

Uva Wellassa University, Sri Lanka
End Semester Examination – September 2011
SCT 309-2 Green Techniques for Industry
Time: Two (02) hours



Total six (06) questions.
Answer all the questions.

Use the following case study to answer Q 1 and Q2

1) "Fried Delight" is a potato chip manufacturing plant which buys potatoes from the market for their day to day operations. The company buys 500 kgs of potatoes everyday. The potatoes are cleaned with water and then sorted to remove spoilt ones. 2% of the weight is removed as mud on potatoes and another 2% of potatoes are removed as spoilt. The potato chip manufacturing process is as follows.

- i) The sorted potatoes are then cleaned to remove peel using the peeling machine
- ii) The peeled potatoes are again washed. The weight of the peel is about 25 kgs.
- iii) The remaining clean potatoes are then sliced. During the slicing process about 11 kgs are removed as edges and 4 kgs are spilled on the ground.
- iv) The slices are then put inside a salt water vessel for 10 minutes.
- v) The salted slices are then strained using a net.
- vi) The slices are then fried using vegetable oil on a LP gas stove.
- vii) The company is using open pan without a lid and as a result oil, potatoes are spilled while loading and unloading. The amount of potato slices spilled during loading is 7.2 kgs and amount of fried potatoes spilled while unloading was 6.8 kgs.
- viii) For a day the company uses 60 liters of oil and 25 liters are removed as waste oil. The industry records show that about 30% of the oil is evaporated in a open pan frying process. 01 liter of oil weighs 0.95 kgs
- ix) The weight of fried potatoes for a day is 438 kgs.

- Q1) i) Draw a Process Flow Diagram for the above process. (50 marks)
- ii) Identify all the inputs and waste streams on the process flow diagram. (50 marks)
- Q2) i) On a block diagram show all the potato and oil inputs and wastes. (30 marks)
- ii) Do a material balance for the potatoes and calculate the unaccounted loss. (50 marks)
- iii) What is the percentage of the unaccounted loss from the input potato weight? (20 marks)
- Q3) i) What is an environmental life cycle of a product. (20 marks)
- ii) Draw the life cycle of an A4 photocopy paper. (40 marks)
- iii) Write a list of resulting environmental impacts from making of photocopy paper at different stages of the life cycle. (40 marks)
- Q4) i) Cleaner Production is a proactive environmental management approach to reduce generation of waste in any industrial process. Explain the above in your own words (25 marks)
- ii) Cleaner Production Assessment methodology is said to have six stages and 18 tasks. Write down the six phases of the standard Cleaner Production assessment methodology with tasks under each phase. (50 marks)

iii) What are the economic, environmental and social benefits of Cleaner Production to an industry.

(25 marks)

Q5) i) Human Population living on the earth is over consuming all the resources leading to Resource depletion and environmental degradation. Do you agree to the above statement? Explain your answer giving a suitable example.

(30 marks)

ii) Suggest two concepts used in measuring resource over consumption in the world and explain the concepts and applications in your own words.

(40 marks)

iii) Recommend three strategies to reduce resource consumption by human population.

(30 marks)

Q6) Write Short notes on any three (03) of the following. (33 marks each)

- i) Eco Design
- ii) Climate change
- iii) Earth Carrying capacity
- iv) Brain Storming
- v) Cleaner Production techniques