Reg. No. : | | | | | | | | | | | | |

Question Paper Code: 1016269

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024
Sixth Semester
Aeronautical Engineering
U20AE603 – COMPOSITE MATERIALS AND STRUCTURES
(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. Define the term “composite materials”.

2. State the functions of matrices and reinforcements in composite materials.

3. Define macro mechanics.

4. What is hygrothermal effect on a lamina?

5. Define the governing differential equation for a laminate according to Classical Lamination Theory.

6. List the assumptions made in classical laminated theory.

7. Write short notes on “Braiding Process”.

8. Enumerate the different types of resins.

9. List the materials used for sandwich construction.

10. What are the primary failure modes of sandwich panels in aircraft and space structures?

PART – B (5 x 16 = 80 Marks)

11. (a) Discuss the classification and different applications of composite materials. (16)

(OR)

(b) Explain briefly the effect of voids in composites. (16)

12. (a) State the generalized Hooke's law applied for composite materials and explain. (16)

(OR)

(b) Derive the expression for stiffness matrix and compliance matrix for an angle ply lamina using generalized Hooke's law. (16)

13. (a) Derive the governing differential equation for a laminate. (16)

(OR)

(b) Explain the various types of failure analysis of a laminate. (16)

14. (a) (i) Explain with neat sketches the production of carbon fibers. (12)

(ii) What are the commercial forms of fibers? (4)

(OR)

(b) Explain with neat sketches the Non-Destructive evaluation of composite parts. (16)

15. (a) Describe the various methods of fabricating sandwich panels. Also write their merits and limitations. (16)

(OR)

(b) Describe the failure modes of sandwich panels under the following load conditions. (16)

(i) Shear
(ii) Buckling
(iii) Bending

----- xxx -----