Department of Forest Products Technology

PUU-28.4060 ADVANCED BIOCOMPOSITES

Examination date 15th May 2008

1. Explain briefly the following: (8 marks)
   i. Young's modulus
   ii. Yield point
   iii. Toughness
   iv. Wood Plastic Composite
   v. Extrusion
   vi. Aspect ratio
   vii. Resin transfer moulding
   viii. Interfacial shear stress

2. Answer the following: (12 marks)
   i. What is a composite material?
   ii. Explain what are meant by the terms "load sharing" and "stress transfer"
   iii. What are meant by the terms "interface" and "interphase". Explain how they differ
   iv. Define "fibre volume fraction" and describe briefly how this might affect the properties of a composite.

3. Explain the toughening mechanisms in fibre reinforced composites (8 marks)

4. Answer both parts: (10 marks)
   i. Describe (using diagrams as necessary) how the aspect ratio of fibrous reinforcement influences the stress transfer process in composite materials.
   ii. How would you expect the mechanical properties of biocomposite materials reinforced with a) wood 'flour' and b) flax fibres to differ?

5. Write an essay on **one** of the following: (12 marks)
   i. Production processes for Woodfibre Plastic Composites (WPCs)
   ii. Factors influencing the mechanical properties of wood (or other natural fibre) reinforced composites
   iii. Matrix polymers for biocomposite materials