Name : ……………………………………………………

Roll No. : ……………………………………………………

Invigilator's Signature : ……………………………………

CS/B.Tech/CT/SEM-8/CT-801(C)/2013
2013
COMPOSITE

Time Allotted : 3 Hours   *Full Marks* : 70

*The figures in the margin indicate full marks.*

Candidates are required to give their answers in their own words
as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1.   Choose the correct alternatives for the following : 10 × 1 = 10

   i)   Composite materials are classified based on

      a)   type of matrix

      b)   size-and-shape of reinforcement

      c)   both (a) and (b)

      d)   none of these.

   ii)   Major load carrier in dispersion-strengthened composites

      a)   matrix   b)   fiber

      c)   both (a) and (b)   d)   can't define.

   iii)   Usually softer constituent of a composite is

      a)   matrix

      b)   reinforcement

      c)   both are of equal strength

      d)   can't define.

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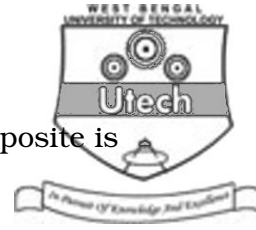
iv) Usually stronger constituent of a composite is

    a) matrix

    b) reinforcement

    c) both are of equal strength

    d) can't define.

v) Last constituent to fail in fiber reinforced composites is

    a) matrix

    b) fiber

    c) both fails at same time

    d) can't define.

vi) Size range of dispersoids used in dispersion strengthened composites

    a) $0 \cdot 01$ - $0 \cdot 1$ µm   b) $0 \cdot 01$ - $0 \cdot 1$ nm

    c) $0 \cdot 01$ - $0 \cdot 1$ mm   d) none of these.

vii) Rule-of-mixture provides .... bounds for mechanical properties of particulate composites.

    a) lower   b) upper

    c) both (a) and (b)   d) none of these.

viii) Al-alloys for engine/automobile parts are reinforced to increase their

    a) strength   b) wear resistance

    c) elastic modulus   d) density.

ix) Mechanical properties of fiber-reinforced composites depend on

   a) properties of constituents

   b) interface strength

   c) fiber length, orientation and volume fraction

   d) all of these.

x) Longitudinal strength of fiber reinforced composite is mainly influenced by

   a) fiber strength   b) fiber orientation

   c) fiber volume fraction   d) fiber length.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. What are the advantages of ceramics over metals as fibers ? What is a composite fiber ? Give an example.

3. Give the relationship between particle size and volume fraction in a dispersion strengthened composites. List two physical properties that can be estimated using rule of mixtures.

4. What are hybrid composites ? Give an example. Name two composite structures subjected to (i) creep and (ii) fatigue loading.

5. Name a reinforced composite material. State its use with justification.

6. Discuss about major advantages and disadvantages of composite materials.
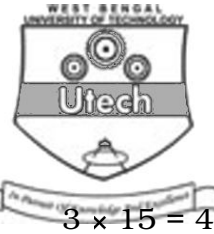
GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45

7. a) Define composites. Classify composites based on reinforcement and matrix. Mention about their salient properties.   8

   b) Discus about rule of mixtures in composite materials.   7

8. Which factors are taken into consideration for the selection of particles in particle-reinforced composites ? Give some examples of particle reinforced composites. How do the particles improve the properties of the composites ?   8 + 7

9. a) Discuss the production of glass fibers in detail using a neat sketch. Give the composition of E glass and S glass.   8

   b) Compare the properties of metals, ceramics and polymers as matrix materials.   7

10. a) What are honeycomb structures ? What are the functions of core and facing material in a honeycomb. Give examples and applications of honeycomb. Give examples and applications of honeycomb structures.   8

   b) Explain briefly any two methods used for producing laminar composites. Give examples and applications for laminar composites.   7

11. a) What is the role of matrix on composites ? What is meant by quasi isotropic laminates ?   7

   b) What are the basic assumptions of laminated anisotropic plates ? How is laminate failure predicted ?   8

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