Register Number……

B.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2010

Sixth Semester

TEXTILE TECHNOLOGY

U07TTE04: Textile Composites

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. The role of fibre and matrix in a composite is ---

   a) to reduce the tenacity of the composite

   b) to give linear configuration to the structural material

   c) to carry and transfer the load between matrix and reinforcement

   d) to withstand the environmental conditions.

2. Interface is ----

   a) The boundary between fibre and matrix. b) Entire surface of matrix component

   c) Entire surface of fibre component d) Total surface of fibre and matrix

3. How do you select a fibre for manufacture of composites?

   a) Based on type, amount and orientation, thermal conductivities and cost.

   b) Based on the availability and ease of processibility.

   c) Based on aesthetic properties

   d) Based on tactile properties

4. Rule of mixture is

   a) $E_L = E_f Vm + E_m V_f$ b) $E_m = E_f V_f + L_m (1-V_f)$

   c) $E_m = E_f V_f + E_L (1-V_f)$ d) $E_L = E_f V_f + E_m (1-V_f)$

5. What is a whisker?

   a) It is single fibre

   b) Whiskers are very thin defect-free single crystals

   c) It is defect free amorphous material

   d) It is defect free composite material

6. The need for coupling agents in composite manufacturing is

   a) To replace matrix

   b) To replace reinforcement

   c) To improve the interfacial strength and to protect the fibre surface

   d) To improve thermal conductivity of composite

7. Select the braiding parameters that influence the performance of the composites.
   a) Braiding angle
   b) End use application
   c) Type of matrix used
   d) Braid architecture, yarn size, spacing of yarn and fibre volume fraction
8. Select appropriate weaving methods used to produce 3D woven fabric reinforcements.
   a) Biaxial weaving, triaxial weaving and multiaxial weaving.
   b) Warp knitting, braiding
   c) Braiding only
   d) Needle punched nonwoven
9. Compare the compression molding and resin transfer molding processes.
   a) RTM has a very low tooling cost, simple mold clamping requirements
   b) Easy to manufacture and higher shelf life
   c) Light weight of the composites
   d) Higher fibre volume can be achieved
10. Defects associated with the compression molded sheets include:
   a) Pinholes, craters b) Void
   c) Entanglement of reinforcement d) Improper adhesion of matrix

PART B (10 x 2 = 20 Marks)

11. How is the fibre weight fraction determined experimentally?
12. State the significance of lamination theory.
13. How does a fibre influence the properties of a composite?
14. What is critical fibre length?
15. List the advantages of thermoplastic polymer matrix.
16. State the various reasons for failure of composites.
17. Give the classification of textile performs.
18. What is non-crimp fabric?
19. Draw the schematic diagram of the bag molding process and specify different layers.
20. How do you define the flexural strength of composites?

PART C (5 x 14 = 70 Marks)

21. (a) Give the classification of laminated composites with suitable diagrams and explain the coding systems used in laminated composites.

(OR)

(b) Explain the role of fibre length in the performance of a composite.

22. (a) Calculate fibre volume fraction and density of composite laminate containing 30 %wt of E glass fibre in a polyester resin using following data:

	Fibre	Matrix
Weight (g)	0.3	0.7
Density (g/cc)	2.54	1.1

(OR)

(b) A continuous fibre reinforced composite consists of 40% of fibres having a modulus of elasticity of 69 GPa and 60% of matrix that displays the modulus of 3.4 GPa. (a) Calculate the modulus of elasticity of the composite in the longitudinal direction. (b) If the cross sectional area is 250mm^2 and a stress of 50 MPa is applied in the longitudinal direction, calculate the magnitude of the load carried by fibre and matrix phases.

23. (a) Compare the properties of carbon and aramid fibre reinforced composites.

(OR)

(b) Compare the properties of polymeric, ceramic and glass fibres. State the relative merits and demerits.

24. (a) Elaborate the mechanical properties of woven fabric based performs

(OR)

(b) Explain the properties of knitted fabric based performs

25. (a) Write short notes on

(i) pultrusion (ii) filament winding

(OR)

(b) Explain the method of measuring the compressional properties of composites.

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