

## Sardar Patel University

M.Sc.(Nano Science &amp; Nano Technology) IIIrd Semester Examination

Date: December 6, 2012

Session: Evening

Time: 2.30-5.30p.m.

Paper Code : PS03ENST02

Subject Title : Composite Materials

Q.1 Answer the following multiple choice question (8)

- i). The Composite with nano reinforcements are made with specific aim of  
(a) economy (b) use of small amount of reinforcements (c) Fashion (d) not significant
- ii). Mechanical properties of composites increase with volume fraction of reinforcement  
(a) continuously with no limit (b) with limit (C) No correlation (d) Not significant
- iii) The kevlar fibers can be used as reinforcement with following as matrix  
(a) Metals (b) Glass (c) carbon (d) polymers
- iv) Which of following precursors is used to get high modulus carbon fibers  
(a) Bamboo , (b) pitch (c) PAN (d) CVD method
- v) SiC nanoparticles are used as reinforcement for ceramic matrix composites since these have  
(a) Highest modulus (b) Highest strength (c) Higher oxidation resistant (d) high conductivity
- vi) Composites Blades for wind mill are made using  
(a) Short fiber hand layup technique (b) Filament winding (c) Prepreg technique (c) None
- vii) Short fibers result in composites with good mechanical properties since these fibers have  
(a) Low price (b) easily available (c) higher length than fiber critical length (b) None of these
- viii) Which techniques is used for making composites with good properties in two directions  
(a) Short fibers (b) UD (c) 2D (d) None of these

Q.2 Explain any seven from the following short questions (14)

- i) Rule of mixture
- ii) Alumina/Aluminium composites
- iii) Calculation of theoretical fiber contents
- iv) Criteria for selecting a material as reinforcement for composite.
- v) Difference between spinnerets and bushing in drawing fibers
- vi) Fracture of composites with strong fiber/matrix bonding
- vii) Effect of fiber orientation on properties of fiber reinforced composites
- viii) Type of nanofibers used for ceramic matrix composites
- ix) Difference between three point bend strength and interlaminar shear strength

Q.3 (a) Describe compocasting method for processing of composites. (6)

Q.3 (b) Describe rules for selecting compatible of reinforcements with different matrix systems. (6)

OR

Q.3 (b). Describe method of fabricating graphite powder reinforced aluminium matrix composites. (6)

Q.4 (a) What are advantages of carbon fibers over glass fibers. Describe specific applications where carbon fibers are preferred over glass fibers. (6)

Q.4 (b) Write briefly the method of producing carbon fibers from PAN fibers. Write different types of PAN based carbon fibers and their properties? (6)

OR

Q.4 (b) What technique is used for manufacturing composites for Home appliances? Describe the technique. (6)

Q.5 (a) What is difference between Interphase and Interface? How interface can be improved in Carbon fiber/polymer matrix composites? (6)

Q.5 (b) What problems are faced in using nano reinforcements for making composites and how are these overcome? (6)

OR

Q.5 (b). Write different methods used for evaluating fiber/matrix bonding.

Q.6 (a) What is Fracture energy? Describe different mode of fractures in composites. (6)

Q.6(b) Describe processing of carbon/carbon composites (6)

OR

Q.6 (b) Describe processing of vacuum bag moulding technique for composites (6)

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