
UNIVERSITI SAINS MALAYSIA

1st Semester Examination
2010/2011 Academic Session

November 2010

EAP 584/4 – Environmental Impact Assessment (EIA)

Duration : 3 hours

Please check that this examination paper consists of **FOUR (4)** printed pages before you begin the examination.

[Instructions: This paper contains **SEVEN (7)** questions. Answer **FIVE (5)** questions only.

You must answer the questions in English.

All question **MUST BE** answered on a new sheet.

1. Discuss two from the list below:-
 - i. Air Pollution Impact Assessment
 - ii. Social Impact Assessment
 - iii. Landscape and Visual Impact Assessment
 - iv. Traffic Impact Assessment

[20 marks]

2. List and explain all the projects that need Environmental Impact Assessment (EIA). The thresholds should be given including sizes and quantum.

[20 marks]

3. An environmental consulting company is seeking your advice to carry out environmental management plan (EMP) for monitoring strategy of expansion of a port terminal involving more than 50% of its capacity. Describe the environmental monitoring strategy that you will propose along with the parameters and programs.

[20 marks]

4. Discuss sustainable constructions practices in relation to choices of materials and their mining to reduce environmental impacts. Use examples to assist your discussions.

[20 marks]

5. Describe the logical flow in implementation of Environmental Impact Assessments and use diagram to enhance your descriptions.

[20 marks]

6. Write a framework for design and implementation of sustainable building projects. Explain the source of concepts that you have chosen to ensure minimum impact of the projects during all development stages. You have to include all the stages involved, anticipated impacts and their remedies.

[20 marks]

7. a) A small factory discharges a chemical into a uniform river at the location $x = 0$ m. The following partial differential equation is often used to describe the spatial-temporal distribution of this chemical in the uniform river. Give the meaning and units for each term used in the form of a table.

$$\frac{\partial c}{\partial t} = -u \frac{\partial c}{\partial x} + E \frac{\partial^2 c}{\partial x^2} - kc + W$$

Sketch the concentration curves $c(x, t_i)$ for $x \in (-\infty, \infty)$ at three increasing time step t_1 , t_2 and t_3 in the same figure to show the time sequence of concentration changes.

[5 marks]

- b) Suppose that the cross sectional area of a uniform river is $A \text{ m}^2$, and flow $Q = Au \text{ m}^3/\text{s}$, A and Q are constant. The complete solution for the steady state concentration distribution $c(x)$ for $x \in (-\infty, \infty)$ is given by,

$$c(x) = \begin{cases} c_0 e^{m_1 x}, & x \leq 0 \\ c_0 e^{m_2 x}, & x \geq 0 \end{cases}$$

$$\text{Where } m_1 = \frac{u}{2E}(1 + \alpha), m_2 = \frac{u}{2E}(1 - \alpha), \alpha = \sqrt{1 + \frac{4kE}{u^2}}, c_0 = \frac{W}{Q\alpha}.$$

Assume that the river is described by $E = 0.0 \text{ m}^2/\text{s}$, $u = 0.1 \text{ m/s}$, $A = 10 \text{ m}^2$, $Q = 1.0 \text{ m}^3/\text{s}$. The chemical is discharged into the river at the rate $W = 0.2 \text{ kgs}^{-1}$ at the location $x = 0$ m. The chemical decays at the rate of $k = 10^{-4} \text{ s}^{-1}$. Find and sketch the steady state concentration $c(x)$ for $x \in (-\infty, \infty)$.

(10 marks]

- (c) Solve the problem given in (b) above by numerical methods using finite segment with 3 segments, each of 1000 m. The chemical is discharged into segment 1, with segments 2 and 3 as the two downstream segments. Assume that the boundary conditions are 0.0 kg/m^3 at segments 0 and 4. Find and sketch this solution and the solution obtained in (b) above in the same diagram. Discuss the accuracy.

[5 marks]

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