



UNIVERSITI SAINS MALAYSIA

1st. Semester Examination
2000/2001 Academic Session

SEPTEMBER / OCTOBER 2000

EAP213/3 – Water Supply Engineering and Environmental Impact Assessment

Time : [3 hours]

Instruction to candidates:-

1. This paper consists of **SEVEN (7)** questions. Answer **FIVE (5)** questions only.
2. Answers **MUST BE** written in Bahasa Malaysia.

1. (a) Explain how the EIA report is given processed and approved by the authority. (5 marks)
- (b) Give **THREE** (3) reasons why the EIA report fail to obtain approval. (3 marks)
- (c) List out and explain briefly the items that must be written in a detailed EIA report. (12 marks)
2. (a) Name the legislation or Act that mentioned the need for EIA and list down **FIVE** (5) activities that requires a detailed EIA report. (5 marks)
- (b) The MATRIX Method is the most popular method used in EIA. Explain briefly its use. (5 marks)
- (c) You are the head of an environmental consultant firm. A contractor firm, Syarikat Mercu Bina Sdn. Bhd. Has appointed you to do the Eia of the project that intends to builds two blocks of 20 stories condominium at a hilly site. Explain how you would carry out the baseline study of the project. This means that you will have to provide information, get relevant data and explain why such data are required for your report. (10 marks)
- 3 A preliminary EIA report is required to convert 300 acreas of ex-mining area into a housing estate.
 - (a) Name the **TWO** (2) elements in an EIA report. (3 marks)
 - (b) Identify and explain **THREE** (3) effects that may be caused by this project to the environment during rainy seasons at the (i) site clearing and (ii) construction stages. (6 marks)
 - (c) Propose at least **TWO** (2) mitigation steps for each effect that has been identified in (b) during the rainy seasons. (6 marks)
 - (d) Give the importance of carrying out EMP for a project. (5 marks)

4. (a) Residents of a community which consist of low-income families have received news that a hazardous waste landfill may be located near the edge of their village. You are working as a consultant in an NGO firm that is very sensitive to environmental issues. What advice would you offer to these residents about this project?
(10 marks)
- (b) Explain briefly on the gravity water distribution system. Sketch the appropriate diagram to help you in your explanation.
(4 marks)
- (c) A service reservoir at an elevation 200m above datum is connected with a pipeline to supply areas or settlements. The distance from the reservoir to the first area is 800m whereas the distance from the first to the second areas has a population of 3000 and 3500 with an elevation of 165m and 140m respectively. The water consumption is at 230 liter per capita per day. Using a pipe diameter of 150mm and assume Hazen-William coefficient $C = 100$, calculate the head losses from the reservoir to first and second areas.
(6 marks)
5. (a) With the aid of a sketch diagram, explain on the important components in the hydrological cycle.
(5 marks)
- (b) There are many ways to construct a raw water intake. With the aid of appropriate diagrams, discuss two methods that are normally used for the abstraction of raw water from a river.
(5 marks)
- (c) Table 1 shows population data of a particular area in Malaysia. The population figure for 1961 is lost from the data bank. However, the record of population estimation for the year 2021 using an arithmetic method indicates that the population will be 30,666. The calculation was made based on the latest population for the year 1991. Based on the above information, calculate the population in 1961 and the population in 2021 using geometric method and declining rate of increase method.

Table 1

| Year | 1961 | 1971 | 1981 | 1991 |
|-------------------|------|--------|--------|--------|
| No. of population | ? | 20,120 | 22,950 | 25,600 |

(10 marks)

6. (a) Discuss briefly on the factors that influence on the variation of water demand that occurs from time to time.
(6 marks)
- (b) Discuss in detail on the following physical characteristics of water quality:-
(i) Conductivity
(ii) Turbidity
(6 marks)
- (c) A water treatment plant with a capacity of 6MLD has 3 working shifts. For each shift 50kg of alum is used by having an alum solution of 10% strength. A jar test in the laboratory indicates that an optimum alum dosage is made based on 20ml alum solution mixed with 1500ml raw water. Calculate the weight of alum initially used to make an alum solution of 1000ml and calculate the volume of the container required to prepare the alum solution for one working shift.
(8 marks)
7. (a) Explain briefly on the inclined plate settler. Sketch the appropriate diagram to help you in the explanation.
(4 marks)
- (b) Raw water may not possibly free from the presence of micro-organisms. Their presence may cause infection on the consumers. Discuss briefly on the following micro-organisms and their effects on drinking water:
(i) virus
(ii) protozoa
(6 marks)
- (c) A mechanical rapid mixing tank with a flow rate of 50.2 litre per second has a retention time of 1.5 minutes. Paddles of 0.5m diameter with 4 blades, each having a dimension of 0.13m width and 0.5m height are being proposed. The diameter of paddles is measured between the tips of the blades. Calculate the volume of rapid mixer, input power and absolute speed of the blade. Given that the velocity gradient is 700S^{-1} and the dynamic viscosity at 15°C is $1.145 \times 10^{-3}\text{Ns/m}^2$. Drag coefficient for the blade is 1.8 and the density water is 1000kg/m^3 .
(10 marks)