CBCS SCHEME

USN | | | | | | | | | | |

18AU642

Sixth Semester B.E. Degree Examination, June/July 2023
Composite Materials

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Clearly define a composite materials. Give the complete classification of composite materials. **(06 Marks)**

b. What are the role of a matrix and reinforcement? Explain in brief. **(08 Marks)**

c. What is laminate composites? Explain clearly different arrangements in a laminate with examples. **(06 Marks)**

OR

2 a. List the important/highlights the mechanical properties of fibrous composites. **(06 Marks)**

b. List out the applications of composites in automobile and aircrafts. **(08 Marks)**

c. Write the advantages of future potentials of composites. **(06 Marks)**

Module-2

3 a. Differentiate between open mold and closed mold technique with a simple sketch. **(06 Marks)**

b. With a neat sketch explain the basic principle of hand layup techniques. **(08 Marks)**

c. What are the different arrangements used in filament winding? List some of its applications. **(06 Marks)**

OR

4 a. With a neat sketch explain the following process :
i) Filament winding
ii) Pultrusion process. **(12 Marks)**

b. Explain Vaccum bag moulding process with a neat sketch. **(08 Marks)**

Module-3

5 a. Write short notes on the selection of base metal in MMC's. **(06 Marks)**

b. List some fiber used in MMC's and list merits and demerits of MMC's. **(06 Marks)**

c. Explain the need for MMC's. What are the advantage and limitations of MMC's? **(08 Marks)**

OR

6 a. Describe the production of MMC's by using the powder metallurgy techniques with a suitable sketch. **(10 Marks)**

b. List the desirable characteristics of powder for the powder metallurgy process. **(05 Marks)**

c. Name any five applications of powder metallurgy process. **(05 Marks)**

Module-4

7 a. Discuss the effect of slope, type, size and distributions of reinforcement on the properties of MMC's. **(08 Marks)**

b. What are nanomaterials? Why are nanomaterials important and write down classification of nanomaterials. **(07 Marks)**

c. List out the few characteristics of MMC's. **(05 Marks)**

OR

8 a. With a neat sketch explain the synthesis of nanometerials using chemical vapour depositions. **(10 Marks)**

b. Write short notes on properties of nanomteirals
   i) Optical properties
   ii) Electrical properties
   iii) Mechanical properties. **(10 Marks)**

Module-5

9 a. What is rule of mixture? Derive rule of mixture for calculating the Young's modulus of a fiber composite loaded parallel to the fibers. **(10 Marks)**

b. Write short notes on following :
   i) Micromechanics of composites
   ii) Sate and explain Hookes law. **(10 Marks)**

OR

10 a. A Glass/epoxy laming consist of a 70% fiber volume fraction to determine the
   i) Density of lamina
   ii) Mass fraction of the glass and epoxy
   iii) Volume of composite lamina if the mass of the lamina is 4 kg
   iv) Volume and glass of glass and epoxy
   Given Data : properties (specific gravity)
   Glass – $\rho_b = 2500 kg/m^2$ – Density
   Epoxy – $\rho_m = 1200\ kg/m^3$ – Density **(12 Marks)**

b. Explain in brief stress – strain relationship of anisotropic materials. **(08 Marks)**

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