Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Introduction to Composite Materials

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. Define composite material and list out how composite material are broads classified with an example in each.   **(10 Marks)**
   b. Write a note on laminated campsite.   **(04 Marks)**
   c. List the advantages and limitations of composite material.   **(06 Marks)**

2 a. With neat sketch, explain hand layup moulding process.   **(08 Marks)**
   b. Sketch and explain the spray up moulding process for polymer based composite. What are its advantages?   **(12 Marks)**

3 a. Differentiate between pultrusion and pulforming.   **(04 Marks)**
   b. With neat sketch label and explain :
      i) Injection moduling
      ii) Blow moulding.   **(16 Marks)**

4 a. List he different types of composite joining process and explain any one process.   **(10 Marks)**
   b. List the various methods used for cutting cured composite and explain abrasive waterjet cutting.   **(10 Marks)**

PART – B

5 a. Derive an relationship for stress strain for 2 –D plane stress in an orthotropic material.
                                                                             (10 Marks)
   b. Explain macromechanical failure theories and explain any one in detail.   **(10 Marks)**

6 a. Define the term rule of mixture. Obtain the relationship for density of composite using rule of mixture.   **(10 Marks)**
   b. A glass/ epoxy lamina with 70% fibre volume fraction. Take density of fibre ρ_f = 2500 kg/m^3 and density of matrix ρ_m = 1200 kg/m^3 determine : i) density of composite ii) mass fraction of glass and epoxy and sum of mass fraction.   **(06 Marks)**
   c. Define : i) micromechanics ii) macromechanics.   **(04 Marks)**

7 a. Obtain an expression for stress and strain variation in laminate.   **(10 Marks)**
   b. Derive the expression for resultant laminate force and momentum using classical lamination theory.   **(10 Marks)**

8 a. Discuss stir casting technique of producing metal matrix campsite.   **(08 Marks)**
   b. Explain any four characteristics of reinforcement material used in MMC's.   **(08 Marks)**
   c. List out various applications of MMC's.   **(04 Marks)**

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