

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2019
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALISATION PAPER FOR FOOD TECHNOLOGY

Date	: October 13, 2019
Total Marks	: 100
Writing Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
Part II - 4 Short Answer Questions
All questions under SECTION A are COMPULSORY.
 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **7 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions (30 marks)

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Addition to the food of one or more dietary essentials in amounts higher than those present in the food in the natural state is called
 - a) Enrichment
 - b) Fortification
 - c) Restoration
 - d) None of the above.

2. Tocopherol is the chemical name of vitamin _____.
 - a) vitamin A
 - b) vitamin C
 - c) vitamin D
 - d) vitamin E

3. In the liver, alcohol is converted into:
 - a) Caffeine
 - b) Acetone
 - c) Acetaldehyde
 - d) All of the above.

4. Bacteria that can live with or without oxygen are called
 - a) Facultative anaerobes
 - b) Autotrophic anaerobes
 - c) Obligate anaerobes
 - d) Hilotrophic anaerobes

5. Saturated fatty acids
 - a) elevate blood cholesterol.
 - b) minimize the level of blood cholesterol.
 - c) has no effect.
 - d) None of the above.

6. Cow milk is yellow in color due to the presence of
 - a) Riboflavin
 - b) Xanthophenol
 - c) Beta carotene
 - d) None of the above.

7. Strategies that reduce the amount of waste from food manufacturing and improve the sustainability of food production systems include
 - a) reducing the manufacture of foods that produce greenhouse gases.
 - b) discounting the price of unsold food and donating it to charity.
 - c) developing new food products from the waste left from food processing.
 - d) increasing the use of waste as fertilizer for organic farming.

8. Refractometer is used for the analysis of
 - a) TSS
 - b) Ash content
 - c) Moisture
 - d) Fat

9. Proteases are used for degradation of
 - a) Polypeptides
 - b) Fats
 - c) Carbohydrates
 - d) Nucleic acid

10. Bacterial growth occur maximum at temperature of
 - a) 20°C
 - b) 5°C
 - c) 100°C
 - d) 37°C

11. A food additive causing the classical symptoms of the Chinese Restaurant Syndrome is
 - a) Monosodium glutamate
 - b) Anticaking agents
 - c) Sequest-rants
 - d) Buffering agents

12. Trimethyl amine oxide is reduced to trimethyl amine is an indicator of
 - a) Meat spoilage
 - b) Egg spoilage
 - c) Fish spoilage
 - d) Poultry spoilage

13. Which of the following is polyunsaturated fatty acid?
 - a) Palmatic acid
 - b) Butyric acid
 - c) Arachidonic acid
 - d) None of the above.

14. Papain and bromelain are used in
 - a) Beverages industry
 - b) Milk industry
 - c) Meat industry
 - d) Bakery

15. The first enzyme to be purified and crystallized was
- Urease
 - Diastase
 - Insulin
 - Zymase
16. What happens when Potassium Metabisulphate (KMS) is added as a preservative?
- Gives out sulphur dioxide.
 - Gas collects on top.
 - Prevents entry of micro-organism.
 - All of the above
17. Tempeh is a highly popular soyebean preparation in
- Indonesia
 - Japan
 - China
 - Africa
18. Ketose like fructose is distinguished from other sugar by
- Benedicts
 - Barfodes
 - Bialis test
 - Selliwanoffs
19. The non-methylated galacturonic with polymers found in immature fruit is
- Protopectin
 - Pectic
 - Pectinic acid
 - Pectin
20. Commercial food producers are legally obliged to produce food that is
- consistently available and convenient.
 - safe to consume and labelled correctly.
 - labelled correctly and consistently available.
 - safe to consume and convenient.
21. The measure of the availability of water molecules to enter into microbial, enzymatic or chemical reactions is
- Moisture content
 - Water activity
 - Bound water
 - Relative humidity
22. Which condition is common to meats that are frozen before rigor mortis is established?
- Pale Soft Exudative (PSE)
 - Cold shortening
 - Pre-rigor
 - Dark Firm Dry (DFD)

23. The virus most often linked to food handlers is
- Hepatitis A
 - Salmonella
 - Claviceps
 - Hepatitis C
24. In a product like bread, why is calcium propionate used?
- Antioxidant
 - Dough strengthener
 - Emulsifier
 - Antimicrobial agent
25. The principle behind the application of several treatments to prevent bacterial growth is
- the hurdle effect.
 - the inhibitory effect.
 - the antimicrobial principle.
 - the inhibitory principles.
26. A phospholipid in egg yolk that is very effective emulsifying agent is
- Lecithin
 - Calcium propionate
 - Glyceryl monostearate
 - Ethanol amine
27. The pungent principle in chili is an alkaloid called
- Pipperin
 - Capsaicin
 - Curcumin
 - Euginol
28. Nutritive value of proteins of legumes is improved by
- Diet planning
 - Eating raw
 - Heat processing
 - None of the above.
29. Which drug is present in cola drinks?
- Valium
 - Cocaine
 - Opiate
 - Caffeine
30. A free trade agreement allows trade
- without the use of barriers such as tariffs, subsidies and embargoes.
 - with farmers in developing countries offering a fair price for crops.
 - without tariffs or taxes added to the cost of exported goods only.
 - to secure income and support sustainable farming practices.

PART II – Short Answer Questions (20 marks)

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. What are the pack-house operations for proper post-harvest handling and management operation of fruits and vegetables? Explain any six major operations in the pack house. (2+3 marks)
2. What are the sensory attributes of a food product? Explain in detail the appearance of food as a sensory attribute. (2+3 marks)
3. Explain the importance of microorganism in food. What are the factors affecting microbial behaviour in food? (2+3 marks)
4. What is food irradiation? Give six examples of foods irradiated with purpose. (2+3 marks)

SECTION B: Case Study (50 marks)

Choose either CASE I or CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Humankind has always been interested in food. The science of functional foods is the convergence of two major events in our lives - diet and health. The association between food and disease is widely recognized as the bedrock of preventive nutrition. The concept of 'functional foods' is often cited as a newly emerging field.

1. Explain the concept of functional food and recent developments worldwide. (10 marks)
2. Explain the opportunities in the development of functional food products. (10 marks)
3. Explain any five roles and health benefits of different functional food components. (10 marks)
4. Describe in detail with examples under each category of functional food and their benefits:
 - a) Fermented functional food (5 marks)
 - b) Functional whole food (5 marks)
5. Describe functional food from animal products. Explain the roles and health benefits of functional food from meat with examples. Draw future prospects and limitations of functional food. (3+5+2 marks)

CASE II

Sensory evaluation is a scientific disciplines that analyses and measures human response to the composition and nature of food and drinks. It does not just deal with "likes and dislikes, "OK or not OK" but the process scientifically elicits, measures, analyses and interprets psychological and/or physiological responses to physical stimuli produced by a food product.

1. What do you understand by the term 'Sensory Evaluation' of food product and why it is important? Explain the steps in developing a sensory analysis test/study. (2+3+8 marks)
2. Name the sense organs responsible for sensory analysis of food product and explain how each sense organ perceives different characteristics of food. (2 + 10 marks)
3. Describe physiological, psychological and cultural factors affecting sensory evaluation of a food product. (9 marks)
4. Describe the sensory evaluation methods listed below: (4x4=16 marks)
 - a) Discriminatory testing
 - b) Difference testing
 - c) Descriptive Testing
 - d) Affective testing

TASHI DELEK