

**2011 State Dairy Products CDE
Iowa FFA Association**

Part 1. General Knowledge Exam

1. Milkfat carries the following fat soluble vitamins.
 - a. A, D, E and K
 - b. B, B12, D and K
 - c. C, A, E and K
 - d. D, riboflavin, niacin and C

2. Pasteurization
 - a. kills all organisms in milk
 - b. kills only somatic cells
 - c. neutralizes the milk
 - d. kills all illness causing bacteria

3. Probiotic generally refers to live bacteria that _____ affects the host's intestinal microbial balance.
 - a. negatively
 - b. digest
 - c. beneficially
 - d. infect

4. Fermented milk is coagulated by _____.
 - a. casein
 - b. lactose
 - c. lactic acid
 - d. whey

5. The favorite ice cream flavor is
 - a. chocolate
 - b. strawberry
 - c. vanilla
 - d. neopolitan

6. The fat content of reduced fat milk is _____.
 - a. 0.5%
 - b. 1.0%
 - c. 2.0%
 - d. 3.25%

7. Milk with a "feed" off-flavor may have been caused by:
 - a. poor ventilation in the building
 - b. exposure to "white metal" or rusty surfaces on milk handling equipment
 - c. excessive use of chlorine sanitizers
 - d. excess agitation or foaming of raw milk (air leaks)

8. This product is made with whey, a by-product of cheese-making that contains a high amount of nutrients.
 - a. Coffee-Mate non-dairy creamer
 - b. pasteurized half and half
 - c. gouda cheese
 - d. Velveeta

9. Cheese contains, in a concentrated form, many milk nutrients. About _____ pounds of whole milk are needed to make 1 pound of whole milk cheese.
 - a. 2
 - b. 10
 - c. 22
 - d. 36

10. The minimum amount of fat allowed in vanilla ice cream is:
a. 7.5% b. 10.5% c. 12% d. 16%
11. Yogurt is the product resulting from the culturing of a mixture of milk and cream products with the lactic acid-producing bacteria, *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The lactic acid increases shelf life by _____.
a. creating a slightly sour taste
b. destroying the *Lactobacillus bulgaricus*
c. creating a thicker, creamier texture
d. lowering pH and inhibiting the growth of other bacteria
12. Reduced-fat cheese is defined as:
a. 25% less fat per reference amount than its full fat counterpart
b. 50% less fat per reference amount than its full fat counterpart
c. 75% less fat per reference amount than its full fat counterpart
d. less than 0.5 grams of fat per reference
13. Emulsifiers are an important ingredient in ice cream. Emulsifiers _____ and reduce the formation of ice crystals.
a. are rarely used when pasteurized milk is used.
b. are not needed in frozen custard-type ice creams
c. keep fat dispersed and in suspension
d. prevent casein from becoming rancid
14. Milk contains _____ which helps build red blood cells that carry oxygen and nutrients to help fuel your body.
a. niacin b. vitamin B-12 c. vitamin D d. vitamin C
15. Which of the following statements is NOT an accurate representation of processing steps used in making natural cheeses.
a. cottage cheese: pasta filata or stretched curd
b. swiss: bacteria-ripened throughout interior with eye formation
c. colby: curd particles kept separate
d. cheddar: curd particles matted together
16. When compared to unflavored lowfat milk, lowfat chocolate milk is _____.
a. much higher in whey content b. less nutritious
c. just as nutritious d. lower in calories

17. _____ comes from cows fed and raised without the use of pesticides, synthetic fertilizers or hormones.

- a. certified milk
- b. wholesome milk
- c. organic milk
- d. substitute milk

18. The “got milk?” campaign promotes milk consumption because milk contains proteins which are used by the body to:

- a. maintain normal vision and skin
- b. promote the absorption of calcium and phosphorus
- c. maintain vital brain development and growth of body tissues
- d. build and maintain strong bones

19. _____, results in a shelf stable product that does not require refrigeration until opened.

- a. UHT: Ultra High Temperature pasteurization
- b. HTST: High Temperature Short Time pasteurization
- c. UP: Ultra pasteurization
- d. Pasteurization at 145 degrees F for not less than 30 minutes

20. _____ is the liquid remaining after milk has been curdled and strained; it is a by-product of the manufacture of cheese or casein and has several commercial uses.

- a. milk plasma
- b. casein
- c. lactose
- d. lactase

21. What is the main difference between flavored milk and unflavored milk?

- a. essential nutrients are less in flavored milk
- b. basically the same
- c. two to four teaspoons of sugar (sucrose or high fructose corn syrup)
- d. flavored milk is more nutritious

22. Which of the protein fractions forms the major structure of cheeses?

- a. neither, cheese is predominantly fat
- b. whey proteins
- c. lactose proteins
- d. caseins

23. _____ represents one of the most common types of food allergies.

- a. milk
- b. strawberry preserves
- c. pork
- d. corn

24. Under which of the following weather conditions would you expect to observe the greatest decreases in milk yield per cow and in percentage of fat and protein in that milk?

- a. cold and dry b. hot and humid c. cool and rainy d. warm and dry

25. Sherbet....

- a. contains more fat than ice cream
b. contains 1% to 2% milk fat and 50% total milk solids
c. contains 1% to 2% milk fat and 2% to 5% total milk solids
d. contains less sugar than ice cream

26. Which statement is true about creating volume when whipping cream?

- a. The temperature of the cream affects the volume of whipped cream, but fat content does not affect volume.
b. The fat content affects the volume of whipped cream, but temperature does not affect volume.
c. Light whipping cream, whipped at room temperature, will create the greatest volume.
d. Heavy whipping cream that has been chilled before whipping will create the greatest volume.

27. Which of the following nutrients helps your body absorb calcium?

- a. niacin b. potassium c. vitamin D d. vitamin A

28. Ricotta is an example of _____ cheeses, which are obtained by concentrating whey and by coagulating the whey protein with heat and acid, with or without the addition of milk and milk fat.

- a. mold-ripened b. whey c. cold-pack d. surface-ripened

29. Cheese can be frozen, but it may become _____.

- a. mealy and crumbly when thawed b. rancid when thawed
c. less nutritious d. rubbery or stringy

30. Which is not true of fat-free milk?

- a. skim milk b. 1% fat - 100 calories
c. non fat milk d. 0% fat - 80 calories

TURN SCANTRON ANSWER SHEET OVER TO MARK THE CORRECT ANSWERS

Analyze and Interpret

51. Which group has the highest dietary needs for protein (g)?
a. lactating females b. 19-24 yr old males
c. 25-50 year old females d. 15-18 year old males
52. What physical property of milk refers to the number of particles in solution?
a. viscosity b. surface tension
c. pH d. osmolality
53. Which non-milk product is highest in calcium content?
a. broccoli b. swiss cheese
c. sardines d. yogurt
54. What is not included in the milk group?
a. yogurt b. pudding
c. cottage cheese d. dried peas
55. Children (9-18) require ____ servings of the milk group per day.
a. 6 b. 4 c. 3 d. 2
56. The boiling point of milk is:
a. 100.17 degrees C b. 98 degrees C
c. 103 degrees C d. NA
57. The pH level of milk is:
a. always the same b. lower in colostrum
c. lower during mastitis d. lower during mid lactation
58. How much calcium is in the following snack?
½ cup ice cream 1 oz swiss cheese 1 orange
a. 223 mg b. 360 mg c. 232 mg d. 218 mg
59. Where can humans receive vitamin D
a. fresh fruit b. cereal grains c. fresh air d. sunlight
60. Which group has a highest need for folate (folic acid)?
a. 0-6 month b. lactating females
c. women over 70 years d. all women capable of becoming pregnant

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Key

- | | |
|-------|-------|
| 1. A | 51. A |
| 2. D | 52. D |
| 3. C | 53. C |
| 4. C | 54. D |
| 5. C | 55. B |
| 6. C | 56. A |
| 7. A | 57. B |
| 8. D | 58. B |
| 9. B | 59. D |
| 10. B | 60. D |
| 11. D | |
| 12. A | |
| 13. C | |
| 14. B | |
| 15. A | |
| 16. C | |
| 17. C | |
| 18. C | |
| 19. A | |
| 20. A | |
| 21. C | |
| 22. D | |
| 23. A | |
| 24. B | |
| 25. C | |
| 26. D | |
| 27. C | |
| 28. B | |
| 29. A | |
| 30. B | |

3. Use the information in **Table 1** to calculate the weighted average somatic cell count for a herd of three cows. The herd includes cows **1, 7, 14**.

Herd Average SCC: _____ cells/ml

4. Which cow had the highest feed cost per day? _____ (1 pt)

What are two possible reasons for her high feed cost? (4 pt)

5. You are considering starting an on-farm cheese plant to process your own milk. You are milking 210 cows that are averaging 71 pounds of milk per cow per day. On a daily basis, how many pounds of cheese would you expect to produce from the milk produced?

Potential of _____ pounds of cheese per day

6. Utilizing the information in **Table 1**, calculate the per hundredweight value of Class I milk that is 4.8% Butterfat, 3.9% Protein, and 6.5% Other Solids. (Other Solids are paid a premium of \$.029/cwt for each point above 5.0%)

\$ _____ per hundredweight

7. What would be the estimated 305 day production record for milk, protein, and fat for cow 10 if this was an average production per day?

8. During a 305 day lactation, **cows 4, 9, 10, 12** could produce an estimated total of _____ gallons of milk?

_____ gallons

9. How many pounds of skim milk (0% fat) must be added to 650 pounds of 30.0% cream to reduce the butterfat test of the 650 pounds to 20.0%?

_____ pounds of Skim milk

10. How much would your income increase per day if the SCC from all the cows was below 200,000 cells per ml?

2011 FFA Dairy Foods CDE Team Problem Solving Key

Part 1

- A. \$10.52
- B. \$13.59
- C. \$ 7.94
- D. \$16.11
- E. \$19.09
- F. \$13.64
- G. \$12.21
- H. \$14.36
- I. \$20.03
- J. \$13.08
- K. \$ 4.42
- L. \$ 1.71
- M. \$ 8.04
- N. \$23.04
- O. \$13.42
- P. \$14.93
- Q. \$14.03
- R. \$10.81
- S. \$ 8.39
- T. \$16.43
- U. \$14.01
- V. \$10.68
- W. \$ 8.26
- X. \$12.58
- Y. \$14.22

Part 2

1. $(.75)(19.65) + (.25)(15.25)$
 $14.74 + 3.81 = \mathbf{\$18.55}$
2. $(100/8.5) \times 3.90 = \mathbf{\$45.88}$
3. $69 \times 367,000 = 25,323,000$
 $29 \times 777,000 = 22,533,000$
 $55 \times 210,000 = 11,550,000$
$$\begin{array}{r} 153 \qquad \qquad \qquad 59,406,000/153 \\ \hline \mathbf{388,274} \end{array}$$
4. **Cow 5**
Bigger cow - eats, needs more feed
Fed more grain/higher producer
5. $(210)(71) / 10 = \mathbf{1491 \# \text{ cheese}}$
6. $4.8 - 3.5 = 13 \text{ pts} \times .25 = 3.25$
 $3.9 - 3.5 = 4 \text{ pts} \times .69 = 2.76$
 $6.5 - 5.0 = 15 \text{ pts} \times .029 = \underline{.435}$
 $19.65 + \qquad \qquad \qquad 6.435 = \mathbf{\$26.095}$
7. $59\# \text{ milk} \times 305 \text{ days} = \mathbf{17,995 \# \text{ milk}}$
 $59\# \times 3.6\% \text{BF} \times 305 = \mathbf{647.82 \# \text{ fat}}$
 $59\# \times 5.0\% \text{ pr} \times 305 = \mathbf{899.75 \# \text{ protein}}$
8. $55 + 77 + 59 + 76 = (267 \times 305) / 8.5 = \mathbf{9580.6 \text{ g}}$
9. $\frac{0}{30} - \frac{10}{20} (10/30) \times 650 = \mathbf{217\#}$
 $\frac{20}{20} (20/30) \times 650 = 433\#$
 $\mathbf{217\# \text{ skim milk}}$
10. $69 + 82 + 29 + 88 + 76 + 55 = (399/100) \times .31 = \mathbf{\$1.2369}$