UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014

COURSE NAME	:	SUSTAINABLE DRAINAGE TECHNOLOGY
COURSE CODE	:	DAB 21002
PROGRAMME	:	1 DAB
EXAMINATION DATE	:	DECEMBER 2013 / JANUARY 2014
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **4 (FOUR)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) List **five (5)** safety rules of laboratory test.

(10 marks)

(b) Sketch and explain briefly about titrimetric analysis.

(10 marks)

(c) Taman Desa Treatment Plant has a plant capacity of 80 MLD with exposed water surface is 12 m^2 and design flow is 55 L/s. Determine the required water surface of a cascade used for aeration.

(5 marks)

Q2 (a) Describe the preservation method as below:

i) Organic chemical reagent
ii) Alkaline iron
iii) Phosphorus
iv) Inorganic chemical reagent
v) Argentum and concerntrated acid

(15 marks)

(b) Refer **Table Q2(b)**, calculate upper control limit and lower control limit by using Range Chart Method.

(10 marks)

Q3 (a) Sketch and label **five (5)** apparatus for water quality experiment.

(10 marks)

(b) Explain briefly about sample quality control.

(5 marks)

(c) Refer **Table Q3(c)**, determine the moisture content and density of 100 kg solid waste sample.

(10 marks)

Q4 (a) List **five (5)** physical parameters.

(5 marks)

(b) Describe about water hardness in chemical parameters.

(10 marks)

(c) A wastewater sample inserted to BOD bottle is 70 mL. The BOD bottle will be filled up with dilution water about 230 mL. DO concerntration for day 1 is 9 mg/L and day 5 is 6 mg/L. Calculate the BOD_5.

(5 marks)

(d) A waste being discharged into a river that has a temperature of 18°C. What fraction of the maximum oxygen consumption has occured in four days if BOD rate constant is 0.115 day-1. (θ = 1.135 for water temperature 4°C - 20°C and θ = 1.056 for water temperature 20°C - 30°C).

(5 marks)

Q5 (a) Sketch and label the monark water distillation.

(10 marks)

(b) Explain briefly about :

i) Total solids
ii) Dissolved solids
iii) Suspended solids

(6 marks)

(c) Determine the area required for a new landfill site with a projected life of 10 years for a population of 100000 generating 20 kg per household per week. Density of waste is 400 kg/m^3 and 4 persons per household. The maximum height of the landfill is 10m.

(9 marks)

Q6 (a) What is analytical technique?

(10 marks)

(b) Sketch the typical analytical flowchart.

(5 marks)

(c) Refer **Table Q6(c),** determine the lapse rate temperature and explain briefly the atmosphere condition.

(5 marks)

(d) An effective stack height is 120 m. The wind speed is 6 m/s at 20 m. Calculate the wind speed at the effective stack height if the p values for urban regime is 0.15.

(5 marks)

- END OF QUESTION –

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TABLE Q2(b) : Slip-ring diameter

Sample	1	2	3	4	5
1	4.97	5.06	5.06	4.96	5.03
2	5.05	5.01	5.10	4.96	4.99
3	5.09	5.10	5.00	4.99	5.08
4	5.14	5.10	4.99	5.08	5.09
5	5.01	4.98	5.08	5.07	4.99

TABLE Q3(c) : Solid waste composition

Component	Mass (%)	Moisture Content (%)	Typical density (kg/m^3)
Food	30	75	300
Paper	40	10	100
Glass	10	7	200
Plastics	20	7	50

TABLE Q6(c) : Ambient temperature

Height (m)	Temperature (°C)
20	6.1
220	2.1