From
Prof. A. Amrutha Valli,
Professor & Chairman-BOS (UG), KCDC,
Acharya Nagarjuna University,
Guntur.

To
The Principal,
Krishna Chaitanya Degree College (A),
Nellore -524003.

Sir,

Sub. : KCDC, Nellore-BOS Food Science and Technology Submission of revised syllabus for B.Sc (Food Science and Technology) Major (U.G)-Reg.

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Under the subject Cited the B.O.S of Food Science and Technology (U.G) had met on 10-11-2025 at 02:30 PM in Online to revise the syllabus for B.Sc. (Food Science and Technology) Major for the Academic Year 2025-2026. I am here with submitting the syllabus for B.Sc. (Food Science and Technology) Major after the discussion of the BOS by online, confirming the Rules and Regulations laid down by the A.P.S.C.H.E. & VSU. The Revised Syllabus along with Model Papers and signatures of B.O.S members, are Enclosed.

Thanking you,

Prof. A. Amruthavalli,
(Chairman – BoS)

Members:

1 **Dr. C. Kalapriya,**
Lecturer,
Dept., of Home Science,
DKW Govt. Degree College for Women, Nellore.

2 **Ms. L. Venkata Sai Mohana,**
Assistant Professor,
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3 **Smt. P.Kalyani,**
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4 **Sri. Md. Irfan,**
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5 **Sri. M. Kishore,**
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Krishna Chaitanya Degree College, Nellore.

6 **Sri E. Syam Kumar,**
Shift Chemist,
Power Plant Industries, Kuwait.

7 **Mr. A. Sai Kumar,**
Associate Medical Coder,
Optum Company

Krishna Chaitanya Degree College(Autonomous)

(Affiliated To V.S University, Nellore)

NELLORE.

Syllabus for 4-Year UG Honours in B.Sc. (Food Science and Technology) as Major in consonance with Curriculum framework w.e.f. AY 2025-26

COURSE STRUCTURE (SEMESTERS – I & II)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of credits	Max Marks Internal Assessment	Max Marks University Exam	Total Marks
I	I	1	Introduction to Food Science and Technology	3	3	30	70	100
			Introduction to Food Science and Technology - Practical	2	1	0	50	50
		2	Principles of Food Chemistry	3	3	30	70	100
			Principles of Food Chemistry - Practical	2	1	0	50	50
	II	3	Food Microbiology	3	3	30	70	100
			Food Microbiology - Practical	2	1	0	50	50
		4	Human Nutrition	3	3	30	70	100
			Human Nutrition - Practical	2	1	0	50	50

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SEMESTER – I

COURSE I: INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

Theory **Credits: 3** **3 hrs/week**

LEARNING OBJECTIVES

To understand the role of foods in our daily life and also to gain knowledge of different plant and animal derived foods and their nutritive values and properties

LEARNING OUTCOMES

- To understand the sources of food and their importance at different age groups of human development
- To learn about the nutritional benefits of plant products
- To understand the nutritional significance of animal products
- To gain knowledge about starch, sugars and fats and oils
- To gain significance scope of food technology and research organizations

UNIT I

Food as a source of nutrients: classification of nutrients and functions, recommended dietary allowances (RDA), BMR, and SDA. Balanced diet, food pyramid and food exchange list.

UNIT- II

Nutritional composition and benefits of foods based on plant origin: Cereals, millets, pectin, gums, dietic fibres, pulses, legumes, vegetables, fruits, nuts and plantation crops

UNIT III

Nutritional composition and benefits of foods based on animal origin: Milk and milk products - composition, and functional properties. Egg: composition, and functional properties. Meat and poultry: structure, muscle composition, and functional properties. Fish and marine foods: classification, composition, nutritive benefits.

UNIT IV

Starch: characteristics, gelatinization, factors affecting gelatinization. Sugars: Types of sugars and sugar syrups, Sugar cookery and applications. Fats and oils: Sources, composition, absorption, functional properties of fats and oils. Sensory evaluation – Sensory attributes and its characteristics, Requirements to conduct sensory evaluation, Sensory tests.

UNIT –V

Definition and Scope of Food Technology and emerging trends in food technology. Research and standards organization of Food Science and Food Technology: Role and Function of the organizations; Nutritional research organization- ICMR-NIN, NNMB; Food Technology research organization- AFSTI, CFTRI, DFRL, NIFTEM. Food Standards- FSSAI, AMARK, FPO, MMPO.

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References:

1. Food Science by Helen Charley.
2. Food Facts and Principles - N. Shakuntala Manay & M. Shadakshara swamy,
3. Vijaya Khader, Text book of food science and technology, Indian council of Agricultural research New Delhi, 2001.
4. Food Science – B. Srilakshmi, New Age international (P) Limited, New Delhi.
5. Swaminathan, M. (1990). Essentials of food and nutrition, Vol. I and Vol. II. 12
6. Nutrition: An Integrated Approach- Pike & Brown;
7. Principles of Nutrition E.D Wilson, K.H.Fisher & M.C.Faqua
8. Food Science- N.Potter & J.H. Hotchkiss- CBS Publishers & Distributors, New Delhi.
9. Khatkar, B. S. (Ed.). (2007). Food Science and Technology. Daya Books.
10. Gopalan, C. (1992). Basic issues in combating malnutrition- NFI Publication.
11. Mehtab S. Bamji. (1996).Text book of human nutrition, Oxford & IBH Co.PVT.LTD, Delhi,
12. Suitor, C.W. and Hunter, M.F. (1980).Nutrition principles and application in health promotion, J.B. Lippincot Company, Philadelphia
13. Food science, Chemistry and Experimental foods by M. Swaminathan.
14. Experimental study of Foods by Griswold R.M.

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SEMESTER – I

COURSE 1: INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

Practical **Credits: 1** **2 hrs/week**

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1. Sensory evaluation of food- preparation of score card, threshold tests, sensory testing.
2. Standardization of weights and measures of various foods
3. Fats and oils – Smoke points, oil absorption and mayonnaise preparation.
4. Vegetable and fruit – Effect of time, temperature, media and cooking methods on pigments, Enzymatic Browning- Preventive measures.
5. Pulse cookery – effect of different cooking methods
6. Visit industries of plant and animal food product processing and preservation technology

SEMESTER – I
COURSE 1: INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY
MODEL QUESTION PAPER

Time: 3 Hrs Max Marks: 70

Part - A

Answer any FIVE of the following questions. 5 X 4 = 20 Marks

1) Define the concept of Recommended Dietary Allowances (RDA).
2) List the functions of carbohydrates in the human body.
3) What are the health benefits of consuming whole grains and cereals?
4) List the nutritional composition of pulses and legumes.
5) Explain the composition and nutritional benefits of milk and milk products.
6) What are the functional properties of eggs in cooking and nutrition?
7) List the sources of fats and oils in the human diet.
8) Discuss the sensory attributes used in sensory evaluation of food.
9) What are the emerging trends in food technology?
10) Explain the role and function of FSSAI in food safety standards.

Part – B

Answer FIVE questions. Choosing ONE question from each unit. 5 X 10 = 50 Marks.

UNIT - I

11) Discuss the importance of a balanced diet and its components.

(Or)

12) Explain the classification of nutrients and their functions in human health.

UNIT – II

13) Elaborate on the nutritional composition and health benefits of various plant-based foods such as cereals, millets, and legumes.

(Or)

14) Discuss the nutritional significance of fruits, vegetables, nuts, and plantation crops.

UNIT- III

15) Discuss the nutritional composition of animal products like milk and poultry.

(Or)

16) Explain the differences in composition and nutritional value between red meat and white meat.

UNIT – IV

17) Explain the characteristics of starch and its application in food processing.

(Or)

18) Describe the different types of sugars, their properties, and uses in food technology.

UNIT – V

19) Discuss the emerging trends in food technology and its impact on food production and safety.

(Or)

20) Elaborate on the role of research organizations like CFTRI, NIFTEM, and ICMR-NIN in food science and technology.

Instruction to Paper Setter:

Two questions must be given from each unit in Section-A.

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SEMESTER – I

Course 2 : PRINCIPLES OF FOOD CHEMISTRY

Theory **Credits: 3** **3 hrs/week**

Objectives

- Understanding the role of foods in our daily life
- To gain knowledge in buffer solutions
- Understand the food enzymes, amino acids, proteins, carbohydrates & food additives.

Course Outcome: Student after successful completion of the course will be able to

- To gain knowledge about buffer solutions, water in food.
- To study about carbohydrates.
- To know about amino acids and proteins.
- To understand food enzymes.
- To gain knowledge about food adulterants and food additives.

UNIT – I : WATER AND ITS IMPORTANCE

Definition of water in Food, Structure of water and Ice, Types of water, Interaction of water with Solutes. Definition of Acids and Bases, Ampholytes, P^{OH}, P^{Ka}, Weak and Strong Acids. Definition of Buffer, Buffer Capacity, Henderson-Hasselbalch equation and its uses-limitations Laboratory use of Buffers, physiological Importance of Buffers in Body.Definition of P^{H}.

UNIT – II : CARBOHYDRATES

Introduction, Classification (Mono, Oligo and Poly Saccharides), occurance of carbohydrates, biological importance of carbohyderates, Mutarotation, Annomers, Epimers, Killiani Synthesis Lobrey-debruyn-VanEkenstein Rearrangement.

UNIT – III : AMINO ACIDS & PROTEINS

Introduction, definition of amino acids, classification of amino acids into alpha, beta & gama amino acids, essential and non essential amino acids & examples. Classification of amino acids into acidic, basic and nutral amino acids with examples. Preparation of Amino Acids – Strecker Synthesis, Melonic Ester Synthesis. Physical Properties - Zwitterion, Iso-Electric point. Proteins – Definition, Structural Determination of proteins.

UNIT – IV : FOOD ENZYMES

Introduction, Types and classification, Functions and Enzyme Activity, Factors affecting Food enzyme, Applications of Enzymes in Food Industry, Maillard-Browning Reaction and its Importance.

UNIT – V : GENERAL FOOD ADULTERANTS & FOOD ADDITIVES

Definition of food adulteration, types of food adulteration, adulterants in some common food and identification tests (Milk, Turmeric Powder, Ghee, Sugar, Salt, Tea Powder, Chilli Powder & Honey).

Food Additives – Examples of general food additives, Health Hazards of some food additives.

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RECOMMENDED READINGS

1. Andrew L. Winton and Katebarber Winton, Techniques of food analysis", agrobios, Jodhpur,(2001)
2. Deman JM, "Principles of Food Chemistry", AVI Publishing, 1980.
3. Fennema OR," Food Chemistry", Marcel Dekker Publishers, 1996.
4. Lowe B., "Experimental Cookery", John Wiely & Sons Inc. New York, 1965. Mahindru SN," Food Additives Publishing Company Ltd., New Delhi -2000.
5. Characteristics, Details and Estimation", Tata Mc. Graw-Hill
6. Meyer LH, "Food Chemistry", Affiliated East West Press Pvt. Ltd. Bombay -1987.
7. Norman N Potter Joseph H and Hotchkirs, "Food Science", 5th edition, CBS, Publishers Distributor, NewDelhi, 1996.
8. Oser BL, Hawk's," Physiological Chemistry", TATA, MeGraw-Hill Publishing Co.,Ltd., Bombay - 1965.
9. Fennema Owen R, "Principles of Food Science Part - I". "Food, Chemistry", Marcel Dekker Inc, New York, 1976.
10. Ranganna S; "Handbook of Analysis and Quality Control for Fruit and Vegetable Products" 2nd Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi 1986.
11. Shakuntala Manay N and Shadakshara Swamy M, "Foods, Facts and Principles", New Age International Publishers (P) Ltd., New Delhi, 1987.
12. A text book organic chemistry by BS Bahl & Arun Bahl.
13. A text book of Food Adulteration by Jesse P Batter Shall

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SEMESTER – I

COURSE 2: PRINCIPLES OF FOOD CHEMISTRY

Practical **Credits: 1** **2 hrs/week**

1. Determination of Carbonate and Bi-carbonate in Water Samples.
2. Determination of Hardness of Water using by EDTA
   - **a.** Permanent Hardness
   - **b.** Temporary Hardness
3. Determination of Chloride in Water Sample
4. Identification of Amino Acids by Paper Chromatography

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SEMESTER – I

COURSE 2: PRINCIPLES OF FOOD CHEMISTRY

MODEL QUESTION PAPER

Time: 3 Hrs Max Marks: 70

Part - A

Answer any FIVE of the following questions **5 X 4 = 20 Marks**

1) Define pH , pOH and Acid and Base.
2) Explain Ampholytes
3) Write down Killani Synthesis.
4) Write down Mutarotation.
5) Explain Strecker Synthesis.
6) Write down Zwitter ion
7) Write down the classification of Enzymes.
8) Explain factors affecting Food Enzyme.
9) Explain the Types of Food adulteration.
10) Write the Examples of Some Food additives.

Part – B

Answer FIVE questions. Choosing ONE question from each unit. **5 X 10 = 50 Marks.**

UNIT - I

11) Define Henderson-Hasselbalch equation and its uses, limitations.

(Or)

12) Define Buffer Solution: write down laboratory uses and physiological importance of Buffers in Body.

UNIT – II

13) write down the classification of Carbohydrates.

(Or)

14) Write note on:
    (i) Epimers
    (ii) Lobrey-debrun-van Ekenstein Rearrangement..

UNIT- III

15) What are Amino acids? Write down the classification of Amino acids.

(Or)

16) Wrrite down the Structural determination of proteins.

UNIT – IV

17) Explain the Applications of Enzymes in Food Industry.

(Or)

18) Write down Maillard-Browning Reaction and its importance.

UNIT – V

19) Write down the Food adulterants in some common food and their Identification Tests.

(Or)

20) Explain General Food additives and their Health Hazards.

Instruction to Paper Setter:

Two questions must be given from each unit in Section-A.

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SEMESTER – II

COURSE 3: FOOD MICROBIOLOGY

Theory	**Credits: 3**	**3 hrs/week**

Learning Objectives

To introduce the fundamental concepts of microbiology.

Learning Outcomes

- Upon successful completion of the course, a student will be able to:
- To understand about scope of microbiology & classification of micro organisms & sterilization methods.
- To study about the prokaryotic cells like bacteria, yeast, molds & viruses which are associated with food.
- To learn about physical & chemical factors affecting growth of micro organisms. To understand about metabolism & growth of micro organisms.
- To study bacterial genetics & mutation.

UNIT I

Historical aspects, Scope of microbiology, General classification of microorganisms, morphology, Structure and function of prokaryotic cells and their organelles Structure and function of eukaryotic cells and their organelles morphological and biochemical characteristics of important groups. Brief survey of microbes as friends and foes. Characteristics, growth and reproduction, Sterilization and disinfections.

UNIT II

Characteristics of growth and reproduction. Physical and chemical factors affecting growth of microorganisms like temperature, pH, oxygen, Osmotic pressure, nutrients etc, bacteriostatic and bactericidal. Physiology, Nutritional requirement of bacteria, yeast and fungi,bacterial growth curve. Structure of DNA, Types of RNA and difference between DNA & RNA.

UNIT III

Microorganisms associated with foods, Sources of microorganisms Soil, water, plants and of animal origin. Useful microorganisms Endospore formers, Irregular non-sporing gram positive rods. Yeasts & molds their role in food spoilage, Estimating number of microorganisms, sampling, sample size.

UNIT IV

Microbiology of Food commodities, Contamination, preservation and spoilage & beneficial role of microorganisms in Cereals, Pulses, Nuts and Oilseeds, Fruits and Fruit products ,Vegetables and Vegetable products Meat , dairy and their products.

Microbiology of water- Contamination and microbial standards.

UNIT V

Food preservation Heat processing: Pasteurization and appertization, Determination of D and z values. Heat sensitivity of micro-organisms & Spoilage of canned foods. Aseptic packaging, Irradiation Brief account of microwave, UV and ionizing radiation. Brief account of High pressure processing Low temperature storage Chilling and freezing. Effect of chemical and natural preservatives on microbes in food.

REFERENCES:

1. General microbiology Pelzar
2. Food Microbiology Frazier
3. Molecular biology of the Cell Bruce Alberts
4. Cell and molecular biology De Roberties&De Roberties
5. W.C.Frazier: *Food Microbiology (IV edition)*Mcgraw Hill Book Company, New York (1995)
6. James M jay: Modern food microbiology *IV* edition, CBS publishers, New Delhi (1996)
7. M.R. Adams and M.O. Moss, *Food Microbiology*, Second Edition, Panima Publishing corporation,New Delhi. Third reprint 2004.
8. Gustavo F Gutierrez-Lopez, Gustavo V Barbosa-Canovas *Food Science and Food Biotechnology:* CRCPress 2003

SEMESTER – II

COURSE 3: FOOD MICROBIOLOGY

Practical **Credits: 1** **2 hrs/week**

1. Identification of microbes by Simple staining
2. Identification of microbes by Gram staining
3. Microbial mobility test (hanging drop method)
4. Determination of size of microbes (micrometry)
5. Direct microscopic count (DMC) of microorganisms
6. Identification of common microorganisms.
7. Identification of fungi in bread, pickles, jam, groundnut etc.
8. Microbiological examination of fresh fruits, vegetables and spices.
9. Microbiological examination of canned foods (acidic and non-acidic foods)
10. Microbiological examination of bottled and aseptically packed beverages
    - water (MPN method for determination of coliform count)
11. Microbiological examination of flour, bread, cakes, sugar and cocoa confectionery products
12. Microbiological examination of meat, milk and their products
13. Visit to food microbiology lab.

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SEMESTER – II

COURSE – 3: FOOD MICRO BIOLOGY

MODEL QUESTION PAPER

Time: 3 Hrs Max Marks: 70

Part - A

Answer any FIVE of the following questions **5 X 4 = 20 Marks**

1) Define microbiology and explain its scope in food science.
2) Write a short note on classification of microorganisms.
3) Write about the effect of temperature and pH on microbial growth.
4) Differentiate between DNA and RNA.
5) Write short notes on microorganisms associated with soil and water.
6) Mention the role of molds in food spoilage.
7) Write about any two food-borne infections and their causative agents.
8) Explain the microbiological standards for water.
9) Write short notes on pasteurization and appertization.
10) What are the effects of freezing on microbial growth in food?

Part - B

Answer FIVE questions. Choosing ONE question from each unit. **5 X 10 = 50 Marks.**

UNIT - I

11) Describe the structure and functions of prokaryotic and eukaryotic cells.

(Or)

12) Discuss the characteristics, growth, and reproduction of microorganisms.

UNIT – II

13) Explain the physical and chemical factors affecting the growth of microorganisms.

(Or)

14) Describe the bacterial growth curve and nutritional requirements of microbes.

UNIT- III

15) Discuss the various sources of microorganisms in food and their importance.

(Or)

16) Explain the methods for estimating the number of microorganisms in food samples.

UNIT – IV

17) Describe in detail the major food-borne diseases, their causative organisms, and preventive measures.

(Or)

18) Explain the microbiology of meat and dairy products in detail.

UNIT – V

19) Discuss different methods of food preservation – physical and chemical.

(Or)

20) Write an essay on irradiation and high-pressure processing in food preservation.

Instruction to Paper Setter:

Two questions must be given from each unit in Section-A.

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SEMESTER – II

COURSE 4: HUMAN NUTRITION

Theory **Credits: 3** **3 hrs/week**

Learning Objectives

To familiarize with the concepts of nutrition

Learning Outcomes

Upon successful completion of the course, the students will be able to

- To Understand about Nutrition, and importance of food for Health
- To Analyze about different vitamins and minerals and their importance
- To know about Balanced diet and Recommended Dialy Allowances
- To study about diet surveys and Vitamin Deficiency Control Programmes
- To gain knowledge about International agencies like WHO, FAO, UNICEF and CARE

Unit – I

Introduction to human nutrition- basic definition of nutrition, health, nutrients. Principles compounds in foods- classification of foods, sources, functions and deficiency symptoms of carbohydrates, proteins, fat, vitamins and minerals.

Unit – II

Nutritional requirements for different age groups – infant, pre-school children, school going children, adolescents, adults, old age, pregnancy, lactation and industrial workers; recommended dietary allowances (RDA) for different age groups.

Unit – III

Classification of foods, their Nutritive value, effect of processing on nutritive value of foods- obesity, food faddism and faulty food habits- toxicants naturally occurring in foods- food adulteration.

Unit – IV

Food production and consumption pattern in different parts of India – food requirements and availability- applied nutrition programme, diet and nutrition in India.

Unit – V

Prevention of malnutrition in developing countries- nutritive value of common Indian recipes- therapeutic diets – food allergy- processed supplementary foods and novel foods.

References:

1. Dietetics (2007) by B. Srilakshmi.
2. ICMR (2010). Nutrient Requirements and Recommended Dietary Allowances for Indians
3. Text Book of Human Nutrition (2010) by Bamji
4. Essentials of Human Nutrition (2007) by A.S.Truswell.
5. Nutrition & Dietetics 3rd edition Subhangini Joshi
6. Oxford Handbook of Nutrition and Dietetics (2012) Joan Webster
7. Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd
8. IFCT (2017) Indian Food Composition Tables

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SEMESTER – II

COURSE 4: HUMAN NUTRITION

Practical **Credits: 1** **2 hrs/week**

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1. Identification of food sources for various nutrients using food composition tables.
2. Record diet of self-using 24 hour dietary recall and its nutritional analysis.
3. Introduction to meal planning, concept of food exchange system.
4. Estimation of BMI and other nutritional status parameters.
5. Planning meals for adults of different activity levels for various income groups.
6. Survey of locally available foods and identifying the key nutrients
7. Estimation of BMI and other nutritional status parameters.
8. Formulation of weaning foods
9. Planning and preparation of diets for aged people

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SEMESTER – II

COURSE – 4: HUMAN NUTRITION

MODEL QUESTION PAPER

Time: 3 Hrs Max Marks: 70

Part - A

Answer any FIVE of the following questions 5 X 4 = 20 Marks

1) Define nutrition and explain its importance to human health.
2) Write short notes on deficiency symptoms of carbohydrates and fats.
3) List the nutritional requirements for infants and preschool children.
4) Write a short note on RDA for industrial workers.
5) Explain the effect of food processing on nutritive value of foods.
6) What is food adulteration? Give two examples.
7) Write a short note on food production and consumption patterns in India.
8) What is the significance of applied nutrition programmes?
9) Explain the nutritive value of common Indian recipes.
10) What are therapeutic diets? Give examples.

Part - B

Answer FIVE questions. Choosing ONE question from each unit. 5 X 10 = 50 Marks.

UNIT - I

11) Discuss the classification, sources, and functions of carbohydrates, proteins, and fats.

(Or)

12) Explain in detail the principles and functions of vitamins and minerals in the human body.

UNIT – II

13) Describe the nutritional requirements of pregnant and lactating women.

(Or)

14) Write in detail about the recommended dietary allowances (RDA) for different age groups.

UNIT- III

15) Discuss the effect of processing on nutritive value and the impact of food faddism.

(Or)

16) Write notes on obesity and faulty food habits and their effects on health.

UNIT – IV

17) Explain the food requirements and availability in different parts of India.

(Or)

18) Describe the diet and nutrition scenario in India and measures to improve it.

UNIT – V

19) Discuss the prevention of malnutrition in developing countries.

(Or)

20) Write in detail about food allergy, processed supplementary foods, and novel foods.

Instruction to Paper Setter:

Two questions must be given from each unit in Section-A.

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