No. of Printed Pages: 3

[142]

SARDAR PATEL UNIVERSITY

M. Sc. Nanoscience and Nanotechnology 3rd Semester Examination

01/12/2012
Saturday
Time: 2.30 p.m. to 5.30 p.m.

PS03CNST02: Engineering Polymers and Nanocomposites

Total Weightage/Marks: 70

Note: (i) All the six questions are compulsory.

(ii) Figures to the right indicate marks.

Q. 1 [A] Select the correct answer from questions (i) to (v). **[5]**

(i) Block copolymers are synthesized by the polymerization process of
(a) Cationic
(b) Anionic
(c) Chain

(ii) Mechanical polyblend is represented by the symbol
(a) p
(b) b
(c) m

(iii) Starting material is used for preparing poly vinyl-alcohol is
(a) Vinyl acetate
(b) Vinyl alcohol
(c) Vinyl chloride

(iv) Glass transition temperature of polyblends are measured using the method
(a) TGA
(b) DSC
(c) SEM

(v) SEM of non compatible polymers in polyblends shows
(a) Single phase
(b) Separate phase
(c) None

Q. 1 [B] Fill in the blanks **[3]**

(i) The structure of polyimide-imide is _____
(ii) Polyphenylene sulphone can not be used in engineering applications because _____
(iii)Kaolin has a clay structure of the type _____

P.T.O

Q. 2 Answer any seven of the following questions. **[14]**

(a) How the poly blends are different from alloys?

(b) What are synthetic paper blends?

(c) What are hot-melt adhesive? Mention their uses.

(d) Write the electrostatic theory to explain adhesion in different substrates.

(e) Give the synthesis of NR 150 B2?

(f) Write the advantages of use of nano-fillers in composites over micro-fillers?

(g) Define cation exchange capacity of nano-clay.

(h) Mention the important properties of Polycarbonates?

(i) Enlist different mixers used to make nanoparticles.

Q. 3 (a) Describe the characterization methods used for poly blends. **[6]**

(b) Classify with suitable definition different types of IPNs. **[6]**

OR

(b) Give an account of wood polyblends. Why wood modification is done? **[6]**

Q. 4 (a) Write various surface preparation methods used prior to adhesive bonding. Mention its importance. **[6]**

(b) Give an account of pressure sensitive adhesives. **[6]**

OR

(b) Write about poly(vinylalcohol) based adhesives. **[6]**

Q.5 (a) Discuss the synthesis, properties and uses of polyetherketons. **[6]**

OR

(a)Describe the synthesis and properties of polyimides. **[6]**

(b) Explain various types of nano scale fillers. Describe the structure and modification of nanoclays used for nanocomposite applications. **[6]**

Q.6 (a) With suitable examples, discuss various methods used for the preparation of polymer nanocomposites. [6]

(b) With the help of neat figure, explain extrusion process. [6]

OR

(c) Discuss the action of twin screw extruder. [6]

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