Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree program
1st Semester Examination – March/April 2013

Uva Wellassa University

SCT 444-1 Glass Technology

Instructions to candidates
Number of questions: Five (05)
Answer Four (04) questions only
Time allocation: One (01) hour
Total marks allocated: 100

1. a. State the *classic definition* of glass. What are the *two prime assets* of glass?

   b. Make a rough sketch to show the variation of *specific volume* with *temperature* for a melt that forms a glass on cooling.

   c. Based on the above sketch, show how to determine the *fictive glass transition temperature*.

(25 Marks)

2. a. According to the first rule of Zachariasen, what is the maximum number of silicon atoms to which an oxygen atom can link in the SiO_2 glass structure?

   b. In crystalline oxides the polyhedra should share both corners and edges. What should the polyhedra share in oxide glasses?

   c. With the help of a rough sketch, explain the *Si–O–Si bridge-rupture mechanism.*

(25 Marks)

3. a. To which type of glass does the commercial Pyrex™ belong?

   b. Name the four *major ingredient types* used in container glass manufacturing. What are the *main oxides* used for these major ingredients in the local glass industry?

   c. Explain the main function of *soda* in glass and list two main disadvantages of it.

(25 Marks)

4. a. Name the three *minor ingredient types* used in container glass manufacturing.

   b. What *metal oxide* is added to give *green color* to container glass?

   c. Explain the term *de-colorization of glass*. Describe the *decolorizing process* used in flint glass.

(25 Marks)

5. a. What are the three main parts of a *glass melting furnace*?

   b. Name the three main types of *forming processes* used to make glass containers.

   c. Briefly explain the function of the *Individual Section (I.S.) Machine*.

(25 Marks)