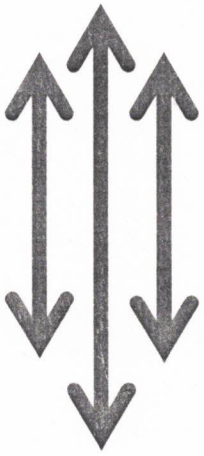
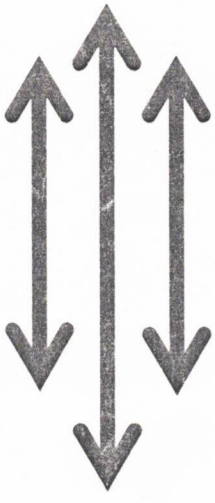
# नेपाली सेना

## श्री भर्ना छनौट निर्देशनालय, कार्यरथी विभाग,

## जंगी अड्डा



## प्रा.उ.से.डाईटिशियन (Food and Nutrition Specialist) (खुला तथा आन्तरिक) पदको लिखित परीक्षाको पाठ्यक्रम



२०७८

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## प्रा.उ.से.डाईटिशियन (Food and Nutrition Specialist) (खुला तथा आन्तरिक) पदको लिखित परीक्षाको पाठ्यक्रम

समय: ४ घण्टा १५ मिनेट

पूर्णाङ्क : १५०
उत्तीर्णाङ्क : ६०

यो पाठ्यक्रम नेपाली सेनाको **प्रा.उ.से.डाईटिशियन (Food and Nutrition Specialist)** (खुला तथा आन्तरिक) पदका उम्मेदवार छनौट परीक्षाको लागि निर्धारण गरिएको हो । लिखित परीक्षामा सरिक हुने उम्मेदवारहरुको पेशा सम्बन्धी विषयलाई आधारमानी प्रश्नहरु सोधिने छ ।

(क) लिखित परीक्षाको माध्यम नेपाली/अंग्रेजी वा दुवै भाषा हुनेछ ।
(ख) लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र अर्को चरणको परीक्षामा सम्मिलित गराईनेछ ।
(ग) प्रश्नपत्र निर्माण गर्दा पाठ्क्रममा समावेश भएका सबै विषयहरुलाई यथासंभव समिटनेछ ।
(घ) बस्तुगत र विषयगत संयुक्त रुपमा पूर्णाङ्क र उत्तीर्णाङ्क कायम गरिनेछ ।
(ङ) बस्तुगत र विषयगत परीक्षाको पाठ्यक्रम एउटै हुनेछ ।
(च) बस्तुगत र विषयगत विषयको लिखित परीक्षा एकैपटक वा छुट्टाछुट्टै गरी लिन सकिनेछ ।
(छ) यो पाठ्यक्रम मिति २०७८/११/२२ गतेबाट लागु हुनेछ ।

### लिखित परीक्षाको योजना र पाठ्यक्रम

| विषय | पूर्णाङ्क | उत्तीर्णाङ्क | परीक्षा प्रणाली | | प्रश्न संख्या अङ्क | समय |
|---|---|---|---|---|---|---|
| पेशा सम्वन्धी | ७५ | ६० | बस्तुगत (Objective) | बहु वैकल्पिक प्रश्न (MCQs) | ७५ प्रश्न x १ अङ्क=७५ | १ घण्टा १५ मिनेट |
| | ७५ | | विषयगत (Subjective) | छोटो उत्तर | ९ प्रश्न x ५ अंङ्क =४५ | ३ घण्टा |
| | | | | लामो उत्तर | ३ प्रश्न x १० अङ्क =३० | |

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1. **FOOD SCIENCE-30 marks**

A. **Introduction**: Definition and scope of food science and, its inter-relationship with food chemistry, food microbiology and food processing. Historical development of food Preservation, an overview of modern techniques of food preservation and processing. Traditional methods of food preservation

B. **Food Processing effects on nutrients and food quality**

C. **Constituents of food**

a. Carbohydrates, proteins and fats: introduction, types, sources, functions and properties

b. Protein: Introduction, types, sources, functions and properties, Protein quality and evaluation **(NPU, PER, PDCAAS etc.)**

c. Vitamins and minerals: introduction, types, sources and functions

d. Fiber: definition, sources types, functions

e. Water: functions, sources, forms, properties

f. Organic acid and their roles

g. Natural food toxicants and anti-nutritional factors: their effect and methods of removal from foods

h. Natural pigments in food: definition, types, function, uses andpreservation

D. **Definition of Functional food and Nutraceuticals, their classifications and associated claims**

E. **Bioactive components of foods**; Sources, Chemistry, properties, functional benefits and nutraceutical potentials, their use in the prevention of potential diseases and effect of processing

**a)** Carotenoids b) Lycopene c) Flavonoids

F. **Antioxidants:** Definitions, sources, biochemical functions, free radical, reactive oxygen species (ROS) and oxidative shears and how each related to diseases

a. Antioxidant contents of fruits and vegetables

b. Anticancer activities of fruits and vegetables

G. **Food quality and deterioration:** Meaning, quality attributes, factors affecting deterioration and spoilage

H. **Food labeling:** Definition, types of information in labeling and their application to consumer,industry and regulatory organizations.

I. **Food processing:** Definition, Objectives, Types of treatment, Effect of factors like heat, acid, alkali on food constituents

J. **Quality Evaluation of food:** Objectives, Sensory assessment of food quality, Methods of sensory evaluation

K. **Food Additives:** Introduction, Types and functions of Emulsifiers, preservatives, colorants, non- nutritive sweeteners, antioxidants etc.

L. **Flavor:** Definition, food flavors (tea, coffee, wine, meat, fish spices etc.), Flavor Enhancers

M. **Dietary Supplements**

N. **Nutritional Toxicity**

## 2. Clinical and Therapeutic Nutrition-30 marks

A. **Introduction:** Definition, growth and scope of dietetics, types and role ofdietitian in the hospital, community and other sectors.

B. **Basic concept of diet therapy:** Principles of therapeutic diets, factors to be considered in planning therapeutic diets.

C. **Nutrition screening and assessment in clinical practice:**

a. Nutrition screening & assessment concept and tools, Direct andindirect method, merits and demerits
b. Anthropometric/body composition measurement and interpretation: height, weight, skin fold, circumferences, bioelectricimpedance analysis;
c. Biochemical assessment and interpretation: assessment of nutritional anemia, vitamin A status and iodine status, nutrition interpretation of routine medical laboratory tests, chronic disease riskassessment, protein assessment
d. Clinical assessment and interpretation: clinical/physical signs;

D. Dietary intake assessment: diet history, 24-hour recall, food record/food diary, food frequency, observation of food intake, evaluation and interpretation of dietary analysis information.

**a.** Nutritional assessment of various age group (infants/children/adolescents/adult/ pregnant female /elders/bed ridden person), various tools used in assessment.

E. **Different Nutritional Counselling Techniques and Nutrition Care Process.**

F. **Nutritional Management of communicable and non-communicable disease**

G. **Modification of diet:** Routine hospital diets: clear liquid diet, full fluid diet, soft diet, regular diet

H. **Special feeding methods:** Tube feeding – Types, enteral feeds, feeding requirements, method of administration. Parental feeding, its advantages and disadvantages

I. **Food and nutrition in surgery and burn**

J. **Nutrition for HIV patients:** Introduction to HIV and AIDS, stages of HIV disease, nutritional problems of HIV patients, nutritional requirements and diet management

K. **Nutrition metabolic disorders:** Gout- nature and occurrence of gout, causes, symptoms and role of diet & nutrition in treatment. Joint diseases- osteoarthritis, rheumatoid arthritis- causes and symptoms, role of diet & nutrition in treatment. Hyperthyroidism: causes and symptoms, role of diet & nutrition in treatment.

L. **Critical Care Nutrition**

M. **Nutritional Management of Inborn Errors of Metabolism**

N. **Pre and Post-Operative Diet**

O. **Sports and Fitness Nutrition**

P. **Food Allergy and Intolerances.**

Q. **Food Taboos**

## 3. Human Nutrition: 30 marks

A. **Nutrition and human development:** Factor affecting human nutrition

B. Nutritional Physiology: Human body composition, parts. Functions of the digestive and circulatory systems.

C. Nutritional Status: Definition and factors affecting the nutritional status.

D. **Digestion, Absorption, metabolism and utilization:** Macro and Micronutrients.

E. **Energy value of food and energy requirement**

a. Energy value of food and units of energy, determination of energy value of food, fuel value of food: gross and physiological value, relation between oxygen requirement, direct calorimetry and RQ
b. Energy requirement of body: basal metabolism, determination of basal metabolism, standard for basal metabolism, basal conditionsand factors affecting BMR
c. Determination of energy requirement during works, SDA of food, Physical activity and energy requirement,
d. Recommended allowances of Nutrients by different organizations FAO, WHO, ICMR etc. at different condition. Energy balance and weight management

F. **Nutrition in Pregnancy, Lactation, Growing years, Adults years and elderly**

G. **Nutritional deficiency diseases:** Malnutrition: definition, forms and causes of malnutrition, Protein energy malnutrition- types, treatment and management Micronutrient deficiency- overview of micronutrient deficiency, deficiency diseases related vitamin A, vitamin D, vitamin C, vitamin B1, folic acid, iodine, iron, calcium & zinc.

H. **Food requirements through the lifecycle.**

I. **Recommended dietary allowances:** Definition, importance and significance of RDA, RDA for energyand specific nutrients.

J. **Concept of healthy diet**
Food diversity, principles of healthy diet and balanced diet, dietary guidelines; different types of food groups, food composition table, and food pyramid, My plate, national & international dietary guidelines, food based dietary guidelines.

K. **Nutrition in Emergency (e.g. disaster, endemic, pandemic-COVID)**

L. **Balanced diet and dietary standards (Dietary Reference Intake/DRI, Adequate Intake/AI, Tolerable Upper Intake Level/ UL, Estimated Average Requirement (EAR) etc.**

M. **Food Fortification and Supplementation**

N. **Complementary and Supplementary Food.**

## 4. Nutritional Biochemistry: 20 marks

**A. Physical and Chemical Properties of Nutrients**

**B. Carbohydrate metabolism**

Digestion and Absorption, Glycolysis, TCA Cycle, Glycogenesis & Glycogenolysis, Gluconeogenesis, Pentose Phosphate pathway, Minor metabolic Pathways of Carbohydrate, Inborn Errors of Carbohydrate metabolism

**C. Dietary fiber, function and Metabolism**

**D. Lipid Metabolism**

Introduction to Lipid, Digestion & Absorption, Lipoprotein Metabolism, Fatty acids synthesis & Oxidation, Cholesterol Biosynthesis, Bile Acids and Bile salts biosynthesis, ketone body synthesis & utilization, TG Synthesis, Inborn errors of Lipid metabolism

**E. Protein Metabolism**

Introduction to Proteins, Digestion and Absorption, Transamination, Deamination, ammonia transport & Urea Cycle, Metabolism of individual Amino Acids, Inborn Errors of protein and Amino Acid metabolism

**F. Fed and Fasting States**

Obesity (Prevalence, basis of obesity, calorie, health risks of obesity, weight management, Weight loss strategies)

G. Fasting & Starvation (Fasting Trend, role of fasting in weight management, Difference between fasting & starvation, metabolic changes in starvation, Food start after starvation)

H. **Vitamins**

Water & Fat soluble vitamins, structure, sources, Absorption, transport, storage, excretion, RDA, function, deficiency & toxicity of water & fat soluble vitamin

**I. Inborn errors of metabolism**

Definition, inborn errors of carbohydrate metabolism, inborn errors of lipid metabolism, inborn errors of amino acid metabolism,inborn errors of nucleotide metabolism, hereditary anemia.

## 5. Food Microbiology: 20 marks

**A. Introduction**

Scope of food microbiology, important micro-organisms in food (molds,yeast, bacteria).

B. **Microbial ecologies, human intestinal microflora, probiotics, prebiotics and symbiosis.**

C. **Food Borne Diseases**

D. **Microbiology of meat and meat products, milk and milk products, fruits and vegetables and their products, cereals and their products, egg and egg products, spices, tea and coffee**

E. **Principles of food spoilage**

spoilage of cereals, vegetables, fruits, meat and meat products, milk and milk products, poultry, fish and sea foods, spoilage of canned foods, factors associated with food spoilage (extrinsic and intrinsic).

F. **Food borne infections and intoxication, biotoxins**

Toxins, antigens, symptoms and control of Staphylococcus aureus,
Bacillus cereus, Clostridium spp, Escherichia coli, Salmonella enteric vartyphi, Vibrio spp. borne food poisoning.

G. **Microbiology of Nepalese fermented foods**

Kinema, sinki, gundruk, tama(mesu), khalpi, chhurpi, sherkhem, dahi, jujudhau, bhakka; kimchi, natto, tempeh, kefir, koumiss, yoghurt, idli; Therapeutic and nutritional values of fermented foods, fermented foods and food security (importance and relationship).

H. **Molds**: fungi of medical importance, fungi important in food; contamination, spoilage of food such as meat, milk, fruits, vegetables, nuts etc.

## 6. Food Quality Control: 20 marks

A. **Principles of quality control**

Principles of Quality Control and Quality Assurance: Preventive tools of food safety, quality management and quality assurance systems and brief introduction of HACCP/GHP etc.

B. **Concept of food security, food safety and Quality and emerging issues on food adulteration and food safety.**

C. **Food laws and regulation**

Salient features of food act & food regulation, Food control system of Nepal.

D. **Total Quality Management (TQM)**

Total Quality Management (TQM); Introduction, definition, principles of TQM, objectives and tools of TQM, elements ofTQM

E. **Food quality management and Food safety management system (FSMS):**

F. **National and international food safety system and related organizations**

G. **Natural toxins in food from plant and animal source**

H. **Food additives & their toxic effects such as preservative, texture enhancers, stabilizer, sweeteners, coloring**

I. **Pesticides, growth hormones, veterinary drugs and other agrochemicals and their residue in food chain and toxic effect to human health.**

J. **Food adulteration and contamination**

a. **Food Adulteration:** definition, causes, condition of adulteration, types of adulteration, effect of adulteration on human health, common adulteration problem and simple detection technique,extraneous matter in food.

b. **Food Contamination:** Introduction, definition, physical, chemical and microbial contaminants; Food commodities and common Food Contaminant (heavy metals, pesticide residues, antibiotics, agrochemicals, veterinary drug residues, environmental pollutants, solvent residues, radioactivity and Natural toxins)

K. **Food Hygiene and Sanitation:** Hygiene and sanitation with respect to food, water, meat, livestock,surroundings, household, hospital kitchen and industrial level.

यस बिषयको पाठ्यक्रमका एकाईहरुबाट सोधिने प्रश्नहरुको संख्या निम्नानुसार हुनेछ ।

| Section Number | Long question | Short question | MCQs Number | remarks |
|---|---|---|---|---|
| 1. | 1 | 2 | 10 | |
| 2. | 1 | 2 | 10 | |
| 3. | 1 | 2 | 10 | |
| 4. | - | 1 | 15 | |
| 5. | | 1 | 15 | |
| 6 | | 1 | 15 | |
| TOTAL | 3x10=30 | 9x5=45 | 75x1=75 | |

## प्रा.उ.से. (Food and Nutrition Specialist) (खुला तथा आन्तरिक) पदको प्रयोगात्मक परीक्षाको पाठ्यक्रम

समयः ६० मिनेट

पूर्णाङ्कः ५०
उत्तीर्णाङ्कः २५

| S. No. | Topics | Marks | Time (minutes) |
|---|---|---|---|
| 1. | General Appearance (Neat and Tidy) | 5 | 2 |
| 2. | History Taking and Rapport Building | 5 | 3 |
| 3. | Nutritional Assessment and Intervention | 20 | 30 |
| 4. | Counselling | 5 | 10 |
| 5. | Viva | 15 | 15 |
| | **TOTAL** | **50** | **60** |

समाप्त