This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **1385**

Unique Paper Code : **1141502** **F-7**

Name of the Paper : **Fiber Science and Rubber Technology**

Name of the Course : **B.Tech. Polymer Science**

Semester : **V**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. **1** is compulsory.

Draw neat and labeled diagram wherever necessary.

1. (*a*) Explain the term extensibility of fiber.

(*b*) Define percentage moisture regain and percentage moisture Content of fiber.

(*c*) Differentiate aging properties of Natural Rubber, Polybutadine and Neoprene.

(*d*) The polychlorprence elastomer cured by metal oxide instead of sulphur. Give suitable justification.

(*e*) Write flammability pattern of Cellulose, Nylon 6 and Poly-1, 4- cyclohexylenedimethylene Terephthalate.

(*f*) What types of monomers used for the formation of fluorocarbon elastomers ? Give the structure of any *four*.

P.T.O.

(*g*) Explain three step process of moisture absorption in nylons.

(*h*) Illustrate high performance fibers.

(*i*) Which of the following will have higher denier ?

(*i*) fiber A having 14000 cm (length) and 12g (weight)

(*ii*) fiber B having 3 meter (length) and 18g (weight). 9×3=27

2. (*a*) How are the following properties affected by degree of cross linking :

(*i*) Fatigue life

(*ii*) Elastic recovery

(*iii*) Toughness ?

Justify your answer.

(*b*) Describe the manufacture of Butyl rubber and their applications.

(*c*) Discuss the mechanism of peroxide vulcanization. 5+4+3=12

3. (*a*) Discuss different grade of NBR rubber on the basis of acrylonitrile content. List the properties which are influenced by acrylonitrile content.

(*b*) Discuss semi crystalline structure of nylon fibres.

(*c*) Write the structure of any *three* Benzothiazolesulphonamides accelerators. 5+4+3=12

4. (*a*) Examine resistance of PET fibers towards bleaching agents and mention applications PET fibers requiring high modulus and resilience properties.

(*b*) Write down the tentative formulation and manufacturing processes of :

(*i*) Welding hose

(*ii*) EPDM profile compound having 56 g/cm^3 (Density).

(*c*) Give the name and structure of monomer used in KELF, Kalrez and Viton A.

5+4+3=12

5. (*a*) Discuss physical and structural properties of Vinylon and Vinyl fibers.

(*b*) Describe effect of annealing temperature on thermal shrinkage of acrylic fibres.

(*c*) Discuss the synthesis of asbestos. 5+4+3=12

6. (*a*) Give biomedical applications of silicone rubber. Also give compounding ingredients.

(*b*) Write short notes on :

(*i*) Cotton staple fiber

(*ii*) Mohair.

(*c*) Give unit cell structure of kevlar fiber crystal and its morphology. 4+4+4=12