

國立屏東科技大學 103 學年度 碩士班暨碩士在職專班 招生考試
食品科學國際碩士學位學程
食品科學概論(含食品加工、食品化學、食品微生物)試題

Instructions:

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1. Write your answers on the **answer booklet** and clearly mark the corresponding question number in the front of them. No point will be given for anything written in the question sheets, but you may use the blank space for notes or scratch work.
2. All answers must be written **in English**. No point will be given if you write your answers in languages other than English.
3. **Do not** mark anything, such as name, phone number, entrance exam admit card number, etc., which may show or mean your recognition on the answer booklet. Violation of this rule will be considered cheating and treated accordingly.

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I. Multiple-Choice Questions: 15 questions; 2 points per question. Mark only one correct or best answer to each question; no deduction for a blank or wrong answer.

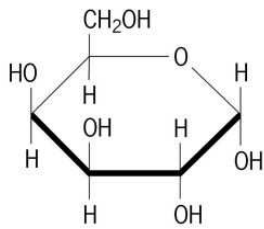
1. You are observing a cell through a microscope and note that it has not apparent nucleus. You conclude that it most likely
 - 【A】 has a peptidoglycan cell wall
 - 【B】 has a cellulose cell wall
 - 【C】 moves by pseudopods
 - 【D】 is part of a multicellular animal
2. What word best describes the following arrangement of cells



- 【A】 diplococci
 - 【B】 streptococci
 - 【C】 tetrad
 - 【D】 sarcinae
3. Which of the following is not part of the active transport process?
 - 【A】 plasma membrane
 - 【B】 carrier proteins
 - 【C】 ATP
 - 【D】 cell wall
 4. For which type of fluid does viscosity not depend on shear rate?
 - 【A】 a dilatant fluid
 - 【B】 a Newtonian fluid
 - 【C】 a pseudoplastic fluid
 - 【D】 a rheopectic fluid
 5. Which of the following compounds would not have a sweet taste?
 - 【A】 arabinose
 - 【B】 saccharin
 - 【C】 caffeine
 - 【D】 aspartame
 6. Protein denaturation may be caused by all except which one of the following?
 - 【A】 heat
 - 【B】 infrared radiation
 - 【C】 change in pH
 - 【D】 treatment with enzymes

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7. What sugar is this? Created by Unregistered Version



- 【A】 alpha-D-galactose 【B】 beta-D-glucose
【C】 alpha-D-mannose 【D】 beta-D-allose

8. Which of the following amino acid would be the most susceptible to participate in Maillard browning? Created by Unregistered Version

- 【A】 glycine 【B】 L-aspartic acid
【C】 L-lysine 【D】 L-serine

9. Certain fruits such as fresh pineapple may not be used in gelatin desserts. This is due to the presence in the fruit of

- 【A】 too much sugar 【B】 too much acid
【C】 too much fat 【D】 too much proteolytic enzyme

10. Which of the following food processing operations is NOT for cooling food products?

- 【A】 air blast 【B】 extrusion
【C】 ice water bath 【D】 vacuum oven

11. An emulsifier

- 【A】 prevents the separation of oil and water in food
【B】 maintains the shape or crispness of fruits and vegetables

【C】 controls insects and pests

【D】 produces or stimulates CO₂ production

12. A microorganism commonly found in human nasal passages and on the skin that can cause foodborne illness if food becomes contaminated is

- 【A】 *Escherichia coli* O157:H7 【B】 *Clostridium perfringens*
【C】 *Clostridium botulinum* 【D】 *Staphylococcus aureus*

13. Sodium benzoate is used in soft drinks primarily to inhibit

- 【A】 rancidity 【B】 color deterioration
【C】 mold growth 【D】 flavor breakdown

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14. The red color of a tomato is due to a compound called

- 【A】 beta carotene 【B】 lycopene
【C】 limonene 【D】 myosin

15. Milk and ice cream processing involves both homogenization and pasteurization.
Homogenization is

- 【A】 evaporation of liquid under vacuum leaving a concentrate
【B】 addition of bacterial starter culture
【C】 rapid heating of milk to very high temperatures to kill disease-causing bacteria in the milk
【D】 reduction in size of fat globules by forcing the milk or cream through a very small opening under pressure

II. Fill-in-the-blank questions: 10 questions; 3 points per question. Fill in the blanks with appropriate and necessary answer(s).

1. The building blocks of protein are called _____.
2. Egg white changes from a clear liquid to an opaque white solid upon heating due to _____.
3. By using _____ the microbial species introduced for fermentation can be controlled.
4. The process when ice become water vapor without first going through a liquid state is called _____.
5. A food contain 6 grams of fat. That would be equivalent to _____ calories.
6. *Listeria monocytogenes* is a bacteria that grows at refrigeration temperature and is considered to be a _____.
7. Margarine is formed by adding hydrogen atoms to unsaturated fatty acid, a process otherwise known as _____.
8. A _____ is an illness caused by consuming a food that contains a harmful metabolite from a microorganism
9. How long would it take to reduce 10^9 *Bacillus stearothermophilus* to 1 at 121°C. ($D_r = 5.8$ min)? _____.
10. Addition of a solute to a solvent _____ the freezing point and _____ the boiling point.

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III. Short Answer Questions: 4 questions, 10 points for each question. Write your answers clearly and legibly. Cross out any errors you make; crossed-out work will not be scored. Diagrams may be used to supplement clarification, but diagrams alone will not suffice.

1. Define the Hurdles or Barrier concept. Explain how you would use the Hurdles or Barrier concept to ensure the safety and shelf-life of a new food product you are developing?

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2. Describe the pathogenic mechanisms involved in foodborne illness for the following:

Enterotoxigenic *Escherichia coli*

Enteroinvasive *Escherichia coli*

Enterohemorrhagic *Escherichia coli*

3. What is the importance of water activity in food? What characteristics, reactions, etc. does A_w control?
4. Discuss the conditions for gelatin gelation. Include the effect of concentration of gelatin, temperature of dispersion and gelation, molecular weight of gelatin, pH, sugar concentration, and presence of enzymes. Which gelatin gel will be the most thermally stable, one set at room temperature or one set at refrigerator temperature?

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