AMTE-3 CHARACTERISTICS OF TEXTILE FIBRES I

UNIT-1 STRUCTURE INVESTIGATION TECHNIQUES

1.1 Transmission and Scanning electron microscopes

1.2 Principle construction and working; X-ray diffraction techniques- X-ray analysis-estimation of crystallinity;

1.3 Infrared radiation and dichroism techniques- chemical element and group identification by transmittance and optical density methods.

1.4 Molecular orientation estimation, typical molecular structures of commercially important FIBREs.

UNIT-2 MOISTURE ABSORPTION CHARACTERISTICS OF FIBRES

2.1 Moisture absorption behavior of natural and man-made FIBREs;

2.2 Influence of FIBRE structure, humidity and temperature on the moisture absorption;

2.3 Conditioning of FIBREs- mechanism of conditioning and factors influencing conditioning.

2.4 Moisture diffusion in FIBREs. Heat of sorption- integral and differential, their relation; factors influencing heat of sorption- measurement of heat of sorption.

UNIT-3 TENSILE CHARACTERISTICS OF FIBRES

3.1 Tensile characteristics –Study of strength, elongation, work of rupture, initial modulus,

3.2 Work factor and yield point – determination of yield point.

3.3 Stress-strain relations of natural and manmade FIBREs - influence of humidity and temperature on tensile characteristics.

3.4 Time effects- Study of creep phenomena.

UNIT-4 ELASTIC RECOVERY BEHAVIOUR OF FIBRES

4.1 Elastic recovery and its relation to stress and strain of FIBREs;

4.2 Mechanical conditioning of FIBREs and its influence on elastic recovery.

4.3 Load cycling and extension cycling-their effect on elastic recovery.

References Books

1 Meredith R., “Mechanical Properties of Textile FIBREs”, North Holland, Amsterdam, 1986.

2 Hearle J. W. S. Lomas B. and Cooke W. D., “Atlas of FIBRE Fracture and Damage to Textiles”, The Textile Institute, 2nd Edition, 1998.

3 Raheel M. (ed.), “Modern Textile Characterization Methods”, Marcel Dekker, 1995.

4 Mukhopadhyay S. K., “The Structure and Properties of Typical Melt Spun FIBREs” Textile Progress, Vol. 18, No. 4, Textile Institute, 1989.

5 Hearle J.W.S., “Polymers and Their Properties, Vol.1. Fundamentals of Structures and Mechanics”, Ellis Horwood, England, 1982