



UNIVERSITY OF GHANA

(All rights reserved)

BSC. ENGINEERING SECOND SEMESTER EXAMINATIONS: 2016/2017

DEPARTMENT OF FOOD PROCESS ENGINEERING

FPEN 314: RHEOLOGICAL AND SENSORY PROPERTIES OF FOODS (2 Credits)

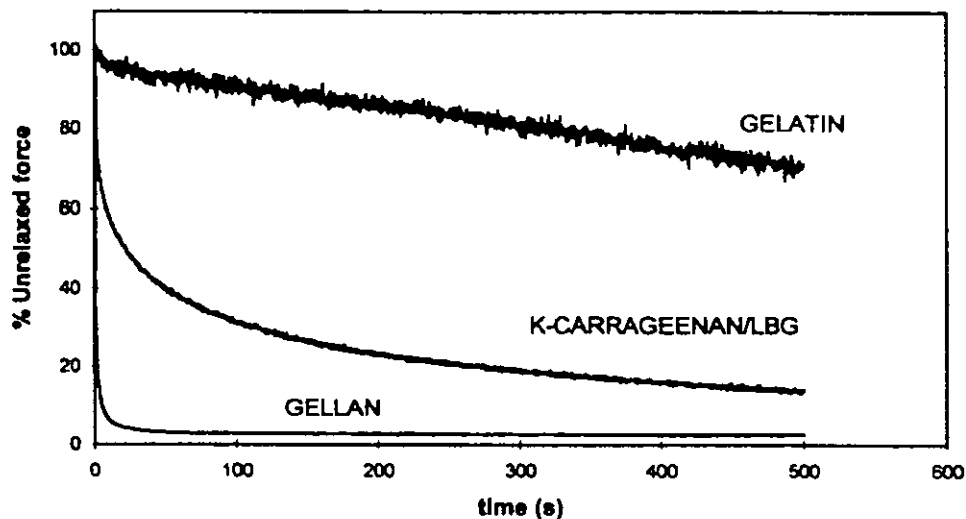
INSTRUCTIONS: ANSWER TWO QUESTIONS FROM EACH SECTION.
ANSWER EACH SECTION IN A SEPARATE BOOKLET.

TIME ALLOWED: TWO (2) HOURS

SECTION A

1. The rheological characteristics of semi-solid foods can frequently be described by their visco-elastic behavior, using stress-relaxation tests. The Figure 1 below shows the stress relaxation of gellan, gelatin and κ -carrageenan/locust bean gum under constant strain for 500 seconds. Discuss the rheological characteristics of the three gels in terms of their viscous and elastic characteristics and, based on the Maxwell mechanical model, indicate which of the three gels dissipates energy the fastest.

Figure 1: Response to Relaxation for Gelatin, κ -Carrageenan/Locust Bean Gum and Gellan Gum, Represented as % Unrelaxed Force in Relation to Time



2. Describe with appropriate examples, textural and rheological measurements of food based on
 - a. Fundamental
 - b. Empirical
 - c. Imitative tests
3. The flow behavior of fluid foods may be modelled on the power law equation.
 - a. Write out the power law equation and explain the practical significance of all its parameters.
 - b. Describe an experiment to determine the flow behavior of partially skimmed milk.

SECTION B

4.
 - a. Explain the steps involved in conducting a valid sensory evaluation test.
 - b. Discuss any four (4) of the physiological or psychological factors which can influence sensory measurements. For each factor indicate the control measure that can be used to minimise associated errors.
 - c. Briefly describe the different types of scales that can be used to measure panellist responses during a sensory evaluation test.
5.
 - a. Your company is in the final stages of developing a new flavoured popcorn product for sale on the Ghanaian market. You have been tasked to conduct a consumer acceptance test. You have all the resources and facilities necessary to conduct a consumer test of your choice.
 - i. Select a test method and explain your choice.
 - ii. Describe in detail how you would conduct the test.
 - b. Indicate the situations under which sensory tests can be applied in a food processing facility.
6.
 - a. Differentiate between descriptive and discriminatory tests in sensory evaluation.
 - b. Explain why and how you would conduct **either** a paired comparison **or** a duo-trio test of mango juice.
 - c. Describe any two (2) sensory characteristics of foods and how they might influence the selection of a food product.