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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014**

COURSE NAME : ENVIRONMENTAL TECHNOLOGY
COURSE CODE : DAK 10903
PROGRAMME : 1 DAK
EXAMINATION DATE : DECEMBER 2013/JANUARY 2014
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FIVE (5)**
QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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- Q1** (a) China is an example of a heavily industrialized country but lack air pollution control.
- (i) Define air pollution. (3 marks)
 - (ii) State two (2) from three sources of air pollution. (2 marks)
- (b) The two most known air pollution disaster were great smog in London (1952) and killer fogs in Donora (1948).
- (i) Discuss how one of the disaster above occurred. (4 marks)
 - (ii) Explain air inversion phenomenon using point form. (2 marks)
 - (iii) Show two (2) similarities of both air pollution disaster. (4 marks)
- (c) Air pollution sampling can be done using human sampling, particle sampling and gas sampling. Illustrate human respiratory system by all their inner compartments. (5 marks)

- Q2** (a) Department of Environment (DOE) and WWF Malaysia are examples of organization which act as a Pollution Control Board (PCB) in Malaysia.
- (i) Determine in which year the DOE is fully established under Kementerian Sumber Asli & Alam Sekitar. (2 marks)
- (ii) State two (2) primary functions of DOE. (4 marks)
- (b) Based on figure **Q2(b)**, discuss the experiment steps to determine:
- (i) Total suspended solids (TSS). (4 marks)
- (ii) Volatile suspended solids (VSS). (4 marks)
- (c) Define electrical conductivity in wastewater sampling method. (2 marks)
- (d) A wastewater treatment plant consists of physical treatment and chemical treatment. Illustrate all processes involved in a chemical treatment using block and arrow diagram. (4 marks)
- Q3** (a) Waste collection is the contact point between waste generators and the Solid Waste Management (SWM).
- (i) Suggest any two (2) sources of waste. (2 marks)
- (ii) Determine two (2) collection systems in SWM. (2 marks)
- (iii) Discuss three (3) differences between both collection systems. (6 marks)
- (b) Demonstrate on how reusing waste can reduce its environmental impact. (4 marks)

- (c) Construct a simple diagram to show:
- (i) Aerobic processing of a compost using forced aeration. (3 marks)
 - (ii) Each steps involved in recycling of plastics. (3 marks)
- Q4** (a) (i) Determine three (3) metabolic functions in biological treatment. (3 marks)
- (ii) Explain one of the metabolic functions above. (3 marks)
- (b) Assume an organic matter is $C_6H_{12}O_6$ (glucose) and a new cell is $C_5H_7NO_2$. Thus the aerobic heterotropic reaction is:
- $$C_6H_{12}O_6 + O_2 + NH_3 \rightarrow C_5H_7NO_2 + CO_2 + H_2O$$
- (Relative atomic mass: C=12, H=1, O=16, N=14)
- (i) Balance the reaction above. (3 marks)
 - (ii) Calculate the biomass yield, Y. (3 marks)
 - (iii) Calculate the COD of glucose. (4 marks)
- (c) Outline two (2) differences between biological nitrification and biological denitrification process using a table. (4 marks)
- Q5** (a) To ensure an industry meets environmental standards, Environmental Management System (EMS) must be adopted and established.
- (i) Suggest two (2) reasons of the need to practise EMS. (2 marks)
 - (ii) Describe the benefits of practising EMS. (2 marks)

- (b) (i) Construct two (2) pictures to explain what “aspect” and “aspect and impact” mean. (3 marks)
- (ii) Discuss two (2) market benefits of ISO 14001. (4 marks)
- (iii) Discuss two (2) cost benefits of ISO 14001. (4 marks)
- (c) (i) Illustrate all five (5) elements of ISO 14001 using a flow diagram. (3 marks)
- (ii) Analyze one impact if management review of ISO 14001 is not done properly. (2 marks)
- Q6** (a) List two (2) of selected air pollutants associated with human health issues. (4 marks)
- (b) Discuss the term:
- (i) Bring collection system. (3 marks)
- (ii) Kerbside collection system. (3 marks)
- (c) Choose the waste collection systems associated with statement below:
- (i) Each house have their own dustbin placed outside their home.
- (ii) A person transfer a garbage inside his home to a dustbin outside his home.
- (iii) A housewife living in an apartment complained about smelly water leaked from waste pickup lorry.
- (iv) A father send his trash to a waste collection centre on the way to his workplace.
- (v) A worker sorting waste in a waste collection company. (10 marks)

- Q7** (a) A water sample is collected from an activated sludge process of municipal wastewater treatment. The relevant information is as follow:

Weight of filter and dish = 0.0896g
Weight of dish with water sample = 53.625g
Weight of filter and dish+residue = 0.1032g
Weight of dry solids in dish = 53.649g
Volume of sample filtered = 100mL
Volume of sample dried = 50mL

Interpret the data to determine:

- (i) The concentration of total solids in water sample.
 - (ii) The concentration of suspended solids.
 - (iii) The concentration of dissolved solids. (7 marks)
- (b) Outline three examples of anthropogenic sources of air pollution. (3 marks)
- (c) Choose the types of physical or chemical water treatment associated with statement below
- (i) Floating object such as sticks, tyres, napkins are removed.
 - (ii) Grit consists of small but hard particle in wastewater
 - (iii) Shredded solids is allowed to remains in water.
 - (iv) Floc is a bigger solid formed by combination of fine particles.
 - (v) Alkali water will be treated with acidic chemicals. (10 marks)

- END OF QUESTION -

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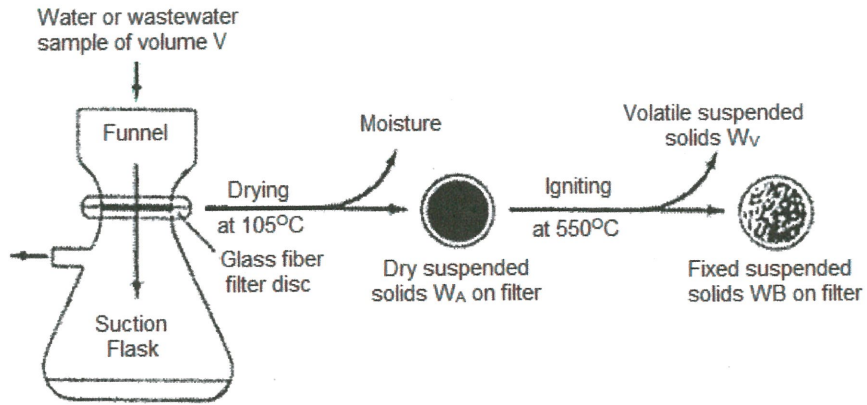


FIGURE Q2(b)