

Code No: 07A81801

R07**Set No. 2**

IV B.Tech II Semester Examinations, APRIL 2011

COMPOSITE MATERIALS

Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Write a note on types of ceramic fibers. [16]
2. How can the composite materials be classified according to the matrix and reinforcements? [16]
3. Discuss how the properties of composite material are a function of the following:
 - (a) Properties of the constituent phases.
 - (b) Their relative amounts, and
 - (c) Geometry of the dispersed phases. [16]
4. Write a note on Preparation of moulding compounds and Prepregs. [16]
5. Describe the following for SiC (Whiskers) - SiN Composites:
 - (a) Properties
 - (b) Manufacture
 - (c) Applications. [6+5+5]
6. (a) What are the processing techniques for short fiber thermoset composites?
 (b) What are the four major steps typically taken in manufacturing composite materials? [8+8]
7. Write short notes on the following:
 - (a) Requisites of matrix
 - (b) Requisites of reinforcements
 - (c) Applications of composite materials
 - (d) Functions of reinforcements. [4×4=16]
8. Describe the following for Carbon-Carbon Composites:
 - (a) Properties
 - (b) Manufacture
 - (c) Applications. [6+6+4]

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R07

Set No. 4

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COMPOSITE MATERIALS

Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
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1. Discuss the pultrusion technique in detail. [16]
2. Discuss the salient features and advantages of carbon-carbon composites. [16]
3. What are Directionally Solidified Eutectics? Discuss their production, properties and applications with an example. [16]
4. What do you exactly mean by 'Composite Material'? What advantages does it possess compared to the conventional materials? [16]
5. With a neat sketch discuss the fabrication of various ceramic fibers by chemical vapor deposition (CVD) method? [16]
6. Briefly describe the following:
 - (a) Unidirectional fiber composites
 - (b) Isotropic composites
 - (c) Particulate composites. [6+4+6]
7. (a) What are the three main types of synthetic Fibers used to produce Fiber reinforced plastic composite materials?
(b) Discuss the properties and production of above composites. [9+7]
8. Discuss the preparation of the following:
 - (a) Glass fibers
 - (b) Carbon fibers
 - (c) Kevlar fibers. [4+6+6]

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R07**Set No. 1**

IV B.Tech II Semester Examinations, APRIL 2011

COMPOSITE MATERIALS

Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) How the composite materials are classified?
(b) With few examples discuss the large particle composites. [8+8]
2. What is filament winding? With a neat sketch explain the process. What are the limitations of filament winding? [16]
3. Write notes on the following:
(a) Thermoset matrices
(b) Cermets. [8+8]
4. Write short notes on the following:
(a) Aramid fibers
(b) Alumina based fibers
(c) Silicon Carbide fibers. [6+6+4]
5. Discuss the fabrication of ceramic fibers by Polymer Pyrolysis method. [16]
6. With a neat sketch discuss the pitch based carbon fiber production by Mesophase pitch process. [16]
7. Write short notes on the following:
(a) Liquid infiltration for manufacture of Metal Matrix Composites
(b) Diffusion bonding
(c) Powder Processing
(d) Deformation processing. [4+4+4+4]
8. (a) For a Fiber-reinforced composite, the efficiency of reinforcement ' η ' is dependent on fiber length ' L ' according to $\eta = (L-2x)/L$, where ' x ' represents the length of the fiber of each end that does not contribute to the load transfer. Make a plot of ' η ' versus ' L ' to $L = 40\text{mm}$, assuming that $x = 0.75\text{mm}$.
(b) What length is required for a 0.80 efficiency of reinforcement? [8+8]

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R07**Set No. 3**

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COMPOSITE MATERIALS

Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Draw an account on Polymer Matrix Composites. [16]
2. (a) Write short notes as Metal Matrix composites.
(b) Discuss in detail about the large particulate composites. [8+8]
3. With a neat sketch discuss the Slurry infiltration process of CMCs. [16]
4. (a) What are the functions of a matrix in composite materials?
(b) Why do materials and composite manufacturing processes go hand in hand? [8+8]
5. What are dispersion strengthened composites? Discuss any one method of producing these composites. Give examples and applications of dispersion strengthened alloys. [16]
6. (a) What are the four major steps in making a mold from a solid board?
(b) What are the guidelines for gate locations in closed molding operations? [8+8]
7. Write short note on the following:
 - (a) Matrix materials of carbon-carbon composites
 - (b) Fibers of carbon-carbon composites. [8+8]
8. It is desired to produce a continuous and oriented carbon fiber-reinforced epoxy having a modulus of elasticity of at least 83 GPa in the direction of fiber alignment. The maximum permissible specific gravity is 1.40. Given the following data, is such a composite possible? Why or Why Not? Assume that composite specific gravity may be determined using a relationship similar to equation of $E_u = E_n V_m + E_f V_f$.
Carbon fiber: Specific gravity: 1.80; Modulus of Elasticity (GPa) = 260
Epoxy: Specific gravity: 1.25 Modulus of Elasticity (GPa) = 2.4. [16]
