

Advanced Culinary Science

Culinary Arts · Answer Key · 10 Questions

1. What is the primary biochemical process responsible for the browning of crusty bread when baked?

- A) Glycolysis
- B) Oxidative deamination
- C) Maillard reaction**
- D) Hydrolysis of starch

2. Which protein undergoes denaturation and coagulation, leading to the solidification of egg whites during heating?

- A) Actin
- B) Myosin
- C) Albumin**
- D) Collagen

3. The ability of an emulsion, such as mayonnaise, to remain stable is primarily due to the presence of an emulsifier. Which of the following is a common natural emulsifier found in egg yolks?

- A) Lecithin**
- B) Casein
- C) Whey
- D) Pectin

4. Sous vide cooking, a precise temperature-controlled method, relies on the principles of heat transfer. What is the dominant mode of heat transfer in a water bath used for sous vide?

- A) Conduction
- B) Radiation
- C) Convection**
- D) Evaporation

5. When searing meat, the rapid browning that occurs on the surface is largely a result of:

- A) Caramelization of sugars and the Maillard reaction**
- B) Denaturation of fats
- C) Evaporation of water from the surface
- D) Increased activity of proteases

6. What is the scientific explanation for the phenomenon of 'transglutaminase activity' in dough, contributing to gluten network development?

A) Enzymatic cross-linking of gluten proteins

- B) Hydrolysis of starch into simpler sugars
- C) Oxidation of disulfide bonds within gluten
- D) Fermentation by yeast producing CO₂

7. The crispness of fried foods is a result of rapid water evaporation and the formation of a brittle matrix. What chemical compound is primarily responsible for this structural change during frying?

A) Starch gelatinization

- B) Protein coagulation
- C) Lipid oxidation
- D) Formation of acrylamide

8. Cryogenic freezing, using liquid nitrogen, achieves extremely rapid freezing. What is the primary advantage of this rapid freezing over slower methods in terms of ice crystal formation?

A) Larger ice crystals form, leading to less cellular damage

B) Smaller ice crystals form, minimizing cellular damage and preserving texture

- C) No ice crystals form, resulting in a completely amorphous structure
- D) Ice crystals form on the surface only, not penetrating the food

9. When making a beurre blanc sauce, the emulsification of butter into the reduction of wine and shallots is stabilized by the interaction of fat globules with the aqueous phase. Which component in the butter is crucial for this emulsification?

- A) Water
- B) Lactose
- C) Fat**
- D) Protein

10. The characteristic 'umami' taste, often described as savory or meaty, is primarily associated with the presence of which molecule and its salts?

- A) Citric acid
- B) Glutamic acid**
- C) Ascorbic acid
- D) Acetic acid