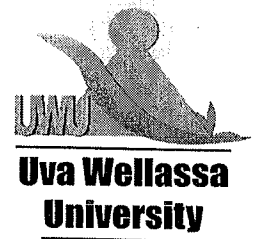


Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Programme
1st Semester Examination – March/April 2013



SCT 446-2 Composites and Bio Materials



Instructions to candidates

Total number of questions = Four (04)

Answer all the questions

Time allocation: Two (02) hours

Total marks allocated: 100

1.

- a. Explain the term *dispersed phase geometry* in the composite terminology.
- b. What is the main mechanism involved in improving the strength of *dispersion strengthened composites*?
- c. Calculate the *modulus of elasticity* of a cermet prepared with 1:1 volume ratio of WC and Co phases. Note that the moduli of elasticity of Co and WC are 201 GPa and 847 GPa, respectively.
- d. Give two main reasons for steel to be a good reinforcement material in portland cement concrete.
- e. Distinguish the main difference between the two major categories of *structural composites* with the help of rough sketches.

(25 marks)

2.

- a. Define the terms *specific strength* and *specific modulus* of fibers.
- b. List the three main groups of fibers.
- c. What are fiber glass?
- d. Explain typical *stress-strain behavior for an aligned fiber-reinforced composite* that is exposed to a uni-axial stress applied in the direction of alignment.
- e. Name two main factors on which the mechanical characteristics of a fiber-reinforced composite depends on.

(25 marks)

3.

a. Give five types of ceramics used in biomedical applications

(05 marks)

b. Describe how Ceramic-on-Ceramic total hip arthroplasty could be a better choice than Metal- on- Metal total hip arthroplasty.

(05 marks)

c. Discuss the merits and demerits of Ceramic Biomaterials (Bioceramics).

(15 marks)

4. Briefly discuss the following.

a. Advantages of biodegradable implants.

(12.5 marks)

b. Biocompatible material features.

(12.5 marks)