Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- IVth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 142802 **Date: 25/05/2012**

Subject Name: Fibre Physics

Time: 10:30 am – 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Answer the following OBJECTIVE questions: **07**

i. Define "Degree of orientation".

ii. State the properties imparted due to the amorphous content of fibre.

iii. The ease of extensibility of a specimen is characterized by _____ term.

iv. Show the formation of ester link.

v. Differentiate macro and micro structure of a fibre.

vi. Give the class of polyester fibre.

vii. What is meant by birefringence?

(b) Elucidate the micro structure of cotton fibre in detail. **07**

Q.2 **(a)** Describe the technical aspects involved with formation of salt linkages and cross linkages using suitable examples. **07**

(b) Explain about the effect of orientation on mechanical properties of fibres. **07**

OR

(b) Discuss the importance of stress – strain curves of fibres to demonstrate their tensile properties with suitable parameters involved. **07**

Q.3 **(a)** Elucidate importance of birefringence value derived from refractive index of a fibre to understand optical behavior of fibres. **07**

(b) Introduce fibre friction with its technological effects in connection to fibre physics. **07**

OR

Q.3 **(a)** Give the technical significance of swelling. Discuss the detailed measurement of swelling effect in different directions. **07**

(b) Derive the relation between moisture regain and moisture content of a fibre using the equilibrium approach. **07**

Q.4 **(a)** Explain the macro structure and polymer system of silk fibre in detail. **07**

(b) Discuss the following fibre forming requirements in depth: **07**

- **i.** High melting point
- **ii.** Length
- **iii.** Hydrophillic properties

OR

Q.4 **(a)** Enlist the methods of investigation of fibre structure. Explain about Reflection electron microscope with neat sketch. **07**

(b) Explain the following terms in connection to tensile properties of fibres: **07**

- **i.** Initial modulus
- **ii.** Work factor
- **iii.** Yield point

Q.5 **(a)** Expand DFE to its full form. Explain in detail about felting phenomenon of wool fibre showing the effect. **07**

(b) Enumerate the detailed morphology of Nylon fibres along with various properties of it. **07**

OR

Q.5 **(a)** Derive the relation between dielectric constant and resistance of a material to demonstrate its dielectric properties. **07**

(b) Explain about primary and secondary creep in detail. **07**

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