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Total Number of Pages : 02

M.TECH

AR-19

M.TECH 1ST SEMESTER EXAMINATIONS NOV/DEC 2019
MANUFACTURING, MPCMT1010
COMPOSITE MATERIALS

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

- Mention important characteristics of composite material
- What is hybrid composite? Give one example.
- List any two inhibitors used for the Polyester resin.
- What are various types of Matrices used in FRP?
- Write the compliance matrix for plane stress.
- Write structural strain relation for laminates.
- How engineer properties of a laminate are predicted from micromechanics?
- What is meant by knitting?
- Define Roving?
- State the process filament winding.

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

2.

- Enumerate the application of composites in the field of
 - Electrical and electronics
 - recreational and sports equipment
 - aerospace industries
- Discuss the future potential of composites

3. Explain Hooke's law for a two-dimensional unidirectional lamina?

4

- what is lamination theory? Describe with a sketch of laminate stacking sequence.
- Discuss the interlaminar stress edge effects in a laminate.

5.

- Explain Dough or Bulk molding compound.
- Explain Hand layup techniques with neat sketch. List advantages and disadvantages of it compare to other Process.

6. Find the following for a 60° angle lamina of graphite /epoxy. $E_1=181\text{GPa}$, $E_2=10.3\text{GPa}$, $\gamma_{12}=0.28$, $G_{12}=7.17\text{GPa}$.



- a) Transformed compliance matrix
- b) Transformed reduced stiffness matrix
If the applied stress is $\sigma_x = 2 \text{ MPa}$, $\sigma_y = -3 \text{ MPa}$, $\sigma_{xy} = 4 \text{ MPa}$, also find
- (c) Global strains
- (d) Local strains
- (e) Local stresses

7.

- a) Briefly explain the process of centrifugal casting
- b) Explain press bag and autoclave

8.

- a) List the assumptions for plane stress condition.
- b) A unidirectional lamina which is treated under plane stress condition is subjected to pure shear. Derive the relationship for compliance and stiffness matrix in terms of engineering elastic constants of a lamina.

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