2017 Iowa FFA Food Science CDE
General Knowledge Exam

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Food is a ____ commodity.
a. global
b. national
c. local
d. state

____ 2. The United States is the largest exporter of which two items?
a. milk and sugar
b. oranges and apples
c. potatoes and carrots
d. cereal grains and soybeans

____ 3. The periodic table arranges elements by the number of ____ in their outermost energy levels.
a. neutrons
b. atoms
c. protons
d. electrons

____ 4. Covalent bonds are formed by the sharing of a pair of ____.
a. atoms
b. neurons
c. electrons
d. protons

____ 5. What is the symbol for salt?
a. NaCl
b. $C_6H_{12}C_6$
c. H_2O
d. CO_2

____ 6. Hydrogen bonds are formed when a hydrogen atom is shared between two ____.
a. molecules
b. atoms
c. elements
d. neutrons

____ 7. Which types of chemical bonds are the weakest?
a. covalent
b. Van der Waals
c. ionic
d. none of the above

____ 8. Organic chemistry involves molecules that contain which element?
a. carbon
b. nitrogen
c. oxygen
d. calcium

____ 9. Carbohydrates are composed of ____ and ____.
a. carbon, water
b. hydrogen, oxygen
c. zinc, aluminum
d. gold, calcium

____ 10. Which of the following is the source of carbohydrates?
a. plant
b. human
c. animal
d. insect

____ 11. Vitamin ____ functions in normal blood clotting.
a. C
b. A
c. D
d. K

____ 12. Sucrose is commonly referred to as ____.
a. salt
b. carbohydrate
c. sugar
d. glucose

____ 13. ____ is the most common polysaccharide added to food products.
a. Water
b. Salt
c. Glucose
d. Starch

____ 14. Identify the complex carbohydrate that cannot be digested.
a. fiber
b. cellulose
c. sugar
d. fat

____ 15. ____ makes up 14 to 17 percent of the skeleton.
a. Magnesium
b. Iron
c. Phosphorus
d. Sodium

____ 16. ____ functions in carbohydrate metabolism.
a. Zinc
b. Thiamin
c. Riboflavin
d. Vitamin B

____ 17. How many cups of water do humans require per day?
a. 1 to 3
b. 10 to 12
c. 5 to 9
d. 7 to 11

____ 18. Which micromineral is essential for the production of the thyroid hormones?
a. calcium
b. iodine
c. fluorine
d. magnesium

____ 19. RDA stands for Recommended ____ Allowances.
a. Dose
b. Dietary
c. Dairy
d. D-vitamin

____ 20. ____ percent of the adult body is made up of water.
a. Fifty-five
b. Sixty-five
c. Seventy-five
d. Eighty-five

____ 21. An adult should drink ____ glasses of water per day.
a. 6 to 8
b. 7 to 9
c. 5 to 7
d. 8 to 10

____ 22. Carbohydrates and proteins provide about ____ calories per gram.
a. 5
b. 2
c. 4
d. 6

____ 23. Fat contributes about ____ calories per gram.
a. 9
b. 10
c. 8
d. 7

____ 24. Alcohol supplies about ____ calories per gram.
a. 6
b. 7
c. 5
d. 4

____ 25. Fiber is important in ____ function.
a. bowel
b. stomach
c. muscle
d. skeletal

____ 26. The most important food appearance factor is ____.
a. color
b. size
c. shape
d. packaging

____ 27. Naturally occurring ____ play a role in food coloring.
a. enzymes
b. sugars
c. pigments
d. carbohydrates

____ 28. ____ or spectrophotometers can be used for measuring transparent foods.
a. Thermometers
b. Meters
c. Liquid
d. Colorimeters

____ 29. Fruits and vegetables are graded based on their ____ and ____.
a. size, shape
b. color, size
c. smell, shape
d. smell, color

____ 30. ____ standards help ensure food quality.
a. National
b. Quality
c. Packing
d. Legal

____ 31. ____ can be achieved on the basis of density or size and shape.
a. Separation
b. Quality
c. Clarification
d. Flavor

____ 32. A ____ pump consists of a reciprocating or rotating cavity between two lobes or gears and a rotor.
a. positive
b. centrifugal
c. negative
d. hand

____ 33. ____ and ____ are already solid and lend themselves to sun or tray drying.
a. Cheese, meats
b. Fruits, vegetables
c. Cheese, vegetables
d. Fruits, meats

____ 34. The most common drying method is ____ drying.
a. freeze-
b. sun or tray drying
c. spray
d. oven

____ 35. ____ are the largest of the microorganisms but are still single cells, and some produce spores.
a. Yeast
b. Bacteria
c. Molds
d. Ameba

____ 36. Microbes that prefer cold temperatures are ____.
a. mesophilic
b. thermophilic
c. psychrophilic
d. obligative

____ 37. Bacteria or molds that require atmospheric oxygen are ____.
a. anaerobic
b. aerobic
c. mesophilic
d. thermophilic

____ 38. Most bacteria are killed at ____º to ____ºF, but spores are not.
a. 150, 175
b. 180, 200
c. 160, 200
d. 175, 200

____ 39. Microbial growth slows at temperatures under ____ºF.
a. 80
b. 70
c. 60
d. 50

____ 40. ____ can destroy the microorganisms and inactivate enzymes.
a. Radiation
b. Cooling
c. Drying
d. Freezing

____ 41. ____ is the transfer of heat from one particle to another by contact.
a. Conduction
b. Convection
c. Radiation
d. Combustion

____ 42. ____ heating means that the circulation of currents in one region inside a can distributes the heat to another.
a. Conduction
b. Radiation
c. Convection
d. Slow

____ 43. ____ is the transfer of energy in the form of electromagnetic waves.
a. Compulsion
b. Radiation
c. Convection
d. Conduction

____ 44. To achieve continuous pasteurization in milk, the milk needs to be heated to 161ºF for ____ seconds.
a. 15
b. 20
c. 10
d. 5

____ 45. Low-acid foods have pH values of ____ or less.
a. 5.2
b. 4.6
c. 3.9
d. 4.2

____ 46. Cool storage is considered any temperature from ____º to ____ºF.
a. 28, 68
b. 18, 48
c. 28, 78
d. 32, 58

____ 47. Household refrigerators usually run at ____º to ____ºF.
a. 45.5, 50.2
b. 40.5, 44.6
c. 32.3, 35.7
d. 21.4, 26.5

____ 48. Intimate contact occurs between the food or package and the refrigerant with ____ freezing.
a. blast
b. pressure
c. cold
d. immersion

____ 49. How long will frozen orange juice last at 10°F?
a. 14 months
b. 6 months
c. 10 months
d. 2 months

____ 50. Which vitamin is used most commonly to control browning in fruits by enzymes?
a. K
b. C
c. B
d. D

2017
Answer Key

MULTIPLE CHOICE

1. ANS: A
2. ANS: D
3. ANS: D
4. ANS: C
5. ANS: A
6. ANS: A
7. ANS: B
8. ANS: A
9. ANS: A
10. ANS: A
11. ANS: D
12. ANS: C
13. ANS: D
14. ANS: A
15. ANS: C
16. ANS: B
17. ANS: D
18. ANS: B
19. ANS: B
20. ANS: B
21. ANS: A
22. ANS: C
23. ANS: A
24. ANS: B
25. ANS: A
26. ANS: A
27. ANS: C
28. ANS: D
29. ANS: A
30. ANS: B
31. ANS: A
32. ANS: A
33. ANS: B
34. ANS: C
35. ANS: A
36. ANS: C
37. ANS: B
38. ANS: B
39. ANS: D
40. ANS: A
41. ANS: A
42. ANS: C
43. ANS: B
44. ANS: A
45. ANS: B
46. ANS: A
47. ANS: B
48. ANS: D
49. ANS: C
50. ANS: B

2017 Iowa FFA Food Science CDE

Food Safety and Quality Section
Response to Consumer Complaint

The Consumer Affairs Department at Cyclone Dairy has received the following letter from a customer. Please respond to the consumer's complaint. Your response should contain the answers presented by the consumer. Please be concise and courteous in your response. Your response will be scored based on the identification of problem, identification of correct solution, completeness and correctness of your response, courteousness, conciseness (limit to 1 page), and appropriate grammar and correct spelling.

June 5, 2017

Dear Sirs:

I am a loyal customer of Cyclone Dairy and love all your dairy products. Three weeks ago, I purchased several cartons of yogurt. The yogurt I ate right after I purchased it had a smooth creamy texture and great flavor. Yesterday I was going to have some yogurt for lunch. When I opened the container, there was a small amount of watery liquid on the surface of the yogurt. I smelled the yogurt and it had a typical yogurt aroma. The sell-by date on the carton was June 8, 2017. I wasn't sure if I should eat the yogurt or not because of the liquid separating from the yogurt. I decided to throw it out, but wanted to check with you to see if this was safe or not, so if it happens again, I would know what to do. Could you answer the following questions for me?

1. *What caused the separation of the liquid in the yogurt?*
2. *Will I get sick from eating the yogurt?*
3. *Is there anything I can do to correct the problem or should I just throw it out?*
4. *What will your company do to make sure that this liquid separation does not occur in the future?*

I look forward to hearing from you.

Thank you.
Madison Crosby

	Points Possible	Points Received
Identification of Problem	15	
Presentation of Solution	15	
Courteousness of Response	10	
Conciseness (less than 1 page)	5	
Grammar and spelling	5	
	50	

FFA Food Science Consumer Complaint Response

June 8, 2017
50 points

School Name _____
Name _____
Contestant Number _____

Score _____/50____

Complete your response in the box below:

2017 Iowa FFA Food Science CDE

Food Safety and Sanitation Section

In this segment of the contest, you will be given pictures/graphics to view in reference to common problems that exist within the food industry. Your task for each set of pictures and/or graphics are to: (a) identify the problem and (b) select the most appropriate solution to the problem. There will be five (5) sets of food safety and/or sanitation concerns with each question valued at 5 points for a total of 50 possible points.

When done, return this document with your answer sheet to the test proctor.

DO NOT MARK ON THIS DOCUMENT

Set #1:

Question 1: These pictures most represent which of the following food industry concerns:

a. Staphylococcus
b. Salmonella
c. Listeria
d. Botulism
e. Campylobacter

Question 2: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.; Wash raw vegetables thoroughly before eating; and Keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
b. Carefully wash fruits and vegetables, and steam oysters before eating them; Frequently wash your hands, especially after toilet visits and changing diapers and before eating or preparing food; and Thoroughly clean and disinfect contaminated surfaces immediately after an episode of illness.
c. Always wash hands with warm, soapy water; if your hands have any kind of skin abrasion or infection, always use clean disposable gloves; and keep cutting boards clean.
d. Do not eat raw or undercooked eggs, poultry, or meat; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.
e. Handle poultry carefully to prevent cross-contamination; utilize proper wrapping; and most egg products should be pasteurized.

Set #2:

Question 3: These pictures most represent which of the following food industry concerns:

a. Cross contamination
b. E coli
c. Botulism
d. Listeria
e. Salmonella

Question 4: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Home canned products need to use higher level acids, follow strict hygienic procedures, and prepare foods using high temperatures.
b. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry; Wash raw vegetables thoroughly before eating; and Keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
c. Drink only pasteurized milk, juice, or cider; wash fruits and vegetables under running water, especially those that will not be cooked; and cook all ground beef and hamburger thoroughly.
d. Sterilize raw foods at the plants, pasteurization of milk, and improving safe food handling practices in kitchens
e. Do not eat raw or undercooked eggs, poultry, or meat.; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.

Set 3:



Question 5: These pictures most represent which of the following food industry concerns:

a. Listeria
b. Metal contamination in ground beef
c. Botulism
d. Staphylococcus
e. E coli

Question 6: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Sterilize raw foods at the plants, pasteurization of milk, and improving safe food handling practices in kitchens
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e. Do not eat raw or undercooked eggs, poultry, or meat; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.

Set #4:

Question 7: These pictures most represent which of the following food industry concerns:

a. Campylobacter
b. E. coli
c. Salmonella
d. Listeria
e. Norovirus

Question 8: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Home canned products need to use higher level acids, follow strict hygienic procedures, and prepare foods using high temperatures.
b. Sterilize raw foods at the plants, pasteurization, and improving safe food handling practices in kitchens.
c. Increased regulations; over-use promotes emergence of resistant bacteria; and regulated usages to minimize residues in the human food chain.
d. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.; Wash raw vegetables thoroughly before eating; and Keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
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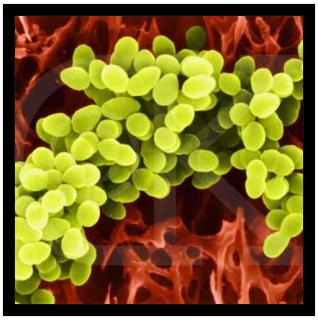

Question 9: These pictures most represent which of the following food industry concerns:

a. Norovirus
b. parasites
c. E coli
d. Staphylococcus
e. Botulism

Question 10: In reference to the above pictures, what would be the solution to this food industry concern/problem?

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b. Home made or processed foods need to be properly stored; when preparing foods, remember to prepare foods under sanitary conditions; if food is to be stored longer than two hours, keep hot foods hot (over 140°F) and cold foods cold (40°F or under).
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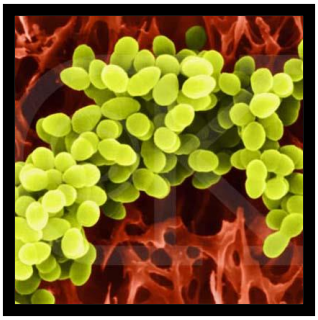

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FFA Food Science Product Development Career Development Event
Developing a Breakfast Bars/Sports Bars

BACKGROUND

Americans are becoming increasingly more interested in their health through improved diet and exercise. Breakfast/Sport bars have gained popularity as a means to provide important nutrition prior to and during work outs. These bars are generally high in protein, vitamins, and minerals, but can also be high in calories and low in fiber. On the other hand, granola bars and trail mixes are generally good sources of fiber, but may be limited in some of the nutrients found in the breakfast bars/sports energy bars.

OBJECTIVE

Your task is to develop a breakfast/sports bar with the desirable characteristics of a breakfast/sports bar (high in protein and carbohydrates) and a granola bar (good source of fiber). Your product should be nutritious, easy to eat, require minimal time for preparation, be easy to prepare, and have satisfactory sensory characteristics. In addition, you will attempt to commercialize the product for grocery store use.

Your target nutrient guidelines are:
Serving size: 75 g (1 bar)
Fat: Less than 5 g
Protein: At least 7 g
Carbohydrates (total): At least 25 g
Dietary Fiber: At least 3 g
Calories: Less than 300 calories

METHOD

With your team, create a food product from the ingredients supplied in the following table. Your team should develop a product name, consider the potential use by consumers, determine the nutritional value, and evaluate the appearance, texture, and flavor of the final product.

Your team will present an oral report (15 minutes – 10 to present and 5 for questions) to a group of trained judges. The evaluation form attached is how your group presentation will be evaluated. It is important that you have graphics to clearly show your product.

RULES

<u>Your team will need to develop but not prepare your product</u>. The following table includes suggestions for ingredients you may use. You may also use related ingredients (not listed) as alternates. You will need to include at least one source of fiber, one source of protein, and a binder which will hold the ingredients together so a bar can be formed. The use of dried fruits and flavorings is optional. A maximum of 8 ingredients can be used in your product. Select items from the following categories:

Fiber	Proteins	Binder	Dried Fruits	Flavorings
Oatmeal	Peanuts	Corn syrup	Raisins	Cinnamon
Wheat Germ	Almonds	Peanut butter	Dried apples	Vanilla
Oat bran	Walnuts	Soynut butter	Dates	Chocolate
	Sunflower seeds	Honey	Coconut	Chocolate chips
	Non-fat dried milk	Oil		
	Sesame seeds			

EVALUATION

Product name _____

Ingredients _____

Preparation time _____

MARKETING PRESENTATION

Each team member should present at least one of the following aspects of food product development: selection of ingredients, nutritional value, ease of preparation, sensory characteristics.

COMMERCIALIZATION

The product that you develop will need to meet all aspects of labeling requirements including principal display panel, nutritional label, and ingredient listing. Your team will be evaluated on this being done correctly. **Information about labeling can be found at: https://www.fda.gov/food/guidanceregulation/guidancedocumentsregulatoryinformation/labelingnutrition/ucm2006828.htm.**

RESOURCES FOR DETERMINING NUTRIENT INFORMATION

USDA Food Composition Database

Downloadable data sets prepared by the **USDA** Nutrient Data Laboratory with nutrient values of foods. https://ndb.nal.usda.gov/ndb/

SPECIFIC REQUIREMENTS

- Suitability of product as a high fiber sports energy bar
- Ingredients should be listed in order of amounts used in product.
- All required parts of the principle display panel should be there.
- All required elements on the Information Panel
- Correct relative placement of PDP and Information Panel
- Appealing PDP and Creative Character
- Reasonably close nutritional panel
- Ability to answer questions about the product.
- All members participate in presentation.

Team Presentation Scorecard

CHAPTER NAME_____

CRITERION	POSSIBLE POINTS	POINTS EARNED
Objective met – to develop a breakfast/sports bar.	50	
All required parts of the principal display panel (PDP).	50	
All required elements on the Information Panel	50	
Correct relative placement of PDP and Information Panel	50	
Reasonably close nutritional panel	50	
Communication skills/oral presentation (clear, logical, easy to understand, confidence in presentation and the information presented, :	50	
Ability to answer questions about the product.	50	
Did all team members contribute?	50	
OVERALL	400	