

January 2007

Examination for the degree of

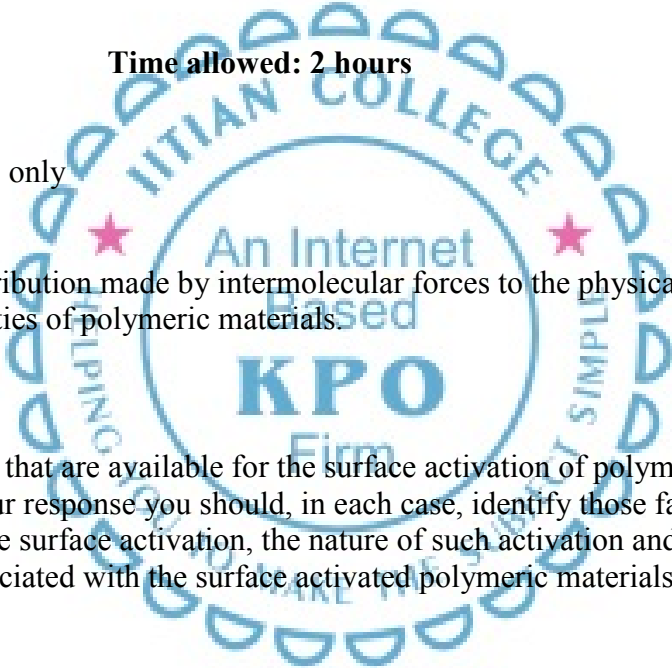
MSc Polymer and Surface Coatings Science and Technology

Level 5

ADVANCED POLYMER AND MATERIALS SCIENCE

Time allowed: 2 hours

Answer **four** questions only

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1. Discuss the contribution made by intermolecular forces to the physical and the structural properties of polymeric materials. [25]
 2. Discuss methods that are available for the surface activation of polymeric materials. In your response you should, in each case, identify those factors that are relevant to the surface activation, the nature of such activation and the applications associated with the surface activated polymeric materials. [25]
 3. Discuss the concept of functional polymers, their preparation and their applications from the standpoints of:
 - (a) the polymerisation of functional monomers; [9]
 - (b) the further functionalisation of existing polymers. [16]
 4. Write an essay on the theme "Bio-compatible polymeric materials and their applications". [25]

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5. (a) Derive the copolymerisation equation, defining the symbols that you use. [8]
- (b) Give an account of the significance of the copolymerisation equation with respect to the composition of copolymers whose synthesis follows the kinetic profile that is implied when using this equation. [5]
- (c) Give an account of the factors of relevance to the preparation of copolymeric materials and their effective application. [12]
6. (a) Describe the factors that are of importance to the processing of thermoplastic polymers through extrusion and moulding. [15]
- (b) Outline the significance of rheological behaviour to each of the processes of extrusion and moulding. [10]
7. (a). Compare and contrast the synthesis of Perlon® with the synthesis of Nylon. [12]
- (b) Discuss syntheses of polyurethanes. [9]
- (c) Comment on the classification of polyurethanes in terms of the polymerisation techniques. [4]

