SEMESTER II

SEMESTER II

ND 201 PRINCIPLES OF FOODS (CORE)

(5credits: Theory credit= 3 + Practical credits =2)

3 hrs/week

Objectives:

- **To provide an understanding of composition of various food stuffs.**
- **To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.**

UNIT I: PLANT FOODS

Cereals

- Starch: functions and properties;
- Protein- gluten, factors affecting gluten formation
- Gelatinization, factors affecting gelatinization, Retro gradation, syneresis

Millets

- Jowar- Nutritive value and processing
- Ragi - Nutritive value and processing.
- Bajra and Quinoa - Nutritive value

Legumes

- Decortication, Soaking and Germination – Advantages
- Fermentation, Parching and Puffing – Advantages
- Effect of cooking treatments on the nutrient composition- Anti nutritional factors.

Vegetables

- Classification and Nutritive value
- Water insoluble and Water soluble pigments
- Flavour compounds: terpenoids, flavonoids, Sulphur compounds and other volatile flavour compounds

Fruits

- Classification and Nutritive value
- Enzymatic Browning and its prevention
- Post harvest changes

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UNIT II: SUGARS, NUTS & OILSEEDS and ANIMAL FOODS

Sugars

- Types of sugar
- Sugar crystallization and caramalization (Non Enzymatic browning) , Factors affecting crystallization
- Stages of sugar cookery, preparation of candies – crystalline and non crystalline

Nuts and oils

- Composition, Properties of fats and oils- Homogenization, Winterization and Plasticity
- Rancidity – types, mechanism and prevention
- Fat Replacer - Carbohydrate-Derived with Examples , Fat-Derived with Examples, Protein-Derived with Examples

Milk

- Composition and Nutritive Value
- Types of Processed milk
- Properties of milk proteins – effect of heat, acid and phenolic compounds on milk

Egg, poultry and Meat

- Composition and Nutritive Value
- Advantages of white meat (Poultry), Meat Substitutes
- Changes during cooking of meat

Fish

- Composition and Nutritive Value
- Classification, Characteristics of fresh fish
- Spoilage of Fish

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UNIT III: FOOD ADDITIVES

Food Additives

- Definition. Functions and uses of food additives
- Additives- additive class, function , chemical substance, foods in which it is used
- Food preservatives - Chemical , Principle preservatives in current use

Food Colours

- Natural colourants
- Sources of natural colourants
- Synthetic colourants - Permitted and non permitted colours

Emulsions and Foams

- Emulsion Formation , Emulsifiers & stabilizers– Types , Factors affecting Emulsion stability
- Foam Formation and Stability
- Factors affecting Foam Stability and Anti-foaming Agents

Leavening agents

- Natural
- Chemical
- Microbial

Sweetners

- Artificial Sweetners
- Sugar Alcohols (Polyols)
- Novel Sweeteners

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BOOK RECOMMENDED

- Food Science – Norman N Potter, Joseph H. Hotchkiss, 5th edition, CBS Publishers & Distributors, New Delhi.
- Food Facts and Principles – Shakuntala Manay, New Age International Publishers.
- Food Science – B Sri Lakshmi, New Age International Publishers.

SUGGESTED REFERENCES FOR ADDITIONAL READING

- Fruit and Vegetable Preservation – Principles & Practices – R P Srivastava, Sanjeev Kumar. 3rd edition, international Book Distributing Co., Lucknow.
- Food Science, Chemistry and Experimental Foods – Dr.M.Swaminathan, The Bangalore Printing & Publishing Co. Ltd., Mysore
- Essentials of Food Science by Vickie A. Vaclavik and Elizabeth W. Christian

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ND 251 P PRINCIPLES OF FOODS
PRACTICALS

4 hrs/week

Objectives:

- **To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.**

1. Gel formation
2. Estimation of gluten in wheat flour
3. Malting of millets
4. Effect of heat on vegetable pigments
5. Effect of acid on vegetable pigments
6. Effect of alkali on vegetable pigments
7. Methods to prevent enzymatic browning in vegetables
8. Methods to prevent enzymatic browning in fruits
9. Pectin strength in fruits
10. Stages of Sugar cookery
11. Test for checking Rancidity of oils- Acid value
12. Effect of heat on milk proteins
13. Effect of acid on milk proteins
14. Identification of food colours by paper chromatography
15. Market survey of food products/ Visit to a food industry

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ND 202 T NUTRITIONAL BIOCHEMISTRY – II (CORE)

(5 credits: Theory credit= 3 + Practical credits =2)

Objectives:

3 hrs/ week

- **To enable students to understand the role of nutrients in the body.**
- **To know the classification, functions and metabolism of lipids, and minerals.**

UNIT I: LIPIDS AND THEIR METABOLISM AND INTERMEDIARY METABOLISM

Classification, sources and functions

- Classification based on their chemical composition
- Fatty acids- Types, sources and Role of essential fatty acids, Lipoproteins, Triglycerides and Cholesterol
- Role of Lipotropic factors

Utilisation

- Digestion and absorption
- Deposition , storage and mobilisation of lipids
- Role of adipose tissue in lipid metabolism

Metabolism

- Oxidation of fatty acids and Synthesis of fatty acids
- Biosynthesis of triglycerides and phosphatides
- Synthesis of cholesterol (Flow chart), Breakdown and excretion -Bile pigments and Bile salts

Inborn errors of Lipid Metabolism

- Gaucher's disease, Niemann's pick disease,
- Tay-sach's, Fabry's disease
- Hyperlipoproteinemia's

Intermediary Metabolism

- Interrelationship between carbohydrate, fat and protein metabolism
- Ketosis and metabolism of ketone bodies
- Metabolic Changes during starvation.

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UNIT II: VITAMINS

Fat Soluble Vitamins- Metabolism, transport and storage of

- Vitamin A
- Vitamin D
- Vitamin E & K

Fat Soluble Vitamins Sources, Functions and deficiency of:

- Vitamin A
- Vitamin D
- Vitamin E & K

Water Soluble Vitamins (B complex Vitamins) – Metabolism, transport, storage, sources, functions and deficiency of:

- Thiamine
- Riboflavin
- Niacin

Water Soluble Vitamins (B complex Vitamins) – Metabolism, transport, Storage, sources, functions and deficiency of:

- Pantothenic acid and Biotin
- Pyridoxine
- Folic Acid and Cyanacobalamin

Water Soluble Vitamins (Vitamin C)

- Metabolism, transport, and storage of Ascorbic Acid
- Ssources, functions and deficiency of Ascorbic Acid
- Role of fat and water soluble vitamins as Anti oxidants

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UNIT III: MINERALS

Macro Minerals

Calcium

- Metabolism, absorption, sources, functions and deficiency
- Factors affecting calcium absorption-Enhancing and Interfering
- Role of calcium in ossification and bone growth

Phosphorous

- Metabolism, absorption, utilization
- Sources, functions and deficiency
- Inter-relationship between parathormone and vitamin D in the regulation of calcium and phosphorous metabolism

Sodium and Potassium

- Metabolism, absorption, transport
- storage, functions and sources.
- Deficiency and Excess

Micro Minerals

- Iron - Metabolism, Functions, Sources and Deficiency manifestations
- Iodine - Metabolism, Functions, Sources, and Deficiency Manifestations
- Flourine and Zinc - Functions, Sources, and Deficiency Manifestations

Trace elements

- Selenium - Functions, Sources and Deficiency manifestations
- Copper and cobalt - Functions, Sources, and Deficiency Manifestations
- Chromium and Manganese – Functions, Sources, and Deficiency Manifestations

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BOOKS RECOMMENDED

- A Textbook of Biochemistry – A V S S Rama Rao, 9th edition, UBS Publisher's Distribution Pvt. Ltd.
- Nutritional Biochemistry – Tom Brody, 2nd edition, Academic Press
- Biochemistry – U Satyanarayana, U Chakrapani, Books & Allied (P) Ltd.
- Textbook of Biochemistry (for Medical Students) – DM Vasudevan and S SreeKumari,4th edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

SUGGESTED REFERENCES FOR ADDITIONAL READING

- Textbook of Medical Biochemistry – M N Chatterjee, RanaShinde, 7th edition, Jaypee Brothers.
- Textbook of Medical Biochemistry – S Ramakrishnan, K G Prasannan, R Rajan, 3rd edition, Orient Longman.
- Harper's Illustrated Biochemistry – Robert K Murray, Daryl K Granner, Peter A Mayes, Victor W Rodwell, 26th edition, McGraw Hills.
- Experimental Biochemistry – A Student Companion – B SashidharRao, Vijay Deshpande, I K International Pvt. Ltd.
- Clinical Biochemistry – Nagini.
- Principles of Biochemistry – Leihninger A L, CBS Publishers and Distributors.
- Nutritional Science – B. Sri Lakshmi, New Age International Publishers, 2nd edition.
- Text Book of Human Nutrition – Mahtab S Bamji, N PrahladRao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd

ND 252 P NUTRITIONAL BIOCHEMISTRY- II
PRACTICALS

4 hrs/ wk

Objectives:

- **To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.**

1. Estimation of Moisture
2. Estimation of Ash content
3. Preparation of the sample using ash solution
4. Estimation of Iron by Wong's method in Ash Solution
5. Estimation of Calcium by titrimetry in Ash solution
6. Estimation of Vitamin C by titrimetry in vitamin C rich sources
7. Estimation of Vitamin C in Synthetic Supplements
8. Qualitative test for lipids –solubility test, acrolein test, bromine water test
9. Extraction and Estimation of Total Lipid content in the given food sample- oil seed
10. Qualitative test for cholesterol- Salkowski test
11. Estimation of Phosphorous by colorimetric method
12. Estimation of beta carotene in food
13. Estimation of sodium by Flame photometry
14. Estimation of Potassium by Flame photometry.
15. Estimation of calcium salts in water by EDTA method.

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ND 203 T RESEARCH METHODOLOGY (CORE)

(5credits: Theory credit= 3 + Practical credits =2)

Objectives: **3 hrs/week**

- **To enable the students to understand the importance of research design**
- **To impart in depth knowledge on collection, compilation and analysis of data.**

UNIT I: BASICS OF RESEARCH (15 hrs)

Research

- Definition, Characteristics, Criteria
- Classification of research – Application perspective, Objectives perspective, mode of enquiry perspective
- Merits and demerits of scientific Method of research

Research Strategies in the field of Nutrition

- Descriptive studies – (Correlation studies, Case studies, Cross-sectional surveys)
- Analytical studies (Observational, Case-control, Cohort studies –Prospective and Retrospective)
- Experimental studies (Clinical /Intervention trials including Randomized controlled trials)

Research Process – Steps of quantitative research

- Conceptual phase
- Design and Planning phase
- Empirical or analytic phase and Dissemination and communication phase

Research Design:

- Concepts, Problem Statement, Review of Literature, Objective of the study, Formulation of Hypothesis and its types.
- Methodology, Tools for collection of data, Plan of data analysis.
- Plan of time and financial budget

Report writing

- Types of Reports- Technical and Descriptive
- Research Abstract: Definition, guidelines for writing abstract
- Technical Thesis: Definition, parts, steps in writing thesis

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UNIT II: SAMPLING DESIGN AND METHODS OF DATA COLLECTION (15 Hrs)

Sampling

- Definition, Characteristics of good sample, Advantages and Limitations, Sample size and its determination
- Methods of sampling:
  A) Probability Sampling - Simple random sampling, Stratified random sampling, Systematic sampling, Cluster sampling
  B) Non random sampling (non – probability) methods-Judgment sampling, Convenience sampling, Quota sampling, Volunteer sampling and Snowball sampling
- Sampling and Non sampling errors

Data Collection

- Types of data based on source - Primary data and secondary data, Advantages and disadvantages
- Sources of secondary data, precautions in the use of secondary data. Difference between primary data and secondary data.
- Ethical responsibilities of the researcher- required qualities of a researcher in fulfilling ethics informed consent, confidentiality, protection from risk and injury, debriefing, Plagiarism.

Methods of collecting primary data:

- Questionnaire method - Drafting of questionnaire
- Interview- training of interviewer for collecting of data using schedule.
- Observation method – Types, Inventory method, Use of checklists

Processing of data

- Ranking and Rating Scales
- Criteria for evaluation of instruments – reliability and validity
- Compilation of the data collected: geographical, chronological, qualitative and Quantitative methods.

Data Presentation

- Tabulation of data: parts of a table, general rules of tabulation, types of tables
- Diagrammatic representation of data
- Graphic representation of data

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UNIT III: STATISTICAL METHODS (15 Hrs)

Measures of central tendency

- Mean
- Median
- Mode, their relative advantages and disadvantages

Measures of dispersion:

- Mean deviation
- Standard deviation
- Coefficient of variation, percentile - their relative advantages and disadvantages

Correlation and Regression

- Types – Positive and Negative; Linear and Non linear, Simple and Multiple; Partial and Total;
  Methods of studying correlation- Scatter diagram, Graphic method, Coefficient of correlation and its interpretation
- Karl Pearson's coefficient of correlation and Spearman's Rank correlation
- Regression analysis using regression lines and equations, Difference between correlation and Regression

Parametric Tests – Advantages and Disadvantages

- 't' test: types and interpretation
- Analysis of Variance (ANOVA) - One way and two way- interpretation
- F test and its interpretation

Non parametric tests – Advantages and Disadvantages

- Chi-square test: Contingency table
- Wilcoxon signed rank test and Kruskal- Wallis test
- Difference between parametric and non parametric tests

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BOOKS RECOMMENDED

- Statistical Methods – S P Gupta, Sultan Chand and Sons Publishers, New Delhi.
- Research Methodology – methods and techniques – C R Kothari, Wiley Eastern Limited, Madras.
- Methodology of research in Social science – O.R. Krishnaswami and M. Ranganatham, 2nd revised edition, , Himalaya Publishing house ltd, 2015.

SUGGESTED REFERENCES FOR ADDITIONAL READING

- Resesarch Methodology (Concepts, Methods, Techniques and SPSS)-Dr.Priri R. Majhi, Dr.Prafull K. Khatua, II Edition , Himalaya Publishing House, Pvt. Ltd. 2015.
- A Handbook of Methodology of Research – Dr.Rajammal P Devadas and Dr. K Kulandaveil, Sri Ramakrishna Mission, Coimbatore.
- Research Methods in Social Science – B H V Sharma, D Ravindra Prasad, P Satyanarayana, Sterling Publications.
- Biostatistics – SundaraRao., 7th edition, Jaypee Brothers medical Publishers
- Methods in Biostatistics- B.K. Mahajan, 2010
- Manual of Biostatistics- JP Baride, AP Kulkarni, RD Mazumdar, Jaypee Publishers
- Research & Biostatistics for Nurses- R Sudha, Jaypee publications.

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ND 253 P RESEARCH METHODOLOGY
PRACTICALS

4 hrs/week

Objectives

- To familiarize the students with newer concepts in research.
- Enable the students to analyze the data for the project work with the Statistical techniques
- Application of statistical methods related to community nutrition and sensory evaluation techniques

1. Tabulation of Raw Data
2. Diagrammatic representation of Raw Data
3. Graphical representation of Raw Data
4. Calculation of mean
5. Calculation of Median
6. Calculation of Mode
7. Calculation of Mean deviation
8. Calculation of Standard Deviation
9. Calculation of Coefficient of Correlation and its interpretation using Karl Pearson's coefficient method.
10. Calculation of Coefficient of Correlation and its interpretation using Spearman's Rank method
11. Calculation of one sample based t- test and its interpretation
12. Calculation of Paired t- test and its interpretation
13. Calculation of Chi square test and its interpretation
14. Calculation of ANOVA (one way)and its interpretation
15. Calculation of ANOVA (Two way)and its interpretation

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ND 204 T DIET IN DISEASE (CORE)

Objectives: 3 hrs/week

- **To impart in depth knowledge regarding prevalence, causes, diagnosis, diet and life style management in acute and chronic diseases.**
- **To gain knowledge to recommend and provide appropriate nutritional care for prevention or and treatment of various diseases.**

UNIT I: NUTRITIONAL MANAGEMENT FOR HEPATOBILIARY AND PANCREATIC DISORDERS

Hepatitis

- Types
- Causes, symptoms, diagnosis
- Dietary management

Cirrhosis and Alcoholic Liver Disease

- Causes and symptoms
- Diagnosis and complications
- Dietary Management

Cholelithiasis

- Types
- Causes, symptoms, diagnosis
- Dietary management

Cholecystitis

- Types- Acute and Chronic
- Causes, symptoms, diagnosis
- Dietary management

Pancreatitis

- Types- Acute and Chronic
- Causes, symptoms, diagnosis
- Dietary management

UNIT II: NUTRITIONAL MANAGEMENT FOR RENAL DISORDERS, CANCER AND AIDS

Nephritis and Nephrosis

- Types- Acute and Chronic, Causes
- Symptoms, diagnosis,
- Dietary management

Renal Failure

- Acute and Chronic Renal Failure
- Dialysis – Types: Hemodialysis and Peritoneal dialysis - Advantages, disadvantages and Dietary management
- Kidney Transplant

Renal calculi

- Types – Calcium, Oxalate, Uric acid, Cystine, and Struvite
- Causes and Composition
- Dietary Management

Cancer

- Types, mechanism
- Causes, metabolic changes,
- Dietary management

AIDS

- Causes, symptoms & diagnosis
- Metabolic changes
- Dietary management

UNIT III: NUTRITONAL MANAGEMENT FOR DEGENERATIVE METABOLIC DISORDERS

Diabetes Mellitus

- Types, Causes and symptoms, diagnosis
- Metabolic changes and Complications
- Dietary Management – Role of fibre, glycemic index, food exchange list

Gout

- Causes, symptoms
- Risk factors and Diagnosis
- Dietary management

Polycystic ovarian Syndrome

- Causes, Symptoms and Diagnosis
- Nutritional Management
- Complications

Diseases of Thyroid Gland

- Causes, Symptoms and diagnosis of Hypothyroidism
- Causes, Symptoms and diagnosis of Hyperthyroidism
- Dietary management in Hypothyroidism and Hyperthyroidism

Cardio vascular disease

- Clinical Effects, hypertension
- Categories of Risk Factors
- Dietary Management

BOOKS RECOMMENDED

- Clinical Dietetics and Nutrition – F P Anita and Philip Abraham.
- Food, Nutrition and Diet Therapy – Kathleen Mahan & Krause, Sylvia EscottStump.
- Normal and Therapeutic Nutrition – Robinson & Lawler, 17th edition, Mac MillanPublishers.
- Clinical Nutrition – Ed Michael J Gibney, MarinosElia, OlleLjungqvist and JulieDowsett.
- Basics of Clinical Nutrtion, 2nd Edition, Joshi, Jaypee Publishers

SUGGESTED REFERENCES FOR ADDITIONAL READING

- Foods – Nutrition and Health – Dr.VijayaKhader, Kalyani Publishers.
- Nutrition in Clinical Practice – David L. Katz, Lippincott, Williams & Wilkins.
- Text Book of Human Nutrition – Mahtab S Bamji, N PrahladRao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd.
- Nutrition in Health and Diseases – Anderson, 17th edition.
- Modern Nutrition in Health & Disease – Eds – Maurice E. Shils, James A. Olson, Moshe Shike, 8th edition, Vol I and II, Williams & Wilkins Publication.
- Biochemistry – U Satyanarayana, U Chakrapani, Books & Allied (P) Ltd.
- Principles and Applications in Health Promotion – Sintor& Crowley, 2nd edition.
- Perspectives in Nutrition – WardlawKessel, McGraw Hills.
- https://mayoclinic.org
- https://my.clevelandclinic.org

ND 254 P DIET IN DISEASE
PRACTICALS

4 hrs/week

Objectives

- **To familiarize the students with newer concepts in dietary management of various disorders and diseases.**

1. Plan a day's diet and Calculate Nutritive value & cost of the menu planned for cirrhosis
2. Preparation of the planned diet for cirrhosis
3. Plan a day's diet, Calculate Nutritive value & cost of the menu planned for Gallstones.
4. Preparation of the planned diet for Gall stones
5. Plan a day's diet, Calculate Nutritive value & cost of the menu planned for pancreatitis
6. Preparation of the planned diet for pancreatitis
7. Plan a day's diet, Calculate Nutritive value & cost of the menu planned for nephritis/ nephrosis
8. Preparation of the planned diet for nephritis/ nephrosis
9. Plan a day's diet , Calculate Nutritive value & cost of the menu planned for ARF/CRF
10. Preparation of the planned diet for ARF/CRF
11. Plan a day's diet, Calculate Nutritive value & cost of the menu planned for cancer
12. Preparation of the planned diet for cancer
13. Plan a day's diet , Calculate Nutritive value & cost of the menu planned for diabetes mellitus
14. Preparation of the planned diet for diabetes mellitus
15. Plan a day's diet, Calculate Nutritive value & cost of the menu planned for Atherosclerosis
16. Preparation of the planned diet for Atherosclerosis

HOSPITAL INTERNSHIP IN NUTRITION AND DIETETICS

(Between 2nd and 3rd semester)

AIM : Internship is a phase of training where in a graduate is expected to conduct actual practice of diet management and healthcare and acquire sills under supervision of a practicing dietician so that the student may become capable of functioning independently.

OBJECTIVES:

1. To familiarize the students with the hospital Organization.
2. To train the students in the dietetics Department of Hospital .
3. To have hands on experience in the various OPD of a hospital.
4. The students will have to prepare a report and submit to the department.
5. A presentation has to be made in seminar on their work experience.

Duration of Internship – 30 days in Hospital in a multispecialty hospital with dietary department.

Case studies - Three case studies (2 major and 1 minor) of different diseased conditions have to be taken up during the internship.

Report to be submitted in the hospital - Submit a bound copy of the word-processed, printed internship report to the dietician along with a student's copy (attested by the Dietician and Head of the Department)

Evaluation – Students will gain additional 2 credits based on the evaluation by the dietician

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KOTI, HYDERABAD-095
P.G. YEAR: SEMESTER, -INTERNAL ASSESSMENT
(TITLE)

Name of the Student:
Roll no:-

(Max Marks 10)

I. Answer the following Questions:- $(4 \times 2\frac{1}{2} = 10M)$

1.

2.

3.

4.

****

CODE NO:

TELANGANA MAHILA VISWAVIDYALAYAM

KOTI, HYDERABAD-095

M.Sc. SEMESTER EXAMINATION-2024

(QUESTION PAPER PATTERN CONSISTING OF 3 THEORY UNITS)

Time: 2 $^1/_2$ **Hours** (***Max. Marks***: 60)

SECTION – A (6 *X* 4 = 24*M*)

Answer all the Questions (Short notes)

1. Question from Unit-I
2. Question from Unit-I
3. Question from Unit-II
4. Question from Unit-II
5. Question from Unit-III
6. Question from Unit-III

SECTION – B (3 *X* 12 = 36)

Answer all the Questions. All questions carry equal marks

7. a) Question from Unit-I

(OR)

b) Question from Unit-I

8. a) Question from Unit-II

(OR)

b) Question from Unit-II

9. a) Question from Unit-III

(OR)

b) Question from Unit-III

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