Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH (TT)/SEM-2/MTT-201/2011

2011
HIGH PERFORMANCE FIBRE & INDUSTRIAL TEXTILES

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.

Answer question No.1 and any *four* from the rest.

$5 \times 14 = 70$

1. a) Write basic difference between IPN and polyblend.

   b) How do fibre morphology and chemical composition of polymeric chain influence on thermal and chemical properties of fibre. Explain briefly with suitable examples.

   c) What are the different methods of making hydrogel dressing ?

   d) Show the chemical structure of different polymers used as hydrogels. 2 + 5 + 3 + 4

2. a) Explain degree of order and degree of orientation by some representative model.

b) From the said two which one has more impact on tensile properties of fibre ? Explain.

c) Make a comparative study on commodity fibre forming polymeric chain and rigid rod polymeric chain. 5 + 4 + 5

3. a) Make short note on gel-spinning technique.

b) "Ordinary polyethylene fibre is difficult to use in apparel application due to their thermal instability. But polyethylene fibre made from ultra-high molecular weight polyethylene polymer can be used for bullet proof vests". Explain the statement.

c) "Kevlar fibre has more thermal and chemical resistances and also mechanical strength." Justify the statement.

4 + 5 + 5

4. a) You are asked to make a bullet proof vest with certain amount of comfort property. Which type of fibre will be best suit for this purpose ? Justify your answer.

b) Write down the different types of glass fibre spinning method. Explain any one spinning method.

c) Why does PEEK fibre show chemical inertness ?

5 + 6 + 3

5. a) Prepare a comparative table showing the advantages and disadvantages of the different fibres used for making tyre.

b) Elaborate in detail the selection criteria of textile materials in rubber industry. 5 + 9

6. a) Explain "Alginate fibre: versatile wound manager".

   b) Why collagen fibre is the major scaffold protein for tissue engineering ? 9 + 5

7. a) Explain the concept of breathability and waterproofness.

   b) What are different approaches to create breathable fabric. 4 + 10

8. a) Explain the concept of design considerations of a dialyser.

   b) Elaborate the functions of dialysis machine.

   c) What are the different types of dialyser ?

   d) What is hemodialysis ?

   e) Why is heparin pump used in hemodialysis process ?

   f) What are basic requirements of membrane materials used in artificial kidney ?

   g) Explain the term "Ultrafiltration". 7 × 2