

TXL372 Major

Discipline: B.Tech.

Total Marks: 25

Date: 06.05.2023

Time: 1 Hour

Part A: Yarn

1. Describe the merits and demerits of thermoset and thermoplastic polymers used to produce hybrid yarns. (4)
2. How, uniform distribution of matrix and reinforcement fibers as well as reduction of damage to reinforcing fibers is achieved in co-wrapping and commingling manufacturing process of hybrid yarns? Explain. (5)
3. How do dipping process parameters like time, temperature and dip pick activate adhesion and establish desired tyre cord properties? Explain through graphical relationships-. (4)
4. Discuss the problem associated with the use of organic and inorganic materials for conductive textile yarns. (4)
5. The properties of textile materials are ideal support materials for electronic devices. Justify the statement. (4)
6. The bulk of shrinkable and non-shrinkable blended yarns is influenced by different yarn manufacturing systems. Justify with suitable examples. (4)

MAJOR : 2023

TXL372 : Specialty Yarns and Fabrics

Part B : Fabric

1. What is auxetic fabric? How an auxetic yarn is produced? What are common auxetic geometries used to produce auxetic woven fabrics? Draw a typical axial strain vs Poisson's ratio curve for an auxetic woven construction. Show that the Poisson's ratio of a rotating square auxetic geometry is a negative quantity.
[1+1+1+1+2]
2. What are special characteristics of a leno weave? How is a leno weave represented? Show that the slip force of a double leno structure is much higher than that of single leno structure, both analytically and graphically. What are applications of leno structures?
[1+1+3+1]
3. Give a broad classification of 3D woven constructions. Draw a labelled weave diagram of five-layer 3D woven orthogonal fabric. What is the role of binder thread in this structure. What are special properties of this fabric.
[2+2+1+1]
4. Define loop dimension, loop shape and loop density of a terry fabric. How these parameters influence performance of a terry towel? What are different essential properties of terry fabric?
[2 + 2 + 2]
5. What are objectives of producing woven spacer fabric? How conventional spacer is different from integrated spacer fabric? Why the conventional take-up system cannot be used for weaving spacer fabrics? What kind of modification is needed for take up mechanism to produce spacer preform of different heights?
[1+1+2+2]