

SMSU Ag Bowl Invitational 2026- Key
Food Science and Technology

1. The function of the enzyme ____ is that it coagulates the casein to form cheese curds.
 - A. catalase
 - B. lactase
 - C. narginase
 - D. **rennin**

2. ____ are a group of compounds responsible for many of the flavor characteristics of food.
 - A. **Flavonoids**
 - B. Astringents
 - C. Xanthophylls
 - D. Carotenoids

3. ____ is the term food scientists use to describe thickening a liquid with starch.
 - A. **Gelatinization**
 - B. Polymerization
 - C. Paste
 - D. Retrogradation

4. ____ is a cereal formulated from maize, sorghum, and cottonseed flour that contains 28% protein.
 1. Amaranth
 1. Quinoa
 1. Triticale
 1. **Incaparina**

5. ____ is a process in which a liquid is heated until pathogens and some spoilage bacteria have been destroyed.
 1. **Pasteurization**
 1. Fermentation
 1. Proofing
 1. Pickling

6. ____ is leakage of water from a gel.
 - a. **Syneresis**
 - b. Concentration
 - c. Dehydration
 - d. Denaturing

7. All organic compounds that contain at least one –OH group are called ____.
 1. **alcohols**
 1. acidic
 1. basic
 1. humectants

8. An ____ is a mixture of two immiscible liquids, where one is dispersed in droplet form in the other.

- 1. foam
- 1. **emulsion**
- 1. suspension
- 1. gel

9. Butter, cheese, cream, and eggs are a good source of Vitamin ____.

- 1. **A**
- 1. C
- 1. D
- 1. K

10. The perfect glass of sweet tea is 15% sugar. Elena is making a one-gallon container of sweet tea. How many cups of sugar are in the gallon of sweet tea?

- a. 2 cups
- b. 2.4 cups**
- c. 3.4 cups
- d. 4 cups

11. Mona's famous creamy asparagus soup is made in the family's 3-gallon pot. If she adds 5 cups of heavy cream to the soup, what percentage of the soup is cream if the soup fills all 3 gallons?

- a. 5.3%
- b. 9.2%
- c. 10.4%**
- d. 18.8%

12. If the amount of bacteria in a bowl of fruit can be represented by the equation $B = 2^t$ where B represents the bacteria count in thousands and t represents the hours since refrigeration, how much bacteria can be expected three hours since refrigeration?

- a. 2,000
- b. 6,000
- c. 8,000**
- d. 10,000

13. _____ stops FDA from banning a chemical sweetener but requires a warning label on food products containing it.

- A. Saccharin Study and Labeling Act**
- B. Food Additives Amendment
- C. Fair Packaging and Labeling Act
- D. Food, Drug and Cosmetic Act

14. What factor improved public opinion regarding cake and pancake mixes?

- A. High cost of ingredients during the Depression.**

- B. Research regarding the nutritional value of mixes as compared to homemade.
- C. Television advertisements.
- D. Women entering the workforce because of World War II.**

15. Which of the following statements about organic foods is true?

- A. The terms “natural” and “organic” are interchangeable.
- B. Organic foods and conventional foods both have good safety records.**
- C. Evidence shows that organic foods are more nutritious than conventional foods.
- D. Organic foods have never been the cause of a foodborne illness outbreak.

16. A _____ is a recipe used in the food industry.

- A. A phenomenon
- B. experiment
- C. formulation**
- D. variation

17. The ability of a substance to draw up the muscles of the mouth is _____.

- A. aroma
- B. astringency**
- C. volatility
- D. consistency

18. Which of the following is one of the basic tastes to which the tongue responds?

- A. Peppery.
- B. Lemony.
- C. Yeasty.
- D. Salty.**

19. Which factor has the most effect on the intensity of the flavor of many foods?

- A. Temperature.**
- B. Mouthfeel.
- C. Color.
- D. Time of day.

20. Which texture quality describes pourability of a food?

- A. Astringency.
- B. Chewiness.
- C. Consistency.**
- D. Firmness.

21. Water makes a good medium for cooking food because _____.

- A. most foods dissolve in it
- B. its temperature will steadily climb as cooking progresses
- C. heat is transferred throughout by conduction and convection**
- D. its polarity creates increased surface tension

22. A solution that holds more solute at a given temperature than normal is ____.

- A. a solid
- B. saturated
- C. supersaturated**
- D. not possible

23. The Dietary Guidelines for Americans recommend that people reduce the percentage of total calories consumed from added sugars to no more than ____%.

- A. 6.5**
- B. 10.5
- C. 20
- D. 30

24. The test used by food scientists to measure the resistance to flow of a starch thickened mixture is called ____.

- A. gelatinization
- B. retrogradation
- C. syneresis
- D. viscosity**

25. Which method should not be used to test the safety of a food product?

- A. Appearance.
- B. Smell.
- C. Taste.**
- D. Touch.

26. All carbohydrates are compounds composed of the elements ____.

- 1. carbon, nitrogen and oxygen.
- 1. hydrogen, neon and oxygen.
- 1. **carbon, oxygen and hydrogen.**
- 1. oxygen, carbon and potassium.

27. ____ foods and beverages supply vitamins, minerals, and other healthful substances with relatively few calories.

- 1. Organic
- 1. Natural
- 1. **Nutrient-dense**
- 1. Fat-free

28. Freeze-dried coffee is a food product developed through ____.

- 1. crystallization
- 1. **sublimation**
- 1. vaporization
- 1. condensation

29. The basic nutrient groups are:

- 1. vitamins, water, carbohydrates, fats, and minerals
- 1. proteins, water, carbon, fats, vitamins and minerals
- 1. carbohydrates, fats, proteins, vitamins and minerals
- 1. **water, carbohydrates, fats, proteins, vitamins and minerals**

30. When baking at a high altitude, _____ flour should be _____ to the recipe to change the leavening action.

- 1. **5% more; added**
- 1. 5% less; removed
- 1. 10% more; added
- 1. 10% less; removed

31. Today, technology makes it possible to produce enough food for _____ people with only two people.

- 1. 50
- 1. 195
- 1. 350
- 1. **100**

32. _____ is lowering the quality and safety of a product caused by adding inferior ingredients that may be toxic.

- 1. Genetic modification
- 1. **Adulteration**
- 1. Food analoging
- 1. Cryogenic freezing

33. "Organic" means the food contains at least _____ percent organic products, not including water and salt.

- 1. 100
- 1. **95**
- 1. 85
- 1. 70

34. The term, _____, describes the path of food from the growth of raw product, through processing, preparation, and presentation, to the final consumer.

- 1. field to fork
- 1. pasture to plate
- 1. **farm to the table**
- 1. field to plate

35. Select the best numerical scoring system to rank food samples for a taste test panel:

- 1. **1-7**
- 1. 1-4
- 1. 1-3
- 1. 1-10

36. Taste buds are found on the ____.

- 1. tongue
- 1. palate
- 1. epiglottis
- 1. **All of the above**

37. The temperature danger zone, or the temperature at which most pathogens multiply rapidly, is ____ degrees Fahrenheit.

a. **41 to 135**

b. -32 to 0

c. 0 to 50

d. 140 to 160

38. As citrus fruits ripen _____, so growers test the pH of fruits to determine when to harvest for peak flavor.

- 1. sugars increase and acids increase
- 1. **sugars increase and acids decrease**
- 1. sugars decrease and acids decrease
- 1. sugars decrease and acids increase

39. An example of a disaccharide is ____.

- 1. Fructose
- 1. Glucose
- 1. **Maltose**
- 1. All of the above

40. ____ is how intense the color is.

- 1. Value
- 1. Hue
- 1. Tint
- 1. **Chroma**

41. Taste bias is a(n) ____ influence that may affect a person's food likes or dislikes.

- 1. **psychological**
- 1. physical
- 1. cultural
- 1. environmental

42. ____ is the ability of a substance to draw up the muscles in the mouth.

- 1. Flavor
- 1. **Astringency**
- 1. Sour
- 1. Adulteration

43. The ____ prohibits the use of any additive in food that is found to cause cancer.

- 1. New Food Code
- 1. Fair Packaging and Labeling Act
- 1. Nutrition Labeling and Education Act

1. Delaney Clause

44. "Made with Organic Ingredients or Foods" means the food contains at least ____ percent organic products, not including water and salt.

- 1. 100
- 1. 95
- 1. 85
- 1. **70**

45. ____ is a fact, occurrence, circumstance, or process that can be observed.

- 1. Science
- 1. Theory
- 1. Hypothesis
- 1. **Phenomenon**

46. ____ is the study of food components and their use by the body to sustain life and health.

- 1. Food Chemistry
- 1. **Nutrition**
- 1. Food Science
- 1. Culinary arts

47. ____ focuses on what happens to the foods after you eat them.

- 1. **Nutrition**
- 1. Processing
- 1. Genetic modification
- 1. Analoging

48. Taffy would rank high in ____ and pudding would rank low.

- 1. **Chewiness**
- 1. Graininess
- 1. Consistency
- 1. Texture

49. ____ refers to the size of the particles in a food products.

- 1. Chewiness
- 1. **Graininess**
- 1. Consistency
- 1. Texture

50. The phase change from the liquid to the solid phase, the phase change is called ____.

- 1. **crystallization**
- 1. evaporation
- 1. vaporization
- 1. condensation

Photo 1- Key



Safety Photo 1:

1. The situation depicts a violation of GMP, sanitation and/or food handling/storage.
 - A. **Yes**
 - B. No

2. Select the appropriate response that would best apply from the list of guidelines provided:
 - A. **All walls, ceilings, floor, and equipment exposed to foods in the processing or storage areas shall be rust-free**
 - B. Food handling employees shall wear clean, impact-resistant, sanitary gloves made of impermeable plastic or rubber whenever in direct contact with foods, ingredients or containers for these foods and supplies
 - C. Food employees must not touch ready-to-eat foods with their bare hands
 - D. No violation is depicted in the photo.

Photo 2



Safety Photo 2:

3. The situation depicts a violation of GMP, sanitation and/or food handling/storage.
- A. Yes
 - B. **No**
4. Select the appropriate response that would best apply from the list of guidelines provided:
- A. All raw ingredients shall be sound and wholesome and cooked to the proper temperature
 - B. Food handling employees shall wear clean, impact-resistant, sanitary gloves made of impermeable plastic or rubber whenever in direct contact with foods, ingredients or containers for these foods and supplies
 - C. Food employees must not touch ready-to-eat foods with their bare hands
 - D. **No violation is depicted in the photo.**

Photo 3

Safety Photo 3:

5. The situation depicts a violation of GMP, sanitation and/or food handling/storage.
- A. Yes
 - B. **No**

6. Select the appropriate response that would best apply from the list of guidelines provided:

- A. Equipment, facilities, walls and floors, and overhead utilities must be dirt, dust, mold, or otherwise contamination-free
- B. All food contact surfaces shall be constructed of heavy stainless steel, or of food grade quality sanitary plastic or rubber
- C. In-use utensils shall be properly stored between uses, by keeping the handle out of the food product, on a clean sanitized surface, in clean running water or in water of at least 135 degrees F.
- D. **No violation is depicted in the photo.**

Photo 4

Safety Photo 4:

7. The situation depicts a violation of GMP, sanitation and/or food handling/storage.

A. Yes

B. No

8. Select the appropriate response that would best apply from the list of guidelines provided:

- A. Equipment, facilities, walls and floors, and overhead utilities must be dirt, dust, mold, or otherwise contamination-free
- B. All food contact surfaces shall be constructed of heavy stainless steel, or of food grade quality sanitary plastic or rubber
- C. In-use utensils shall be properly stored between uses, by keeping the handle out of the food product, on a clean sanitized surface, in clean running water or in water of at least 135 degrees F.
- D. **No violation is depicted in the photo.**

Photo 5

Safety Photo 5:

9. The situation depicts a violation of GMP, sanitation and/or food handling/storage.

A. **Yes**

B. No

10. Select the appropriate response that would best apply from the list of guidelines provided:

- A. Food employees must not touch ready-to-eat foods with their bare hands

B. All employees should wear hair nets, caps, and beard covers (if applicable) to avoid contamination of food, food contact surfaces, and food packaging materials.

C. **A & B**

D. No violation is depicted in the photo.

Photo 6

Safety Photo :

11: The situation depicts a violation of GMP, sanitation and/or food handling/storage.

A. Yes

B. **No**

12: Select the appropriate response that would best apply from the list of guidelines provided:

A. Proper temperature control of processes throughout the facility is required, such as: Freezer storage temperatures

B. Frozen ingredients may be thawed prior to use, but containers cannot be dripping moisture or other liquids prior to usage

C. All packaging materials, equipment, or storage and delivery supplies must be free of dust, dirt, rust, or other possible contaminants

D. **No violation is depicted in the photo.**

Photo 7

Safety Photo 7:

13. The situation depicts a violation of GMP, sanitation and/or food handling/storage.

A. **Yes**

B. No

14. Select the appropriate response that would best apply from the list of guidelines provided:

A. **All chemicals used in the facility must be stored separate and apart from food and food contact surfaces.**

B. All processing room walls shall be constructed of washable, waterproof materials

C. All packaging materials, equipment, or storage and delivery supplies must be free of dust, dirt, rust, or other possible contaminants

D. No violation is depicted in the photo.

Photo 8

Safety Photo 8:

15. The situation (image 2) depicts a violation of GMP, sanitation and/or food handling/storage.

- A. **Yes**
- B. No

16. Select the appropriate response (for image 2) that would best apply from the list of guidelines provided:

- A. Food employees must not touch ready-to-eat foods with their bare hands.
- B. All employees should wear hair nets, caps, and beard covers (if applicable) to avoid contamination of food, food contact surfaces, and food packaging materials.
- C. **A & B**
- D. No violation is depicted in the photo.

Photo 9

Safety Photo 9:

17. The situation (image 7) depicts a violation of GMP, sanitation and/or food handling/storage.

- A. **Yes**
- B. No

18. Select the appropriate response (for image 7) that would best apply from the list of guidelines provided:

- A. Weeds and trash shall be cleared within several inches of outside facility walls.
- B. **Trash containers are required to be covered and free of trash.**
- C. Both A & B
- D. No violation is depicted in the photo.

Photo 10



Safety Photo 10:

19. The situation (image 8) depicts a violation of GMP, sanitation and/or food handling/storage.

- A. Yes
- B. No

20. Select the appropriate response (for image 8) that would best apply from the list of guidelines provided:

- A. Proper temperature control of processes throughout the facility is required, such as: cooler storage temperatures.
- B. All food ingredients to be added to foods and/or processed for human consumption must be clean and free from any contact with contaminated surfaces prior to usage.
- C. Uncooked foods and cooked foods shall be stored in separated areas with proper identification.
- D. **No violation is depicted in the photo.**

SMSU Ag Bowl Invitational 2026- Key Problem Solving/Math Practicum

1. The ideal brine solution for pickling cucumbers is **10% salt by weight**. A processor is preparing **5 kilograms** of brine. How much **salt (kg)** should be added?

- A. 0.25 kg
- B. **0.50 kg**
- C. 0.75 kg
- D. 1.0 kg

2. A juice formulation calls for **850 mL** of orange concentrate. If the density of the concentrate is **1.2 g/mL**, what is the **weight in grams** of the required amount?
- A. 708 g
 - B. 850 g
 - C. **1,020 g**
 - D. 1,240 g
3. A food manufacturer produces granola bars at a **cost of \$0.42 per bar** and sells them to distributors for **\$0.90 per bar**. What is the **profit margin per bar**?
- A. 0.38
 - B. 0.42
 - C. **0.48**
 - D. 0.90
4. A batch of jerky begins with **18 pounds** of raw beef. After drying, the final product weighs **9.9 pounds**. What is the **processing yield**?
- A. 35%
 - B. 45%
 - C. **55%**
 - D. 75%
5. A smoothie contains **42 g carbohydrate**, **6 g protein**, and **4 g fat**. Using carb = 4 kcal/g, protein = 4 kcal/g, fat = 9 kcal/g, how many **total calories** are in the smoothie?
- A. 190 kcal
 - B. 214 kcal
 - C. **228 kcal**
 - D. 256 kcal

Scenario #1- Key

To Whom It May Concern:

Last night I opened a jar of your *Harvest Home* Chunky Tomato Pasta Sauce that I purchased at Market World on December 3. The jar had a “Best By” date of March 2026. When I opened it, the safety button on the lid did not pop, and the sauce had a strange, fermented smell and small bubbles rising from the bottom. I did not taste it because it looked spoiled, but I am now concerned that the jar was not properly sealed or processed.

I have used your brand for years, but this made me nervous. Have there been any issue with your processing equipment or sealing procedures? I would like a replacement and information on what caused this.

Sincerely,

Mary Thompson

Question 1: This issue represented in this scenario is a:

- A. Food Quality Issue
- B. **Food Safety Issue**

Question 2: Is the concern or hazard primarily:

- A. **Biological**
- B. Chemical
- C. Physical

Scenario #2

Dear Customer Care Team:

On January 18, I bought one of your *Mountain Mornings* Blueberry Greek Yogurts from the gas station in Brook Ridge. When I peeled back the foil lid, I noticed a strong chemical smell, almost like a cleaning solution. The yogurt tasted bitter and not at all like the others I normally buy. I threw it away immediately. I'm worried about something contaminated by the product during production or packaging. This was very concerning, and I would appreciate a response and possibly a refund.

Sincerely,

Daniel Ortiz

Question 3: This issue represented in this scenario is a:

- A. Food Quality Issue
- B. **Food Safety Issue**

Question 4: Is the concern or hazard primarily:

- A. Biological
- B. **Chemical**
- C. Physical

Scenario #3

Customer Relations:

I bought a box of your *Golden Grain* Granola Bars on January 10. When I opened the first bar, it looked fine, but the second and third bars each had a long, thin piece

of clear plastic embedded inside the granola. It looks like plastic came from a packaging film. I didn't ingest any, but I'm worried someone else might. I have never had this issue with your products before.

Please explain how this could happen and whether other boxes may be affected.

Thank you,

Kelly Rogers

Question 5: This issue represented in this scenario is a:

- A. Food Quality Issue
- B. **Food Safety Issue**

Question 6: Is the concern or hazard primarily:

- A. Biological
- B. Chemical
- C. **Physical**

Scenario #4

To the Quality Assurance Department:

My son ate one of your *Crunchy Trail* Peanut Protein Bars that we purchased last week from the Outdoor Outlet Store. Shortly after eating it, he developed swelling and trouble breathing. We checked the ingredients and noticed that the label lists "natural protein blend," but it does not specifically state that peanuts are included in that blend. My son is severely allergic to peanuts, and we rely on clear labeling to keep him safe.

I'm upset that the allergen was not clearly identified. I expect a response and information on your labeling procedures.

Sincerely,

Angela Miller

Question 7: This issue represented in this scenario is a:

- A. Food Quality Issue
- B. **Food Safety Issue**

Question 8: Is the concern or hazard primarily:

- A. Biological
- B. **Chemical**
- C. Physical

Scenario #5

To Whom It May Concern:

Yesterday while eating your *Frosty Falls* Mint Chocolate Ice Cream, I scooped out what I thought was a cluster of chocolate chips. Instead, it was a small insect frozen in the middle of the carton. The product was sealed and had been stored in my freezer since purchase. I am horrified and unsure how this could have happened inside a sealed container.

Please let me know how this occurred and what you will do to resolve this.

Regards,

Steven Barnes

Question 9: This issue represented in this scenario is a:

- A. Food Quality Issue
- B. **Food Safety Issue**

Question 10: Is the concern or hazard primarily:

- A. **Biological**
- B. Chemical
- C. Physical