Indian Institute of Space Science and Technology
Thiruvananthapuram

B. Tech.
Fifth Semester -2016 Admissions
CH 311 – Environmental Science and Engineering

Quiz I
9.00 AM, August 28, 2018

Time: 1-hour **Maximum marks: 30**

Each question carries 5 marks

1. Write a note on phosphorous cycle (with the help of a scheme). What is eutrophication? Explain.
2. Define sustainable development. How is creation of buffer zone and watershed management practices are being useful in sustainable development.
3. Write a note on Soil formation **-or-** Classification of soils in India
4. Discuss (a) White revolution in India and (b) Biodiversity in Western Ghats
5. What are the causes of 'Global warming'? Explain.
6. *'Equitable distribution of resources is a step towards sustainable development'* Suggest a protocol (practice) that can be used in our IIST campus (suggest something unique and feasible, to get full credit).

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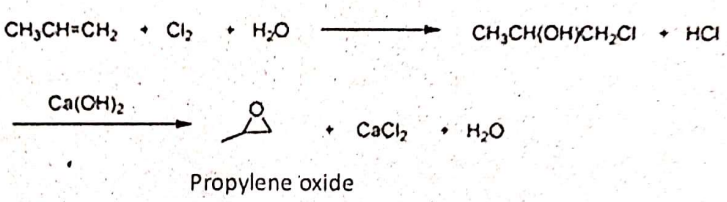
Quiz II

9.00 AM, October 09, 2018

Time: 1-hour **Maximum marks: 30**

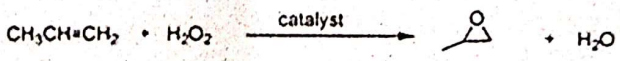
1. Define green chemistry. (2)
2. Use of enzyme help us to follow green chemistry, How? Explain with an example. (3)
3. Two chemical processes that lead to propylene oxide is shown below. If an industry wants to follow green chemistry principle, which reaction is desirable? Why? Explain. (*atom economy should be calculated for the full credit*) (5)

1. Chlorohydrin process



Propylene oxide

2. Catalytic oxidation with H_2O_2



Propylene oxide

Atomic weight of C = 12, H= 1, O=16, Ca = 40, Cl =35

4. Discuss any three different types of reverse osmosis (RO) membrane (eg: tubular). (3)
5. The performance characteristic of RO systems is normally defined by various parameters. Explain (i) permeate flux, (ii) salt rejection and (ii) recovery rate. (6)
6. What is the specific advantage of double pass RO system over single pass RO system? (2)
7. Another term of E-waste is WEEE. Expand the acronym WEEE. (1)
8. What are the different categories (classifications) of E-waste? (4)
9. Write a note of e-waste disposal methods. (4)

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End Semester Examinations

1.30- 4.30 pm, November 21, 2018

Time: 3-hour **Maximum marks: 100**

Answer any 10 questions

4. (a) What are the factors affecting aquatic life? (3)

   (b) Describe oxygen cycle. Write at least three pathways leads to oxygen gain and oxygen loss. (5)

   (c) Give the primary classification of natural resources with examples. (2)

2. Describe steps towards sustainable developments. Give examples wherever possible. (10)

3. (a) Write a note on mineral resources in India and the environmental effects of mining. (6)

   (b) Write the classifications of soils in India (4)

4. (a) What are the component structures of a river valley project? (5)

   (b) What are the objectives of Kyoto protocol? (5)

5. (a) What is a greenhouse gas? Give two examples. (3)

   (b) Explain the **causes** and **effects** of global warming. (7)

6. 'Environmentally Sound E-Waste Treatment Technologies' involve three tier (three level) treatment system. Explain. (use scheme, examples wherever possible) (10)

7. 'Green chemistry' protocol is based on some principles. Explain the **first five** principles of 'green chemistry' with proper examples. (10)

8. (a) What is the use of 'multimedia filter' (MMF) in a RO system? Explain its function. (5)

   (b) Draw the schematic showing single stage RO, two stage RO and double pass RO system. (Show the *feed water*, *permeate water* and *concentrate* in the scheme). (5)

9. (a) Describe the detection of air pollutants by absorptions of infrared radiation. (5)

   (b) Write a note on 'Wet scrubbers' used for air pollution control (including its advantages and disadvantages). (5)

10. (a) What are the causes of soil pollution? Explain (5)

    (b) Describe the phytoremediation method of soil pollution removal. (5)

11. (a) Write a note on important water quality parameters (eg: turbidity) and its effects. (5)

    (b) Explain the primary, secondary and tertiary steps involved in sewage water treatment. (5)