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21AE642

Sixth Semester B.E. Degree Examination, June/July 2024
Composite Materials and Structures

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain about natural fibres and natural composites and make a note of their mechanical properties. **(10 Marks)**

b. Explain in brief about various structural applications of composite materials. **(10 Marks)**

OR

2 a. Differentiate between natural composites and manmade composites. **(10 Marks)**

b. Explain about role of composites in aerospace applications. **(10 Marks)**

Module-2

3 a. Explain in brief about various fibres used in composite materials as reinforcements. **(10 Marks)**

b. Explain about metal matrix composites. **(10 Marks)**

OR

4 a. Differentiate between thermoplastics and thermosetting plastics. **(10 Marks)**

b. Explain about laminate designation with neat sketches. **(10 Marks)**

Module-3

5 a. With a neat sketch, explain pultrusion technique for fabrication of polymer matrix composites. **(10 Marks)**

b. Explain about powder metallurgy process. **(10 Marks)**

OR

6 a. Explain about various casting processes. **(10 Marks)**

b. Explain about machining process for composite materials. **(10 Marks)**

Module-4

7 a. Derive expressions for E_{11}, G_{12}. **(10 Marks)**

b. Explain about following characterization of properties along with required expressions and equations:
i) Tensile properties of unidirectional lamina.
ii) Interlaminar shear properties. **(10 Marks)**

OR

8 a. Explain about Tsai-Wu quadratic interaction criterion. **(10 Marks)**

b. Explain about following NDT methods.
i) Acoustic Emissions
ii) Thermography. **(10 Marks)**

Module-5

9 a. Derive an expression for bending in specially orthotropic plate considering "all edges simply supported". **(10 Marks)**

b. Explain about moisture diffusion in composites. **(10 Marks)**

OR

10 Explain in detail about two dimensional heat conduction in composite laminates. **(20 Marks)**

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