North Carolina Science Olympiad
Coaches Training Food Science (B) Event 2008

Please place all answers on the answer sheet. Additional scratch paper is available.

Please read instructions and questions carefully.

Clean up instructions are included in each question and is required before leaving the event.

1. Bakery treat (60 points)

Marty is a high school student working for the summer in a lab at his parent's bakery which makes all types of baked goods. This lab runs several types of chemical tests. Marty didn't participate in the Science Olympiad Food Science Event and needs your help. He needs to know the answers to the following questions. Please answer the questions below concerning the tests and leavening agents, then continue with some experiments to assist in answering the rest of his questions.

QUESTIONS part 1 (4 pts each)

A. What does the Benedict's test measure?

a. starch b. monosaccharides c. reducing sugar d. protein

B. What does the Biuret test measure?

a. starch b. monosaccharides c. reducing sugar d. protein

C. What colors could you see in a positive reaction for the Benedict's test?

a. green, yellow, red b. blue, yellow, red c. blue, green, purple d. purple, pink

D. What colors would you see in a positive reaction for the Biuret test?

a. green, yellow, red b. blue, yellow, red c. blue, yellow, pink d. purple, pink

E. The bakery where Marty works makes several types of items using several types of leavening agents. Match the food and the leavening agent they use.

1. Crackers	a. Yeast
2. Biscuits	b. Whipped air
3. Angel food cake	c. Water
4. Whole wheat bread	d. Baking powder

All the ingredients that come to the bakery are tested in the quality control lab before the ingredients can be used to make any of the products. Five different ingredients were delivered to the lab in one day with no labels! Can you help Marty decide which ingredients are in the containers?

EXPERIMENTS---READ INSTRUCTIONS on page 3 BEFORE STARTING TESTS!!

North Carolina Science Olympiad 2008
Coaches Training Food Science (C) Event
Read all instructions carefully.

You may complete the event questions in any order! Please place all marks and answers on the ANSWER sheet. Additional scratch paper is available. Clean up instructions are included in each question and is required before leaving the event.

I. (90 pts) Bakery Blues

Marty is a high school student working for the summer in a lab at his parent's bakery which makes all types of baked goods. This lab runs several types of chemical tests. Marty didn't participate in the Science Olympiad Food Science Event and needs your help. He needs to know the answers to the following questions. Please answer the questions below concerning the tests, then continue with some experiments to assist in answering the rest of his questions.

QUESTIONS (4 pts each)

A. What does the Benedict's test measure?

a. starch b. monosaccharides c. reducing sugar d. protein

B. What does the Biuret test measure?

a. starch b. monosaccharides c. reducing sugar d. protein

C. What colors could you see in a positive reaction for the Benedict's test?

a. green, yellow, red b. blue, yellow, red c. blue, green, purple d. purple, pink

D. What colors would you see in a positive reaction for the Biuret test?

a. green, yellow, red b. blue, yellow, red c. blue, yellow, pink d. purple, pink

E. The bakery where Marty works makes several types of items using several types of carbohydrates. Match the food and the carbohydrate they contain.

1. Fructose	a. Cornstarch
2. Sucrose	b. Jelly
3. Pectin	c. Honey
4. Amylose	d. Molasses

F. The bakery decides to switch from using sucrose in one type of bread to using honey. They notice a difference in the final browning of the bread. Is it from:

a. higher pH b. increased carmelization c. increased Maillard reaction
d. b and c e. a and c

All the ingredients that come to the bakery are tested in the quality control lab before the ingredients can be used to make any of the products. Six different ingredients were delivered to the lab in one day with no labels! Can you help Marty decide which ingredients are in the containers?

G. Perform tests needed to identify unknown samples at your station (1-5) (8 points each unknown) Chart for answers is located on answer sheet.

The five ingredients that were delivered to the lab that day for testing were:

Whey protein (W)
Whole wheat Flour (F)
Sugar (sucrose) (S)
Baking powder (BP)
Powdered sugar blend (sugar, dextrose and cornstarch) (PSB)

EXPERIMENTS---READ INSTRUCTIONS BEFORE STARTING TESTS!!

At the side stations, you will find FIVE sample containers labeled with their sample number, test cups and tubes, reagents, and cup for hot water. Obtain hot water from the dispensers. Follow test instructions found below for each type of test. Please return all samples, cups and reagents to stations at end of event.

Perform only the tests you need to fill in the label for each sample.

Perform only the tests you need to fill in the Label for the samples. You may not need to run every test in order to identify the samples, so work smart…not hard, however YOU MUST FOLLOW THE INSTRUCTIONS TO OBTAIN CORRECT REACTIONS.

Test Instructions

Reaction with vinegar

1. Label test cups with sample numbers. Pipet 3 mL of sample from sample container (if liquid) or small amount of dry ingredient into test cup. Add 3 mL water to dry ingredient.
2. Pipet 1mL vinegar **(V)** into test cup and note results in table.

Clean up: Empty liquids from test cups into **sink** and rinse down drain with water. Place sample cups into **trash can**. Clean up spills with paper towels.

Benedicts test

1. Label test tube for samples using Sharpie
2. Pipet 3 mLs of diluted sample from sample cup into corresponding test tube.
3. Add 1 mL Benedict's solution to each unknown.
4. At hot water dispenser, fill **Styrofoam**® cup with only 1" of hot water- no more. Return to station with water.
5. Place tubes in cup of hot water for 5 minutes.
6. Place tubes into rack for observation.
7. Observe and record results in the table on page 3.

Clean up area by emptying samples into **waste container** and placing test tubes into **glass box**. Leave Styrofoam cup, water cup, and pipets (by correct reagents) and samples for next session. Wipe up spills with paper towels.

Biuret test

1. Label test cups for sample
2. Pipet 3 mL of sample from sample cup into corresponding test cup.
3. From the Biuret bottle (B), add 1 mL of Biuret solution to each tube.
4. Gently swirl contents of tube.
5. **Wait 10 minutes.**
6. Observe and record results (++, + or -) in table.

Clean up area by emptying contents of test cups into **waste container** and placing test cups into **trash can**. Wipe up spills with paper towels.

Iodine Test

1. Label test cup for with sample number. Pipet 3 mL of sample from sample container into corresponding test cup.
2. Add 1 drop of **Iodine** to each test cup and note reaction at 3 minutes. Shake or swirl if needed to see reaction. Record results in table.

Clean up: Empty liquids from test cups into **sink** and rinse down drain with water. Place test cups in **trash can**. Clean up spills with paper towels.