

BTECH
(SEM VII) THEORY EXAMINATION 2018-19
COMPOSITE MATERIALS

Time: 3 Hours

Total Marks:100

Notes: Assume any Missing Data.

SECTION -A

1. Attempt all questions in brief.

[2x10=20]

- a) Differentiate between thermosets and thermoplastics.
- b) Discuss the mechanical properties of fibers.
- c) What do you mean by polymer matrix composites?
- d) Write a brief note on engineering application of composites.
- e) Give definition of a balanced laminate.
- f) State the three families of carbon fibers.
- g) Why do you prefer a small orientation difference between adjacent layers?
- h) What is ASTM standard for tensile test? <http://www.aktuonline.com>
- i) Discuss the advantages of the metal matrix composites.
- j) What do you mean by Particulate Reinforced Composites?

SECTION-B

2. Attempt any three part of the following :

[10X3=30]

- a) Give the characteristics of composite materials. Also give the classification of composites based on matrix and reinforcement?
- b) Differentiate between dispersion strengthened and particle strengthened composites.
- c) Derive the equation for elastic modulus of a composite laminate.
- d) Explain the processes in the production of carbon fibers.
- e) Explain interlaminar stresses and edge effects in laminated composites.

SECTION-C

3. Attempt any one part of the following :

[10x1=10]

- a) Compare the performance of metal matrix composites against bare metals with respect to the following properties: (i) tensile strength, (ii) fatigue strength
- b) Explain the effect of size, shape and distribution of particulates in metal matrix composites.

4. Attempt any one part of the following : <http://www.aktuonline.com>

[10x1=10]

- a) Explain the basic assumptions in the analysis of laminated composites.

- b) Explain the methods to improve significantly the mechanical and wear properties of ceramic matrix composites.
5. Attempt any one part of the following : [10x1=10]
- What are the advantages of composites in structural design? Explain.
 - Write short note on the following: <http://www.aktuonline.com>
 - Carbon-carbon composites
 - Maximum stress failure theory
 - Failure envelop
6. Attempt any one part of the following : [10x1=10]
- Explain the tensile testing of composites with neat sketch
 - Discuss the Intra-laminar shear testing, Inter-laminar shear testing with example.
7. Attempt any one part of the following : [10x1=10]
- With illustration and giving all the details explain filament winding process used to manufacture polymer matrix composites. <http://www.aktuonline.com>
 - List down the reinforcement materials and resins used in composite materials. Why are fiber reinforcements of a thin diameter?

<http://www.aktuonline.com>

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