

CBCS SCHEME

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15AU653

Sixth Semester B.E. Degree Examination, June/July 2018 Composite Materials

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Define composite material. Give its classification with suitable block diagram. (08 Marks)
- b. Enumerate the properties of composites. (04 Marks)
- c. List the types of reinforcement and matrix materials with respect to composites. (04 Marks)

OR

- 2 a. Write the applications of composites for automobiles. (04 Marks)
- b. Enumerate the applications of composites in the field of air crafts, missiles and space hardware. (04 Marks)
- c. List the applications of composites in the electrical and electronics industries. (04 Marks)
- d. What are the applications of composites for marine and sports equipments? (04 Marks)

Module-2

- 3 a. Sketch and explain the hand lay-up technique/process to fabricate polymer composites. (08 Marks)
- c. Explain with a neat sketch the Vacuum bag moulding process for preparing polymer matrix composites. (08 Marks)

OR

- 4 a. Sketch and explain the filament winding process to fabricate FRP composites. (08 Marks)
- b. With a neat sketch and explain the pultrusion process for manufacturing the polymer matrix composites. (08 Marks)

Module-3

- 5 a. Sketch and explain the powder metallurgy technique/process for fabrication of metal matrix composites. (08 Marks)
- b. With a neat sketch and explain the squeeze casting technique for fabrication of metal matrix composites. (08 Marks)

OR

- 6 a. Enumerate the reinforcement and matrix materials used in the MMCS. (06 Marks)
- b. What are the properties of MMCS? (05 Marks)
- c. List the applications of MMCS. (05 Marks)

Module-4

- 7 a. Explain the influence of shape, size and distribution of reinforcement on the properties of MMCS. (08 Marks)
- b. Enumerate the physical, mechanical wear and machinability properties of MMCS. (08 Marks)

OR

- 8 a. List the types of nano materials. (04 Marks)
b. Explain the synthesis of nanomaterials using chemical vapor deposition. (06 Marks)
c. Discuss the synthesis of nano material using vapor deposition. (06 Marks)

Module-5

- 9 a. What is laminate? Describe in brief. (06 Marks)
b. Differentiate between "Lamina" and laminate. (04 Marks)
c. Find the longitudinal elastic modulus of a unidirectional glass/epoxy lamina with a 70% fiber volume fraction. Also find the ration of the load taken by the fibers to that of the composite.
Take: $E_f = 85\text{GPa}$
 $E_m = 3.4\text{GPa}$ (Young's modulus of fiber and matrix). (06 Marks)

OR

- 10 a. Mention the assumptions made in the mechanics of material approach model to determine the four elastic moduli. (06 Marks)
b. Determine the modulus of elasticity of a FRP on the fiber direction (E_1) and in the transverse direction (E_2), with proper representative sketches (use mechanics of materials approach). (10 Marks)

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