MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRICULTURAL UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY

APPROVED

Chairman of the selection committee

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PROGRAM

of entrance examinations for persons entering the Master educational degree on the specialty 181 "Food Technologies"

chairman of the professional attestation commission
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Sumy - 2022

The program of professional entrance examinations for persons entering the Master educational degree for the specialty 181 "Food Technology" - 2022. - 17 p.

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Approved by the methodical council of the Food Technologies Faculty

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Explanatory note

The program is designed for a professional entrance test in the specialty of 181 "Food Technology" for educational program "Food Technology" for those, who enter the Master educational degree.

The purpose of the professional test is to establish the level of knowledge and skills required for entrants to Master degree program in "Food Technology".

The tasks of the entrance exam are:

- assessment of theoretical training of entrants in the disciplines of the fundamental cycle and professionally-oriented professional training of the bachelor;
- identification of the level and depth of practical skills;
- determination of the ability to apply the acquired knowledge, skills and abilities in solving practical situations.

Modules of courses characterize the theoretical and practical knowledge and skills of bachelors entering the "Master" educational degree by specialty of 181 "Food technology".

The program includes questions from the courses of professional training:

1. Technological equipment of food industry
2. General technologies of the food industry
3. Methods of food control
4. Food microbiology

The list of questions is compiled according to the curriculum for each of these courses and covers the material of the whole course. The package of test tasks contains several variants of tickets, which cover the list of basic knowledge, skills and abilities provided by the educational and qualification characteristics of specialists in this specialty. The package of tasks also includes reference answers.

Contents of the program

1. Technological equipment of food industry

Equipment for primary milk processing. Equipment for mechanical processing of milk. Equipment for heat treatment of milk. Equipment for the production of fermented milk products. Equipment for oil production. Equipment for the production of hard cheeses. Ice cream production equipment. Equipment for packing and packaging of dairy products. Equipment for washing and cleaning of technological equipment. Categories of equipment classification of dairy enterprises. Equipment for milk transportation. Pressure control in the homogenizer. Methods of heat transfer in heat exchangers. Equipment for the manufacture and packaging of cheese products. Separators for high-fat cream and buttermilk. Equipment for cheddarization of cheese mass. Equipment for spraying the product in the drying tower. Typical structural elements of the freezer. Equipment for packing butter. Reactive washing head. Devices for washing vertical milk containers. Equipment for the production of pasteurized cream. Working bodies of the centrifugal milk pump. Classification of technological equipment according to the degree of mechanization and automation. The purpose of the hydraulic system in the separator - cream separators. Tubular heat exchangers. Automatic lines for the production of butter. Equipment for disassembled washing of pasteurization plants. Equipment for the production of pasteurized milk. The main parameters of milk pumps. Dairy industry equipment for the refrigeration process. OSN-C separator drum. The purpose of the rotary - vortex emulsifier in the production line of cheese products. Ammonia freezer system. Machines for packing cheeses in laminated paper or foil.

General characteristics of technological equipment of meat industry enterprises. Lifting and transport equipment. Equipment for slaughter and exsanguination of animal carcasses. Equipment for removing and treating hides and skins from cattle, small cattle and pigs. Equipment for washing, removing bristles and skinning, mechanical separation of carcasses. Equipment for mechanical separation of raw meat. Equipment for separating raw materials and meat products under the action of centrifugal forces. Equipment for grinding solid raw materials. Equipment for grinding soft raw materials.

Equipment for pickling. Mixing equipment. Equipment for molding. Equipment for heat treatment. Technological equipment for smoking, rolling and packaging of finished products. Sanitary treatment of technological equipment.

Technological equipment for bakery production. Equipment for dough preparation. Equipment for dough division, molding. Dough blanks, racks and stacking. Equipment for the production of special varieties of bread products. Technological equipment for pasta production. Equipment for mixing and forming. Drying equipment. Equipment for stabilization, cutting and packaging of raw pasta. Technological equipment for confectionery production. Heating equipment. Equipment for dissolution and evaporation. Equipment for cooling confectionery masses and products.

Equipment for preparation of root crops for processing. Hydraulic conveyor. Beet washing machine. Elevators - purpose and principle of operation. The principle of operation of the magnetic trap. Principle of operation and rules of operation of the beet cutting machine. Purpose, structure and operation of diffusion batteries. Equipment for saturation. Vacuum filters - the principle of operation and rules of operation. Evaporation equipment. Centrifugation equipment. Sugar drying equipment. Equipment for sugar supply to the warehouse. Equipment for malt production. Equipment for beer production. Equipment for alcohol production. Equipment for the production of alcoholic beverages. Equipment for fat ratification. Equipment for alkaline refining, deodorization, hydrogenation. Equipment for margarine production. Pasteurizers and separators, homogenizers, emulsifiers. Equipment for dosing components, mixers, re-coolers, crystallizers. Equipment for the production of mayonnaise. Equipment for the breakdown of fats and fatty acids. Equipment for alkaline refining, deodorization, hydrogenation. Operating principle, technical parameters.

2. General technologies of food industry

Grain storage and processing technology. Modes and methods of grain storage. Grain quality control during storage. General characteristics of grain mass and factors that affect its composition and properties. Physical and thermophysical properties of grain mass. Physiological and mass transfer processes occurring in

the grain mass during its storage. Grain mass microorganisms and pests of grain stocks.

Characteristics of the main stages of flour production. Quality requirements, characteristics of technological properties of flour. The influence of technological properties of grain on the quality and yield of flour. Terms and conditions of flour storage.

Classification of cereals. Characteristics of raw materials for the production of cereals. Characteristics of the main stages of cereal production. Requirements for the quality of cereals. Features of instant cereal technology. Control of cereals and by-products.

Classification of bakery products. Raw materials used for bread production. Baking properties of flour. Water quality requirements. Additional types of raw materials. Innovative technologies for the production of bakery products.

General information about pasta production. Classification of pasta. Storage conditions of pasta and quality requirements for finished products. Defects in pasta.

Characteristics of confectionery. Raw materials for confectionery production. Classification of confectionery. Production of dietary confectionery. Assortment and classification of flour confectionery. Cookie technology. Gingerbread technology. Requirements for the quality of flour confectionery. Technology of cakes and pastries. Classification of sugar confectionery. Characteristics of the main and auxiliary raw materials. Requirements for the quality of sugar confectionery. Term and conditions of storage. Technology of marmalade, pastilles, marshmallows. Chocolate technology. Halva technology. Determination of food concentrates and characteristics of raw materials for their production. Classification and range of food concentrates. Production of food concentrates. Quality assessment of food concentrates. Packaging, labeling, transportation and storage of food concentrates. Soaking and pickling fruits and berries. Nutritional value of fruits and berries. Classification of canned fruits and berries. Wetting

fruits and berries. Pickling fruits and berries. Characteristics of canned fruits and berries. Production of compotes and fruit juices.

Canned grated and chopped fruits and berries. Fruit drinks. Canning fruits and berries with antiseptics. Production of concentrated products on sugar. Methods of canning. Production of frozen vegetables, fruits and berries. Characteristics of technological processes. Fast freezing of fruits and berries. Technology of drying fruits and berries. Methods of freezing. Terms and conditions of storage of frozen products.

Raw materials for sugar production. Technological scheme of sugar production, characteristics of basic operations. Characteristics of individual operations. Requirements for the quality of raw materials and their preparation for production. Nutritional value and importance in nutrition, scope. Technological scheme of potato starch production. Technological scheme of corn starch production. Starch quality requirements. Origin and properties of starch. Classification of modified starches. Application of modified starches. Modified starch market analysis. Characteristics of the composition, properties and uses of starch molasses. Technological scheme of starch molasses production. Indicators of molasses quality and storage conditions. Malt technology. Range of malt and areas of application. Characteristics of the main stages of the technological process of production of malts of different types. Brewing malt technology. Malt technology used in alcohol production. Technology of special types of malt for the production of polysalt extracts. Rye malt technology. Processes that take place during malt production. Nutritional value of beer and importance in nutrition. Classification of beer. Raw materials used in beer production. Beer production technology. Characteristics and features of the technological process of beer production of different types. Terms and conditions of storage. Requirements for beer quality. Characteristics of alcohol as a food product and ways of use in food production. Alcohol production technology. Characteristics and features of the technological process. Features of complex processing of raw materials in the alcohol industry.

Methods of champagne. Terms and conditions of storage. Falsification of wine. Classification and range of soft drinks. Raw materials used in the production of soft drinks. Production of bread kvass. Technology of carbonated soft drinks. Mineral water technology. Assortment of vegetable oils. The main methods of obtaining vegetable oils. Characteristics and classification of fatty raw materials for the production of animal fats. Features of methods of production of animal fats. Quality indicators of animal rendered fats.

3. Methods of food control

Fundamentals and methodology of food quality control. The use of organoleptic methods in assessing the quality of food products. General concepts of food quality. Legal and technical basis of food quality control. Characteristics of the main indicators of food quality. Basic information about organoleptic evaluation. Methods of organoleptic evaluation.

Methods for determining the mass fraction of moisture and dry matter. The value of water in food, the form of moisture bonds. General characteristics of methods for determining the mass fraction of moisture and dry matter. Characteristics of direct methods for determining the mass fraction of moisture. Characteristics of methods for determining the mass fraction of dry matter

General characteristics of acidity and alkalinity of food products and methods for their determination. Characteristics of determination methods. Characteristics of methods for determining alkalinity.

Estimation of the content of essential nutrients Methods for determining the mass fraction of protein. Protein in food. General characteristics and classification of methods for protein determination. Characteristics of the Kjeldahl method. Determination of total, protein and non-protein nitrogen. Characteristics of photocolorimetric methods for protein determination. Characteristics of physicochemical methods for protein determination.

Methods for determining the mass fraction of fat. General characteristics of lipids and methods for their determination. Gerber's method. Characteristics and

scope. Refractometric method. Characteristics and scope. Extraction and weight methods. Soxhlet method, Rushkovsky method, infusion method. Characteristics and scope.

Methods for determining the mass fraction of carbohydrates. General characteristics of carbohydrates and methods for their determination. Characteristics of physical methods for determining the mass fraction of carbohydrates. Characteristics of chemical methods for determining the mass fraction of carbohydrates

Methods for determining the mass fraction of minerals and vitamins. General characteristics of minerals and vitamins. Characteristics of methods for determining the mass fraction of minerals. Characteristics of methods for determining the mass fraction of vitamins

4. Food microbiology

General characteristics of microorganisms. Morphology of microorganisms (spherical, rod-shaped and tortuous forms). Environmental factors influencing the activity of microorganisms. The value of microorganisms for the food (processing) industry. The main types of fermentation of microbial origin, their characteristics and significance for the food industry. Technically useful and technically harmful microflora. Representatives of technically useful microflora (lactic acid microorganisms, acetic acid bacteria, yeast). The use of lactic acid microorganisms and yeast in food production, as well as their role in food spoilage. General characteristics of technically harmful microflora (putrefactive and butyric acid bacteria, molds). Their role in food spoilage. Microbiological processes of food production. General characteristics of lactic acid, acetic acid, butyric acid and alcohol fermentation.

Microbiology of fruits and vegetables. Microorganisms on the surface of fruits and vegetables. Microorganisms spoil fruits and vegetables. Microbiology of canned food. Microorganisms of raw materials of canned food. Microorganisms

spoil canned food, ways of their entry and methods of prevention of their entry into canned food. Microbiological control of canned food production.

Sources of primary milk microflora and characteristics of microbiological processes in raw milk. Defects of raw milk caused by microorganisms. Requirements of the standard to the microbiological composition of milk. Microbiological study of raw milk.

Microbiology of drinking milk and cream. Defects in drinking milk and cream of microbial origin. Microbiological control in the production of drinking milk and cream

Sources of primary microflora of fermented milk products. Conditions for the development of microorganisms in the production of fermented milk products. Characteristics of microbiological processes in the manufacture of fermented milk products. Defects in fermented milk products caused by microorganisms. Microbiological control of fermented milk products production. Microbiological study of fermented milk products.

Microbiology of butter and cheese. Sources of primary oil microflora. Conditions for the development of microorganisms in oil and conditions for increasing the stability of oil. Take out the oil. Microbiological control of oil production. Features of microbiological research of oil.

Microbiology of canned milk and ice cream. . Microflora of canned milk and their sources. Features of development of microorganisms in canned milk. Defects of canned milk and their prevention. Microbiological control of canned milk production. Sources of primary microflora of ice cream and change of microflora of ice cream. Microbiological control of the technological process of ice cream production.

Sources.

Course "Technological equipment of food industry

1. By what categories is the equipment of the dairy industry classified?
2. What equipment is used for the manufacture and packaging of curd products?

3. What equipment is used in the production of pasteurized cream?

4. What equipment does the butter production line come with?

5. Installation for pumping minced meat. Appointment, device, principle of operation, rules of operation.

6. Operating rules and safety precautions for the operation of mixing equipment.

7. Cutters. Appointment, device, operating rules, safety measures.

8. Equipment for salting meat. Characteristics of the complex of equipment for salting meat.

9. Thermo-units. Appointment, principle of operation, operating rules, safety precautions, technical characteristics.

10. Installation for sterilization of canned food USK-1. Appointment, device, principle of operation, rules of operation.

11. Drum dryers. Appointment, principle of operation, operating rules, safety precautions.

12. Heating stoves. Purpose and device, principle of operation, operating rules.

13. Equipment for smoking meat products. Auto-smokers and stationary smoking chambers. Device, principle of operation, operating rules, formulas for calculations.

14. Stuffing machine. Purpose, device, operating rules, technical characteristics, technical calculations.

15. Equipment for dough preparation.

16. Equipment for packing dry pasta.

17. Equipment for the production of malt, principle of operation and rules of operation.

18. Heat exchangers and equipment for creating low vacuum, classification, technical characteristics.

19. Equipment for the refining of fats.

20. Equipment for alkaline refining, deodorization, hydrogenation. Operating principle, technical parameters.

Course "General technologies of food industry"

1. Traditions and features of Chinese cuisine. Characteristics of the main methods of culinary processing.

2. Methods of heat treatment and heating of food.

3. Characteristics and features of technology of traditional Chinese bread.

4. Types of fermentation, their importance in the food industry.

5. Characteristics and features of technology of fish and seafood dishes.

6. Basic concepts of functional nutrition.

7. Preparation of raw materials for food production (on the example of one of the food industries).

8. Characteristics and features of methods of making canned vegetables and fruits.

9. The role of food in meeting the needs of consumers, of quality food.

10. Indicators of quality of raw materials and finished products according to regulatory documentation (on the example of one of the branches of the food industry).

11. Characteristics and features of traditional Chinese sauces.

12. Characteristics and features of Chinese fast food technology.

13. Characteristics and features of technology of flour products.

14. Characteristics and features of ice cream technology.

15. Basic concepts of dietary nutrition.

16. General characteristics of methods of preserving raw materials and food products - biosis, anabiosis and abiosis.

17. Characteristics and features of yogurt technology.

18. Characteristics and features of chocolate technology.

19. Improving the quality of raw materials through technical and technological techniques.

20. Sources of food contamination.

Course " Methods of food control"

1. Organoleptic assessment of food quality. List and justify the sequence of determination of organoleptic parameters.

2. Sensory analysis. General methods and conditions of its holding.

3. Product quality, essence, basic terms and concepts.

4. Classification of methods of product quality control in restaurants.

5. General concepts of organoleptics. Characteristics of the score method.

6. Product tasting. The main types of tastings, purpose, characteristics, documentation, consequences of tastings.

7. Methods for determining proteins in food.

8. Methods for determining sugars in food.

9. Acidity of food products, methods of determination.

10. Food quality control, technochemical control in production.

11. Dry matter content in products, impact on the quality and shelf life of food products.

12. Physico-chemical indicators of food quality. Give an example.

13. The value of water in food, the form of moisture bonds.

14. Types of laboratories and organization of their work.

15. Microbiological quality control of food.

16. Quality indicators of the main groups of food products and their classification.

17. Give examples of laboratory equipment and describe its purpose.

18. Standardization and regulation of the content of xenobiotics in food raw materials, semi-finished products and finished products.

19. Methods of control over the content of foreign chemicals in food.

20. Express methods of assessing the quality of food products, the principle of choice.

Course "Food microbiology"

1. What is microbiology?
2. What are microorganisms?
3. What are the types of microbiology and the study of what they do?
4. Describe the main stages of development of microbiology?
5. Who designed the first microscope?
6. Why are the works of Louis Pasteur dedicated?
7. Who is the founder of domestic food microbiology?
8. What are toxicosis and toxicoinfections?
9. Toxicoinfections caused by streptococci.
10. Symptoms of clostridia poisoning.
11. Name the main sources of microorganisms in raw milk.
12. What causes the bactericidal phase of milk? What determines its duration?
13. How does the microflora change during the preservation of milk?
14. How does the microflora of milk change in the phase of lactic acid bacteria?
15. How does the phase of development of yeast and molds appear in milk?
16. Repackage and describe the defects of raw milk. What microorganisms are they caused by?
17. On what indicators control the milk arriving at plant? What are the requirements for raw milk when accepting it at a dairy?
18. What are fermented milk products and how to classify fermented milk products depending on the type of microorganisms that are part of the leaven for their production?
19. What are the main sources of microorganisms in fermented milk products?
20. What are the features of microbiological processes in the production of fermented milk products made from yeast mesophilic lactic acid streptococci and thermophilic lactic acid streptococci ?

Norms and criteria for evaluating the answers to the entrance test

Assessment of entrants' knowledge is carried out on a scale from 0 to 200 points. Entrants who received at least 100 points in the entrance exam are allowed to participate in the competition. The exam task contains 50 questions covering all topics listed in the thematic content of this program. Each test question is evaluated in 4 points. Thus, the correct answer to 50 questions is estimated at 200 points. The following time norms are set for conducting written entrance exams (in astronomical hours, no more): testing - 2 hours. The points scored are included in the overall rating of the entrant.

RECOMMENDED BOOKS

1. Bal-Prilipko L.V. Meat storage, canning and processing technology: A. textbook. - K., 2010 - 469 c.

2. Bergilevich O.M. Microbiology of milk and dairy products with the basics of veterinary and sanitary examination / O.M. Bergilevich, V.V. Kasyanchuk - Textbook. - University book, Sumy, 2010. - 350c.

3. Bergilevich O.M. Microbiology of milk and dairy products. Workshop. / O.M. Bergilevich, V.V. Kasyanchuk - Textbook. - University book, Sumy, 2010. – 150 c.

4. Bredikhin S.A. Technique and technology of butter and cheese production. / Bredikhin S.A., Yurin V.N.–M: Kolos: 2007.- 310 p.

5. Bredikhin S.A., Technology and techniques of milk processing. / Bredikhin S.A., Kosmodemyansky Yu.V., Yurin V.N –M .: Kolos, 2001. - 400 p.

6. Bamfort KW New in brewing. – St. Pb.: Professiya, 2007. - 520 c.

7. V.F. Petko, O.I. Haponiuk. Technological equipment for bakery, pasta and confectionery industries. - K: Center for Educational Literature, 2007. - 432p.

8. Vinnikova L.G. Theory and practice of meat processing. - Izmail: SMIL, 2000. - 172 p

9. Jeresko G.O. Technological equipment for the dairy industry. / Yeresko G.O., Shinkarik M.M., Voroshchuk V.Ya. - Kyiv: Incos. Center for Educational Literature. 2007.-344 p.

10. Klimenko M.M. Meat and soft food technology. / M.M. Klymenko, L.G. Vinnikov, I.G. Birch. –K .: Higher school, 2006. -640 p.

11. Kuznetsov V.V. Technological equipment of dairy industry enterprises. Directory. Part 1- / Kuznetsov V.V., Schiller GG, M: DeLi print., 2008.-552 p.

12. Methods of quality control of food products: a textbook / O.I. Cherevko, L.O. Kasilova and others. // for ed. L.M. Krainiuk; HDUHT, SNAU. - Sumy: University Book, 2012. - 512 p.

13. Mechanization of processing and storage of agricultural products: a course of lectures / N.I. Xomik, V.P. Tson - Ternopil: FOP Palyanytsya VA, 2016. - 288p.