Ministry of Higher Education
& Scientific Research
University of Technology
Department of Materials Engineering
Polymers Branch
Class: 3rd
Subject: *Fibers Technologes*
Final Exam **2014-2015**

وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة المواد
فرع هنسة البوليميرات

Date:
Allowed time: *3 hr*
Examiner: *Ass.Prof. Dr. Akram R. Jabur*

Note: **Attempt to answer only five questions**

Q1 (10 marks):

a. The polymer gelatination in phase separation process was found to be the most critical step that control the porous morphology of the nano fibrous foam, how?

b. State high-performance synthetic, organic fibers and explain the properties of one of them?

Q2 (10 marks):

a. Prove mathematically the large surface area to volume ratio of nanofibers?

b. For carbon fibers used in fabrication of the space shuttle which Precursor fibers can be used ?Explain the materials and process

Q3 (10 marks):

a- Draw the relationship between fiber diameter and:

1. Concentration at constant capillary/collector distance, voltage and flow rate.
2. Capillary/collector distance at constant voltage, flow rate and concentration.
3. Flow rate at constant capillary/collector distance, voltage and concentration.
4. Voltage at constant capillary/collector distance, flow rate and concentration.

b. State the condition of Polymer in each steps of extrusion process on fibers manufacturing?

Q4 (10 marks):

a. what was the advantages of bicomponent thermal binder fibers?

b. What are the four critical concentrations from low to high that should be noted through the electrospinning of different polymer solutions? And what are the results from these critical concentrations?

Q5. (10 marks):

a. Generally, lower flow rate in electrospinning is recommended. Why?

b. State glass fibers types and applications?

Q6. (10 marks):

a. Explain Boron fibers properties and usage?

b. The intrinsic morphology of the polymer resulted from interfacial polymerization is nanofibrillar. Explain why?