

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2012  
EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALIZATION PAPER for FOOD SC. & TECHNOLOGY**

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<b>Date</b>	: 14 October 2012
<b>Total Marks</b>	: 100
<b>Examination Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 Minutes (prior to examination time)

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**READ THE FOLLOWING INSTRUCTIONS CAREFULLY:**

1. Write your Roll Number clearly on the Answer Booklet in the space provided.
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are NOT PERMITTED TO WRITE during this time.
3. Use either Blue or Black ink pen or ball point pen for the written part and Pencils for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper or any other materials.
5. It is divided into two sections-namely SECTION A and SECTION B.
6. SECTION A consists of two parts: Part I and Part II.

Part I consists of 30 Multiple-Choice Questions carrying one (1) mark each and is compulsory. The answer of your choice should be clearly written in whole along with the question and option number on your answer booklet. Eg. 31(c).

Part II consists of four (4) short answer questions of five (5) marks each and all questions are compulsory.

7. SECTION B consists of two Case Studies. Choose only ONE case study and answer the questions under your choice. Each case study carries fifty (50) marks in total.
8. This Paper consists of eight (8) pages including this Instruction page.

**SECTION A**

**PART I - Multiple Choice Questions**

**Choose the correct answer and write down the letter of the correct answer chosen in the Answer Sheet against the question number. E.g. 31 (c). Each question carries ONE mark.**

1. What are the respective polysaccharides that plant and animal used for storage of food energy?
  - a. Starch & Glycogen
  - b. Maltose & Amylose
  - c. Sucrose & Glycogen
  - d. Lactose & homoglycans
  
2. \_\_\_\_\_ is the complex lipids.
  - a. Glycerides
  - b. Sterol
  - c. Phospholipids
  - d. Vitamin A
  
3. Which is the target microorganism in the food processing industry because of it being the neurotoxin producer?
  - a. Salminella
  - b. Staphylococcus aureus
  - c. Bacillus cereus
  - d. Clostridium botulinum
  
4. \_\_\_\_\_ is the time dependent non-newtonian fluid
  - a. Shear –thickening
  - b. Ideal Bingham plastic
  - c. Thixotropic
  - d. Shear-thinning
  
5. Which fruit is non-climacteric?
  - a. Apple
  - b. Orange
  - c. Mango
  - d. Persimmon

6. Which pairs of fresh products are compatible for storage in terms of ethylene sensitivity?
- Apple & Persimmon
  - Apricot & Lemon
  - Orange and Mango
  - Potato and Apple
7. The lipid oxidation is lesser in the water activity( $a_w$ ) value range of \_\_\_\_\_
- Less than 0.3  $a_w$
  - More than 0.5  $a_w$
  - Between 0.3  $a_w$  to 0.5  $a_w$
  - None of the above
8. Which enzyme is responsible for the tissue firming of fruits and vegetables?
- Amylase
  - Lipase
  - Polygalacturonase
  - Pectin esterase
9. Which is the secondary taste parameter
- Sweetness
  - Bitterness
  - Sourness
  - Astringency
10. Which statement is correct in three steps of lipid autoxidation?
- Free radical is generated in initiation step
  - Peroxy radicals is generated in termination step
  - Non-radical products in propagation step
  - None of the above
11. The fat soluble vitamins is
- Thiamin
  - Retinol
  - Folic acid
  - Niacin
12. Which of the chain in amylopectin cluster model gives amorphous region ?
- A chain that contains only  $\alpha(1\rightarrow4)$  linkages
  - B chain that contains  $\alpha(1\rightarrow4)$  and  $\alpha(1\rightarrow6)$  linkages
  - C chain that contains  $\alpha(1\rightarrow4)$  and  $\alpha(1\rightarrow6)$  linkages plus a reducing group
  - None of the above

**PAPER III: SUBJECT SPECIALIZATION PAPER for FOOD SC. & TECHNOLOGY (Technical)**

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13. \_\_\_\_\_ enzyme cause the browning of fruits and vegetables
- Peroxidase
  - Polygalacturonase
  - Polyphenoloxidase
  - Myrosinase
14. If 12D process is applied while sterilizing the raw material which contains 1000 spores per container, what will be microbial numbers per container after sterilization?
- $10^{-3}$
  - $10^{-6}$
  - $10^{-9}$
  - $10^{-12}$
15. Which method is used for determining the nitrogen?
- The Soxhelt method
  - The Gerber method
  - The Kjeldahl method
  - None of the above
16. In \_\_\_\_\_, the light absorbance is measured either in a transmission mode for solutions or in a reflectance mode for solids, or even in a combination of both for dispersions.
- Infrared spectroscopy
  - Microwave spectroscopy
  - Fluorescence spectroscopy
  - Near infrared spectroscopy
17. Which type of reaction causes food browning by the direct heating of carbohydrates, particularly sugars and sugar syrups?
- Maillard reaction
  - Oxidative browning
  - Caramelization
  - Enzymatic browning
18. If the orange juice(10% sugar) is mixed with sugar syrup(60% sugar) to get 50kg of fruit squash(15% sugar), what is the resulting proportion of orange juice and sugar syrup need to be mixed(use Pearson Square)
- 10kg of orange juice and 40 kg of sugar syrup
  - 45 kg of orange juice and 5 kg of sugar syrup
  - 35kg of orange juice and 15kg of sugar syrup
  - None of the above

