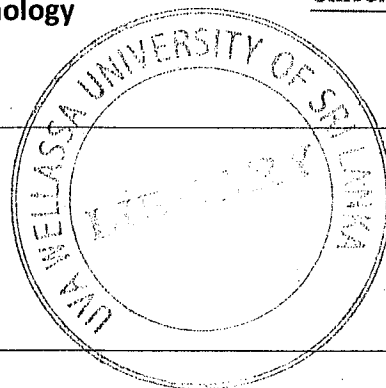


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – December/ January 2018
SCT 355-1 Glass Science & Technology



Instructions to candidates

Duration: One (01) hour

Number of questions: Three (03)

Mark allocation: 80

Answer all questions

1.
 - i. What are the three criteria we use when describe glass structure? Briefly describe each case. (6 marks)
 - ii. Write down main structural changes between glass and ceramics. Include different atomic ordering in your answer. (6 marks)
 - iii. Draw a schematic diagram of the temperature dependence of the specific volume of a liquid as it forms a crystalline and a glass phase. Label the important features on it. (6 marks)
 - iv. What are the structural information you obtain from Radial distribution function, $J(r)$ of a glass structure? Use a rough sketch of the function for your answer. (7 marks)

2.
 - i. Explain briefly why vitreous silica glass is used in optical devices? (4 marks)
 - ii. Addition of soda and lime into silica matrix will change most of the physical properties of pure silica glass. What are the these properties and why they change? (7 marks)
 - iii. Write the chemical composition of Pyrex glass. (3 marks)
 - iv. In glass-ceramic production, a mixture of TiO_2 and ZrO is added to the strating raw materials. Why do you add them? (4 marks)
 - v. Explain brifely how viscosity of glass forming melts plays a major role in glass production using an appropriate viscosity vs temperature diagram. (7 marks)

3.

i. Briefly describe the following physical properties of glasses.

- (i) Mechanical properties
- (ii) Optical properties

(10 marks)

ii. What are the best glasses for the following products?

- (i) Glass containers (ii) Electrical insulating tapes (iii) Telescope mirrors
- (iv) High thermal resistance glass plate (v) Cooktops

(5 marks)

iii. How do you add different colors into glasses?

(5 marks)

iv. Write classical forming methods of the following commercial glass products.

- (i) Glass containers (ii) Flat glasses (iii) Glass fibers (iv) Lamp glasses
- (v) Glass spheres

(10 marks)

