



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016**

COURSE NAME : ENVIRONMENTAL TECHNOLOGY
COURSE CODE : DAB 30102
PROGRAMME CODE : DAB
EXAMINATION DATE : JUNE / JULY 2016
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

QUESTION IN ENGLISH

- Q1** (a) Define the following terms:-
(i) Water Treatment
(ii) Wastewater Treatment
(iii) Air Pollution Control
(iv) Solid and Hazardous Waste
(8 marks)
- (b) Give **Two (2)** examples for each water quality parameters.
(6 marks)
- (c) The BOD of a wastewater sample is estimated to be 200 mg/L.
(i) Calculate volume of undiluted sample that should be added to a 300 mL bottle and value of sample size and dilution factor using this volume. Assume 5 mg/L BOD can be consumed in the BOD bottle.
(9 marks)
(ii) Calculate the BOD₅ of wastewater sample if DO values for the blank and diluted sample after 5 days are 9.2 and 4.2 mg/L, respectively.
(2 marks)
- Q2** (a) Explain **Three (3)** objectives of water treatment.
(6 marks)
- (b) If a 1.5 m³/s flow water treatment plant uses ten sedimentation basins with an overflow rate of 20 m³/day.m², calculate the surface area (m²) of each tank?
(5 marks)
- (c) (i) Compare between graywater and blackwater for domestic sewage.
(2 marks)
(ii) List out wastewater treatment levels.
(4 marks)

- (d) Evaluate the following primary tank design with respect to detention time, overflow rate, and weir loading. Design data are given:-

Flow = 0.150 m ³ /s	Liquid depth = 2.0 m
Length = 40.0 m (effective)	Weir length = 75.0 m
Width = 10.0 m	

(8 marks)

- Q3** (a) Define the Municipal Solid Waste.

(3 marks)

- (b) Result from composition analysis of municipal solid waste sample shows in **Table 1**. Determine

- (i) the moisture content of 100 kg of sample
- (ii) the density of 1000 kg of sample

Component	% by mass
Food	70
Paper	15
Plastics	10
Tin	5

Table 1 : Solid waste composition in sample.

(8 marks)

- (c) List out the hazardous waste classification.

(4 marks)

- (d) There are various treatment methods that available for treating hazardous wastes. Explain the following treatment for hazardous waste.

- (i) Chemical Treatment
- (ii) Biological Treatment
- (iii) Physical Treatment

(10 marks)

- Q4** (a) Air pollution is a phenomenon by which particle and gases contaminate the environment. Show how air pollutant will impact on the human health and environment. (6 marks)
- (b) Construct the steps on air pollution reduction. (7 marks)
- (c) Explain the classification of air pollution and give **Two (2)** examples for each type. (8 marks)
- (d) Propose **Two (2)** strategies to reduce global warming. (4 marks)

-END OF QUESTIONS -

SOALAN BAHASA MELAYU

- S1 (a) Takrifkan istilah berikut:-
(i) Rawatan Air
(ii) Rawatan Air Sisa
(iii) Kawalan Pencemaran Udara
(iv) Sisa Pepejal dan Berbahaya
(8 markah)
- (b) Berikan **Dua (2)** contoh bagi setiap parameter kualiti air.
(6 markah)
- (c) BOD sampel air sisa dianggarkan bernilai 200 mg / L.
(i) Kirakan jumlah isipadu sampel yang perlu dicairkan untuk ditambah ke dalam botol 300 mL dan nilai saiz sampel dan faktor pencairan menggunakan jumlah isipadu ini. Andaikan 5 mg/L BOD boleh digunakan dalam botol BOD .
(9 markah)
(ii) Kirakan BOD5 bagi sampel air sisa jika nilai DO sampel kosong dan dicairkan selepas 5 hari masing-masing adalah 9.2 dan 4.2 mg/L.
(2 markah)
- S2 (a) Terangkan **Tiga (3)** objektif rawatan air.
(6 markah)
- (b) Jika reka bentuk aliran air bagi sepuluh tangki pemendapan adalah 1.5 m³/s dan kadar limpahan adalah 20 m³/hari.m², kirakan luas permukaan (m²) bagi setiap tangki tersebut.
(5 markah)
- (c) (i) Bandingkan antara *graywater* dan *blackwater* untuk kumbahan domestik.
(2 markah)
(ii) Senaraikan tahap rawatan bagi air sisa.
(4 markah)

- (d) Menilai reka bentuk tangki utama dengan masa tahanan, kadar limpahan, dan *weir loading*. Data reka bentuk diberi:-

Kadar alir = 0.150 m ³ /s	Kedalaman = 2.0 m
Panjang = 40.0 m (berkesan)	Panjang <i>weir</i> = 75.0 m
Lebar = 10.0 m	

(8 markah)

- S3 (a) Takrifkan sisa pepejal perbandaran.

(3 markah)

- (b) Keputusan daripada analisis komposisi pepejal sampel sisa perbandaran ditunjukkan dalam **Jadual 1**. Tentukan

- (i) kandungan lembapan berdasarkan 100 kg sampel
(ii) ketumpatan berdasarkan 1000 kg sampel

Komponen	% mengikut berat
Makanan	70
Kertas	15
Plastik	10
Tin	5

Jadual 1 : Komposisi sisa pepejal dalam sampel.

(8 markah)

- (c) Berikan klasifikasi sisa berbahaya.

(4 markah)

- (d) Terdapat pelbagai kaedah rawatan yang boleh didapati untuk merawat sisa berbahaya. Terangkan rawatan berikut bagi bahan buangan berbahaya.

- (i) Rawatan Kimia
(ii) Rawatan Biologi
(iii) Rawatan Fizikal

(10 markah)

- S4** (a) Pencemaran udara adalah satu fenomena di mana zarah dan gas yang mencemarkan persekitaran. Tunjukkan bagaimana pencemar udara boleh memberi kesan kepada kesihatan manusia dan alam sekitar. (6 markah)
- (b) Bina langkah-langkah pengurangan pencemaran udara. (7 markah)
- (c) Terangkan klasifikasi pencemaran udara dan berikan **Dua (2)** contoh untuk setiap jenis. (8 markah)
- (d) Cadangkan **Dua (2)** strategi untuk mengurangkan pemanasan global. (4 markah)

-SOALAN TAMAT -

FINAL EXAMINATION

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FORMULA AND TABLE**Q1 / S1**

$$\text{Sample size (\%)} = \frac{\text{volume of undiluted sample}}{\text{volume of diluted sample}} \times 100$$

$$\text{Dilution factor (P)} = \frac{\text{volume of wastewater sample}}{\text{volume of wastewater plus dilution water}}$$

$$BOD_t = \frac{DO_{b,t} - DO_{s,t}}{P}$$

Q2 / S2

$$\text{Surface area} = \frac{Q}{\text{SOR}}$$

$$\text{Detention time (t}_0\text{)} = \frac{V}{Q}$$

$$\text{Weir loading (WL)} = \frac{V}{\text{Length}}$$

Q3 / S3

Component	Moisture Content (% of weight)	Typical Density (kg/m ³)
Food	70	290
Paper	5	70
Plastics	2	60
Tin	2	200

$$MC = \frac{(w - d)}{w} \times 100\%$$