2 JAM)

Kertas ini mengandungi **LAPAN (8)** halaman bercetak.
Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)
Dokumen sokongan yang disertakan : Tiada

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 questions. Answer ALL questions.

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO2
C2

(a) Describe the causes of Non-Revenue Water (NRW).

Huraikan punca-punca Air Tanpa Pulangan.

[5 marks]

[*5 markah*]

CLO2
C3

(b) With the aid of a diagram, interpret the types of sewerage system as below:

Dengan bantuan gambarajah, huraikan jenis-jenis sistem kumbahan seperti di bawah:

a) Combined system

Sistem Bergabung

b) Separate system

Sistem Berasingan

[10 marks]

[10 *markah*]

CLO2
C4

(c) By using the Manning Formula, calculate the velocity of sewer in the sewers channel, with a diameter of 200 mm. Flow depth in sewers is ¾ of the pipe and the sewer channel slope is 1:100. Given Manning coefficient, n = 0.013.

Dengan menggunakan Formula Manning, kirakan halaju kumbahan di dalam saliran yang berdiameter 200 mm. Kedalaman aliran adalah ¾ daripada kedalaman paip manakala kecerunan pembetung adalah 1:100. Diberi pembolehubah Manning, n=0.013

[10 marks]

[10 *markah*]

3. Statically Indeterminate Truss

i. Redundant Force

$$R = -\frac{\sum P\mu L / AE}{\sum \mu^2 L / AE}$$

ii. Internal Force

$$F = P + \mu R$$

4. Displacement

i. external load

$$\Delta = \sum P\mu L / AE$$

5. Influence Lines

i. $R_A = 1 - x/L$, $R_B = x/L$

ii. $V_C = -x/L$, $Vc = 1 - x/L$

iii. $M_C = bx/L$, $M_C = a\,(1 - x/L)$

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[10 marks]

[10 *markah*]

QUESTION 2 chapter 6

SOALAN 2

CLO2
C1

(a) State **FIVE (5)** types of physical characteristic of waste water. (Chapter 1)
*Nyatakan **LIMA (5)** jenis sifat fizikal air sisa.* (sense).

[5 marks]
[*5 markah*]

CLO2
C2

(b) Most of the waste water that we used will be released into the environment. Waste water that was discharge without treatment will contribute to environmental pollution. Discuss **FIVE (5)** reasons that waste water treatment should be implemented.
*Kebanyakan air sisa yang telah digunakan akan dilepaskan ke persekitaran. Air sisa yang dibuang tanpa di rawat akan menyumbang kepada pencemaran alam sekitar. Bincangkan **LIMA (5)** sebab rawatan air sisa perlu dilaksanakan*

[10 marks]
[*10 Markah*]

CLO2
C4

(c) Explain with the aid of a diagram on how the following tanks work.
Jelaskan dengan bantuan gambarajah bagaimana tangki berikut bekerja.

i) Individual septic tanks
Tangki septik individu

ii) Imhoff Tank
Tangki Imhoff

[10 Marks]
[*10 Markah*]

SECTION B : 50 MARKS

BAHAGIAN B : 50 MARKAH

Chapter 1

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) State **FIVE** (5) sources of water supply. (page 23.

*Nyatakan **LIMA** (5) sumber bekalan air.*

[5 marks]

[5 markah]

CLO1
C2

(b) Describe in details **FIVE** (5) chemical characteristics of water. page 18 / chapter 3 slide.

*Huraikan dengan terperinci **LIMA** (5) sifat kimia air.*

acidity
oxygen dissolved
Suspended and unsuspended

[10 marks]

[10 markah]

CLO1
C3

(c) Referring to Figure B1, explain **FIVE** (5) causes on how deterioration of water resources affecting human life.

*Merujuk kepada Rajah B1, terangkan **LIMA** (5) punca kemerosotan sumber bekalan air memberi kesan kepada kehidupan manusia.*

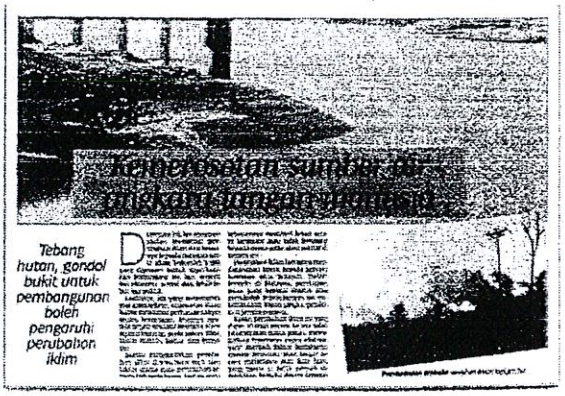

Figure B1/*Rajah B1*

[10 marks]

[10 markah]

QUESTION 2 Chapter 2

SOALAN 2

CLO1
C1

(a) Describe **FIVE (5)** classifications of water demand.

Terangkan LIMA (5) klasifikasi permintaan air.

[5 marks]

[*5 markah*]

CLO1
C2

(b) Referring to the data given below, calculate the population of Proton City for the year 2020 and 2040 by using Arithmetical Increase Method.

Merujuk kepada data yang diberikan, anggarkan unjuran penduduk bagi Proton City pada tahun 2020 dan 2040 dengan menggunakan Kaedah Pertambahan Aritmetik.

Table B2 / *Jadual B2*

Year **Tahun**	**1970**	**1980**	**1990**	2000	**2010**
Population Populasi	29000	36000	38000	42000	43000

[10 marks]

[*10 markah*]

CLO1
C3

(c) The following data obtained from Taman Seri Siput in 2013.

Data-data berikut diperolehi daripada Taman Seri Siput pada tahun 2013.

Total household	= 1400 households
Average household member	= 7 people
Per capita water consumption	= 220 liters / person / day
Population growth	= 2.7% per year
Design Factor	= 2.5
Percent NRW	= 20%
Water supply coverage	= 90%

($P_n = P_O (1 + r)^n$, $WD_n = P_n \times q \times F_1 \times F_2 + D_m$)

Jumlah isi rumah	*= 1400 isi rumah*
Purata ahli isi rumah	*= 7 orang*
Penggunaan per kapita air	*= 220 liter / orang / hari*
Pertumbuhan penduduk	*= 2.7% setiap tahun*
Faktor reka bentuk	*= 2.5*
Peratus NRW	*= 20%*
Liputan bekalan air	*= 90%*

($P_n = P_O (1 + r)^n$, $WD_n = P_n \times q \times F_1 \times F_2 + D_m$)

Calculate the water demand (WD) in 2022.

Kirakan permintaan air (WD) pada 2022.

[10 marks]

[10 markah]

QUESTION 3 chapter 3 3.

SOALAN 3

CLO1 C1

(a) State the importance of chlorine residue for water supply.

Nyatakan kepentingan ujian residual klorin untuk bekalan air.

[5 marks]

[*5 markah*]

CLO1 C2

(b) In selecting a treatment plant location, there are several consideration should be made. Site factors and layout of the plant are parts of them. Briefly describe both of them.

Dalam memilih lokasi loji rawatan, terdapat beberapa faktor yang perlu diambilkira. Antaranya adalah faktor tapak dan susun atur loji. Terangkan kedua-duanya.

[10 marks]

[*10 markah*]

CLO1 C3

(c) Interpret the following raw water treatment processes :

Huraikan proses rawatan air mentah di bawah :

i) Aeration

Pengudaraan

ii) Filtration

Penurasan

iii) Disinfections

Pembasmian kuman

iv) pH Correction

Pembetulan pH

[10 marks]

[*10 markah*]

QUESTION 4

SOALAN 4

Chapter 4

CLO1
C1

(a) State the function of balancing tank in water distribution system.

balancing reservoir.

Nyatakan fungsi tangki pengimbang dalam sistem pengagihan air.

[5 marks]

[5 markah]

CLO1
C2

(b) Water distribution method can be divided into three types. Explain briefly any **TWO (2)** types of water distribution method with the aid of a diagram.

*Kaedah pengagihan air boleh dibahagikan kepada tiga jenis. Terangkan secara ringkas **DUA (2)** jenis kaedah agihan air dengan bantuan gambarajah.*

Gravity system
Pump system
combination
- continuous
- intermittent

[10 marks]

[10 markah]

CLO1
C3

(c) i. Sketch a typical water storage tank and its components.

Lakarkan tangki simpanan air beserta komponennya.

ii. Interpret the functions of each component.

Huraikan fungsi setiap komponen.

[10 marks]

[10 markah]

SOALAN TAMAT