UNIVERSITY OF GHANA

BSC. ENGINEERING SECOND SEMESTER EXAMINATIONS: 2016/2017

DEPARTMENT OF FOOD PROCESS ENGINEERING

FPEN 204: PHYSICAL AND CHEMICAL PROPERTIES OF FOODS (3 Credits)

INSTRUCTIONS: ***ANSWER ANY FIVE (5) QUESTIONS***

TIME ALLOWED: THREE (3) HOURS

1.

a. Describe the key characteristics of food additives and briefly discuss three (3) conditions under which their use is acceptable in food processing.
b. Pectins are critical ingredients in the production of jams. Explain the different options available for the productions of gels with pectins.

2.

a. Explain the underlying principles of the reactions responsible for the development of brown colour during the following processes:
   i. Exposure of a cut apple to air
   ii. Heating sugar under anhydrous conditions
   iii. Toasting of bread
b. Briefly outline any two (2) methods through which you can control the browning process described in (i) above?

3. The colour of a food is one of the most important aspects of appearance of foods and significantly influences food selection and acceptability. Discuss the three main categories of food colours highlighting the specific issues associated with their stability during processing.

4. Emulsions are inherently unstable because of the nature of their constituent ingredients.
   a. Explain the factors that determine the stability of an emulsion
   b. Describe the different means through which an emulsion breaks down.
   c. How would you produce a permanent emulsion?

5. "The characteristic quality and sensory attributes of a food are derived from the complex interactions between its various functional ingredients". Support this statement with specific examples of the functional properties of the main food components. Your answer must include two examples for each component.

6.

a. The formation of crystals are important in different food products including chocolate and ice-cream. With the aid of a typical solubility curve, explain the phenomenon of crystallisation in foods.

b. Briefly discuss the importance of food enzymes and their role in food processing.