THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
ADVANCED CERTIFICATE OF SECONDARY EDUCATTION EXAMINATION

155/1 **FOOD AND HUMAN NUTRITION 1**

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2024**

Instructions

1. This paper consists of sections **A** and **B**.
2. Answer **all** questions in section **A** and only **Three (3)** questions from section **B**.
3. Cellular phones and any unauthorised materials are **not** allowed in the examination room.
4. Write your **examination Number** on every page of your answer booklet(s).

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1. Some types of food contain toxic substances which can cause health hazards to people when consumed in large quantities. Identify five examples of such types of food. In each type, give the toxin it contains and state the health hazard it may cause.

   Cassava contains cyanogenic glycosides. When improperly processed, these release cyanide, which can cause acute poisoning leading to headaches, dizziness, and in severe cases, death.

   Green potatoes contain solanine, a natural toxin. Consumption can cause nausea, vomiting, diarrhea, and neurological problems such as headaches and dizziness.

   Raw kidney beans contain lectins, specifically phytohaemagglutinin. Eating raw or undercooked beans can cause severe gastrointestinal distress including nausea, vomiting, and diarrhea.

   Fugu fish (pufferfish) contains tetrodotoxin. This toxin affects the nervous system and can cause paralysis and even death if ingested in significant amounts.

   Mushrooms like Amanita species contain amatoxins. These toxins cause severe liver damage and can be fatal if consumed.

2. The denaturation of proteins depends on the effects of different conditions which give rise to definite changes in their properties. Justify this statement in five points.

   Denaturation alters the protein's three-dimensional structure without breaking peptide bonds, changing its physical and chemical properties.

   Heat can cause denaturation by breaking weak bonds such as hydrogen bonds and disrupting the folding pattern, making the protein lose its function.

   pH changes affect the charge distribution on amino acids, leading to unfolding of the protein and loss of solubility and biological activity.

   Chemical agents like alcohol or heavy metals interfere with bonding and can cause proteins to precipitate or lose their functional shape.

   Mechanical agitation such as whipping can unfold proteins by breaking intermolecular forces, affecting texture and viscosity in food products.

3. You are invited as an expert in bread making to advise a Mama Lishe group on how to improve their bread production to satisfy their consumers' needs. Briefly describe to them:

   (a) Three factors which affect the baking quality of wheat flour.

   The protein content, especially gluten, influences the dough's elasticity and ability to rise, affecting bread texture.

   The moisture content affects the shelf life and baking performance; too much moisture can make the flour spoil quickly.

   The degree of milling influences the flour's texture and consistency, with finer flour generally producing better quality bread.

   (b) The guidelines they would follow in using the yeast as rising agent for the production of quality bread. Give seven points.

Use fresh and active yeast to ensure good fermentation and bread rise.

Store yeast in a cool, dry place to maintain its potency.

Use the correct yeast quantity as too much or too little affects dough rising time and texture.

Activate yeast in warm water (around 35-40°C) for optimal fermentation.

Avoid using water that is too hot as it kills the yeast, preventing rising.

Allow sufficient time for dough fermentation to develop flavor and volume.

Avoid adding excessive salt or sugar which can inhibit yeast activity.

4. Differentiate perishable and non-perishable types of food by using five points.

Perishable foods have a short shelf life and spoil quickly, while non-perishable foods can be stored for long periods without spoiling.

Perishable foods require refrigeration or freezing to preserve quality, whereas non-perishable foods are stable at room temperature.

Perishable foods are often fresh products like fruits, vegetables, dairy, and meats; non-perishable foods include dried grains, canned goods, and processed foods.

The nutrient content in perishable foods is often higher but degrades faster, while non-perishable foods may lose some nutrients during processing but remain safe longer.

Perishable foods are more susceptible to microbial growth, causing rapid spoilage, while non-perishable foods have low moisture content limiting microbial growth.

5. Your neighbour is seriously sick and you were consulted to plan meals for him/her. What things would you consider in planning for his/her meals? Give ten points.

Consider the specific medical condition and dietary restrictions to avoid harmful foods.

Ensure meals are nutritious, providing adequate energy and essential nutrients for recovery.

Include easily digestible foods to prevent gastrointestinal discomfort.

Avoid foods that can cause allergic reactions or intolerances.

Plan small, frequent meals if the patient has a reduced appetite.

Incorporate fluids and hydrating foods to prevent dehydration.

Consider the patient's taste preferences to encourage food intake.

Avoid foods that may interfere with medications being taken.

Ensure food safety and hygiene to prevent infections.

Monitor portion sizes to prevent undernutrition or overfeeding.

6. A reasonably stable food supply throughout the year is a necessary condition for food and nutrition security in the household. Suggest five ways of ensuring food stability at this level.

   Practice crop diversification to reduce dependence on a single food source.

   Use improved storage facilities to reduce post-harvest losses.

   Implement irrigation to support food production during dry seasons.

   Adopt modern farming techniques to increase yields and reduce variability.

   Establish community food reserves or grain banks to buffer against shortages.

7. You have been invited to a seminar to address on "balanced meals and meal planning." The specific agenda in the second day of the seminar was "why should people become strict vegetarians?" Suggest six key points that you will address for the second agenda.

   Strict vegetarianism promotes better heart health by reducing intake of saturated fats and cholesterol found in animal products.

   It helps in maintaining a healthy body weight due to lower calorie density of plant-based foods.

   A vegetarian diet reduces the risk of certain cancers by increasing consumption of fiber, antioxidants, and phytochemicals.

   It contributes to environmental sustainability by lowering greenhouse gas emissions and reducing resource use compared to meat production.

   Vegetarian diets can improve digestion and gut health through higher fiber intake.

   Adopting vegetarianism promotes ethical treatment of animals and reduces animal suffering.

8. The Amana village farmers who opted to store their food grains by using chemicals realised that, they lacked knowledge on the types and actions of pesticides. Assist them by analysing four organic pesticides and five inorganic pesticides they could use. Give the mode of action of each type.

   Organic pesticides:

   Pyrethrin: Derived from chrysanthemum flowers; it affects the nervous system of insects causing paralysis and death.

   Neem oil: Extracted from neem tree seeds; it disrupts insect feeding and reproduction.

   Rotenone: Extracted from roots of some plants; it inhibits cellular respiration in pests.

   Nicotine sulfate: From tobacco leaves; it acts as a neurotoxin on insects causing paralysis.

   Inorganic pesticides:

   Copper sulfate: Fungicide that disrupts enzyme activity in fungi.

   Sulfur: Used against fungi and mites; it inhibits respiration and enzyme function.

   Bordeaux mixture (copper sulfate and lime): Controls fungal diseases by forming protective barrier.

   Lime sulfur: Controls mites and fungi by acting as a contact poison.

Calcium arsenate: Insecticide acting as a stomach poison to insects by interfering with metabolism.

9. Along with advances in the field of food processing, the convenient measures of packaging should be applied to meet the criteria of a package and enhance consumers' acceptability. In view of this statement, describe:

(a) Three necessities for food packaging.

Packaging protects food from physical damage during transportation and storage.

It acts as a barrier to prevent contamination from microorganisms, moisture, and dust.

Packaging provides information about the food, such as nutritional content, expiry dates, and handling instructions.

(b) Six characteristic features of good food packaging materials.

Good packaging materials should be non-toxic and safe for food contact.

They must have good barrier properties to moisture, oxygen, and light to preserve food quality.

Packaging materials should be strong and durable to withstand handling and transportation.

They need to be cost-effective for commercial viability.

Packaging should be easy to use, including opening, resealing, and disposal.

Materials must be environmentally friendly or recyclable to reduce waste impact.