

1st. Semester Examination 2000/2001 Academic Session

SEPTEMBER / OCTOBER 2000

EAP213/3 - Water Supply Engineering and Environmental Impact Assessment

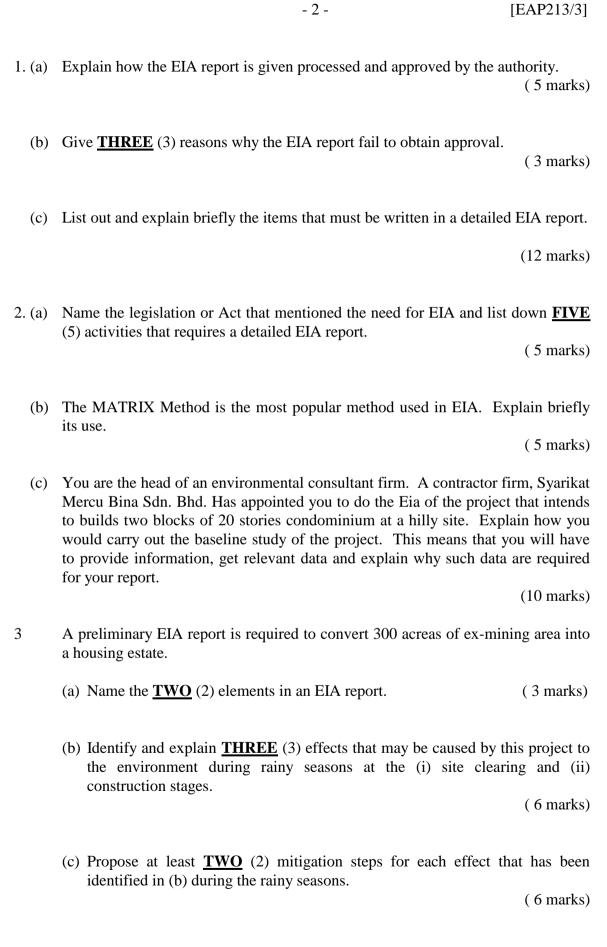
Time: [3 hours]

Instruction to candidates:-

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

(5 marks)

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(d) Give the importance of carrying out EMP for a project.

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 explaination.

(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 arithmatic 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 explaination.

(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 x 10⁻³Ns/m². Drag coefficient for the blade is 1.8 and the density water is 1000kg/m³.

(10 marks)