

लोक सेवा आयोग

नेपाल कृषि सेवा, फूड न्यूट्रिशन एण्ड क्वालिटी कन्ट्रोल समूह, राजपत्राङ्कित तृतीय श्रेणीका पदहरूको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा :- यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परीक्षा लिइने छ :

प्रथम चरण :- लिखित परीक्षा पूर्णाङ्क :- २००
द्वितीय चरण :- अन्तर्वार्ता पूर्णाङ्क :- ४०

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या X अङ्कभार	समय
प्रथम	खाद्य विज्ञान	१००	४०	वस्तुगत बहुवैकल्पिक (Multiple Choice)	१००X१ = १००	१ घण्टा १५ मिनेट
द्वितीय	समूह सम्बन्धी विषय	१००	४०	विषयगत (Subjective)	१०X१० = १००	३ घण्टा

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०	सामूहिक छलफल (Group Discussion)	३० मिनेट
व्यक्तिगत अन्तर्वार्ता	३०	मौखिक	-

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- पाठ्यक्रमको प्रथम र द्वितीय पत्रको विषयवस्तु फरक फरक हुनेछन ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- प्रथम तथा द्वितीयपत्रका पाठ्यक्रमका एकाईहरूबाट सोधिने प्रश्नहरूको संख्या निम्नानुसार हुनेछ :

प्रथम पत्रका एकाई	1	2	3	4
प्रश्न संख्या	25	25	25	25
द्वितीय पत्रका खण्ड	A	B	C	D
द्वितीय पत्रका एकाई	1	2	3	4
प्रश्न संख्या	3	2	2	3

- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरूको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- द्वितीय पत्रमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- यस भन्दा अगाडि लागू भएको माथि उल्लिखित समूहको पाठ्यक्रम खारेज गरिएको छ ।
- पाठ्यक्रम लागू मिति :- २०६२/२/२३ देखि
- द्वितीयपत्रको पाठ्यक्रम परिर्माणन मिति :- २०६६/९/१३ देखि (२०७२/०७/२४ को निर्णय अनुसार सामूहिक परीक्षण समावेश)

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आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम
प्रथम पत्र :- खाद्य विज्ञान

1. Food Chemistry

25%

- 1.1 Historical development of food chemistry
- 1.2 Proximate composition of foods and their determination
- 1.3 Structure, classification and properties of carbohydrates. Physical and chemical properties of monosaccharides and disaccharides. Structure of different polysaccharides (starch, pectin, cellulose, hemicellulose). Properties of starch, gel formation, retrogradation of starch, modified starch, amylase and amylopectin
- 1.4 Structure, classification and properties of proteins. Classification and properties of amino acids, essential and non essential amino acids, denaturation of proteins
- 1.5 Structure, classification and properties of lipids. Saturated and unsaturated fatty acids, reactions of unsaturated fatty acids, rancidity, autoxidation, flavour reversion
- 1.6 Classification and properties of vitamins. Occurrence of minerals in food
- 1.7 Structure of water, hydrogen bond, free water, bound water, water activity and its importance in food
- 1.8 General properties and classification of enzymes, enzymes in food industry, enzymatic browning, non-enzymatic reactions, caramelization, Maillard reaction
- 1.9 Natural pigments in food (chlorophyll, carotenoids, anthocyanins), artificial food colours, synthetic coal tar dyes and their assessment of safe limit
- 1.10 Principal flavouring compound in food, threshold value, flavour enhancers
- 1.11 Other food additives used in food industries: antioxidants, emulsifiers, preservatives, stabilizers, anti caking agents, thickening agents, chelating agents, anti foaming agents, artificial sweeteners (saccharine, aspartame, cyclamate, dulcin)
- 1.12 General introduction to flavonoids and alkaloids

2. Food Microbiology

25%

- 2.1 Principle and application of the polarizing microscope, ultraviolet microscope, phase contrast microscope, electron microscope
- 2.2 Morphology and cytology of bacteria, yeasts, molds, viruses and protozoa
- 2.3 Growth, reproduction, transformation, mutation and spore formation of micro organism
- 2.4 General principles of serology and immunology
- 2.5 Mutation and gene function at the molecular level, genetic recombination.
- 2.6 Bacterial nutrition and metabolism
- 2.7 General morphological and physiological characteristics of yeasts. Identification characteristics of Saccharomyces and Endomyces
- 2.8 Identification characteristics of food spoilage microorganisms (Salmonella species, E. coli, Staphylococcus species., Pseudomonas species), identification of Aspergillus, Penicillium, Rhizopus species
- 2.9 Microbiology of meat, fish, poultry and their products, milk and milk products, fruit and vegetable products, fast foods, cereals and cereal products, spices, tea and coffee

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आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 2.10 Environmental microbiology (air, water and soil)
 - 2.11 Hurdle concept of food safety
 - 2.12 Food borne infection and intoxication. Biotoxins : aflatoxins, fumiginosin, ochratoxin, zearalenon
- 3 Biochemistry and Nutrition 25%**
- 3.1 Digestion, absorption, metabolism and functions of carbohydrates, proteins and lipids
 - 3.2 General properties of enzymes, coenzymes and factors, enzyme kinetics and mechanism of action, inhibitors and activators
 - 3.3 Biochemical functions of nucleic acids, elementary notions of protein biosynthesis
 - 3.4 Nutritional importance of vitamins, minerals, trace elements, essential fatty acids and essential amino acids. Protein Efficiency Ratio (PER), Net Protein Utilization (NPU), Chemical Score
 - 3.5 Nutritional classification of food. Food groups, balance diet and application of food composition table
 - 3.6 Nutritional requirements and recommended dietary allowances of infants, preschool children, pregnant and lactating mother
 - 3.7 Importance of mother's milk in child nutrition. Baby foods, infant foods, weaning foods, supplementary foods
 - 3.8 Assessment of nutritional status and their indicators
 - 3.9 Major nutritional deficiency diseases
- 4. Food Engineering 25%**
- 4.1 Units, dimensions and their conversion
 - 4.2 Unit operation, heat and material balance, heat transfer (conduction, convection and radiation) and heat exchangers
 - 4.3 Laws of thermodynamics and it's applications
 - 4.4 Flow of fluids, laminar and turbulent flow, Newtonian and non-Newtonian fluids, selection of pumps. Principle and application of rheology and rheometry
 - 4.5 Principle, application and equipments for refrigeration & freezing, drying, evaporation, centrifugation, size separation (filtration, sedimentation), size reduction (crushing, slicing, grinding)
 - 4.6 Principle and application of distillation, extraction and super critical fluid extraction
 - 4.7 General introduction to belt conveyers, chain conveyers, screw conveyers, elevators and their importance in food industries
 - 4.8 Steam generation and it's application in food industries
 - 4.9 Principle of extrusion cooking and it's use in food industries
 - 4.10 High pressure technology, membrane technology (Reverse Osmosis and Ultra Filtration) and its application in food industries
 - 4.11 Process plant and equipment design, scale-up and safety factors
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वस्तुगत बहुउत्तर नमूना प्रश्नहरू (Sample Questions)

1. The super critical fluid region in Pressure-temperature phase diagram lies in
(A) Triple point
(B) Liquid region
(C) Vapour region
(D) Beyond Vaporisation curve

Correct Answer:- (D)

2. High pressure treatments of several thousand atmospheres to food system
(A) Denatures protein
(B) Inactivates Enzyme
(C) Sterilises micro organisms
(D) All of them

Correct Answer:- (D)

3. The intake of large amount of MSG by hypersensitive person can trigger
(A) Cancer
(B) Drowsiness
(C) Heart disease
(D) Vomiting

Correct Answer:- (B)

4. Which is not an antioxidant?
(A) TBHQ
(B) PG
(C) BHA
(D) GMS

Correct Answer:- (D)