UNIVERSITY OF CALICUT

(Abstract)

B.Sc Programme in Food Technology – under Choice based Credit Semester System - Scheme and Syllabus – implemented with effect from 2009 admission onwards – approved – orders issued.

GENERAL & ACADEMIC BRANCH - I 'J' SECTION

No. GAI/J1/7359/03. Calicut University P.O, Dated. 25-06-2009.

Read: 1. U.O. No. GAI/J2/3601/08 vol. II dated 19-06-2009.

2. Minutes of meeting of Board of Studies in Food Technology held on 20-01-2009 and 27-04-09.

3. Item No. 2 (vi) of the minutes of meeting of Faculty of Science held on 5-5-09.

4. Item No. II A.6 of the minutes of meeting of the Academic Council held on 14-5-09.

O R D E R

Choice based Credit Semester System and Grading has been introduced for U.G curriculum in all affiliated colleges under this University with effect from 2009 admission onwards and regulations for the same implemented vide paper cited (1) above.

As per paper read as (2) above, the Board of Studies has resolved to approve the Syllabus of B.Sc. Programme in Food Technology under Choice based Credit Semester System.

As per paper read as (3) & (4) above, the Faculty of Science held on 5-5-09 endorsed the minutes of Board of Studies and the Academic Council of 14-05-09 approved the same.

Sanction has therefore been accorded to implement the Scheme and Syllabus of B.Sc programme in Food Technology under Choice based Credit Semester System in this University with effect from 2009 admission onwards.

Orders are issued accordingly. Scheme and Syllabus appended.

Sd/-
DEPUTY REGISTRAR (G & A I)
FOR REGISTRAR

To

The Principals of all affiliated Colleges
offering B.Sc Programme in Food Technology

Copy to:

CE/EXI/EGI/DR B.Sc/
System Administrator with a request to upload in the University Website/Tabulation section/Enquiry/GAI F section/SF/DF/FC.

Forwarded/ By Order

SECTION OFFICER

UNIVERSITY OF CALICUT

Restructured Curriculum with Credit based Semester System for Undergraduate Programme in

B. Sc. Food Technology

Scheme of Examination, Syllabus and Model Question Papers, with effect from 2009 Admission

Semester I

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
	Common course I	4	3	16
	Common course II	5	3	
	Common course III	4	4	
FTI B 01	Perspective of Food Science (PFS)	2	2	
FTI B 02 P	PFS Practicals	2		
	Complimentary Course 1	4	2	
	Complimentary Course 2	4	2	

Semester II

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
	Common Course IV	4	4	18
	Common Course V	5	4	
	Common Course VI	4	4	
FT2 B 03	Food Microbiology I (FM I)	2	2	
FT2 B 04 P	FM I Practicals	2		
	Complimentary Course - 1	4	2	
	Complimentary Course - 2	4	2	

Semester III

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
	Common course VII	5	4	15
	Common course VIII	5	4	
FT3 B 05	Technol. of Food Preservation (TFP)	3	3	
FT3 B 06 P	TFP Practicals	2		
	Complimentary Course - 1	5	2	
	Complimentary Course - 2	5	2	

Semester IV

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
	Common course IX	5	4	27
	Common course X	5	4	
FT4 B 07	Food Chemistry and Nutrition (FC	3	7	
FT4 B 08 P	F C Practical	2		
	Complimentary Course - 1	5	6	
	Complimentary Course - 2	5	6	

Semester V

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits

FT5 B 09	Food Microbiology II (FMII)	4	3	13
FT5 B 10	Grain Science and Technology (GST)	4	3	
FT5 B 11	Technology of Animal Foods (TAF)	4	3	
FT5 B 12 P	FM II Practicals	4		
	Project	2		
FT5 B 13 P	GST Practicals	4		
Open Course				
FT5 D 01	Technology of Spices	3	4	
FT5 D 02	Introduction to Food Technology			
FT5 D 03	Fruits and Vegetable Technology			

Semester VI

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
FT6 B 14	Technol. of Fruits and Vegetable (TFV)	4	3	
FT6 B 15	Dairy Technology	4	3	
FT6 B 16	Food Informatics, Regulations and	4	3	

	Packaging			31
FT6 B 17 P	Practicals TAF	4	8	
FT6 B 18 P	Practicals TFV	4	8	
FT6 B O1 E	Food Engineering (Elective Courses)	3	2	
FT6 B 19 P	Project	2	4	

Complementary courses

Course Code	Title of Courses	Hrs per Week	No. of Credit	Total Credits
FTI C 01	Principles of Nutrition	4	2	12
FT2 C 02	Food Chemistry (FC)	2	2	
FT2 C 03 (P)	Practicals – F C	2	-	
FT3 C 04	Principles of Food Science (PFS)	3	2	
FT3 C 05 (P)	Practicals – PFS	2	-	
FT4 C 06	Food Preservation and Quality Control (FP & QC)	3	2	
FT4 C 07 (P)	Practicals – FP & QC	2	4	

Abbreviation of Codes:

FT: Food Technology; B : Core Courses; P: Core Course Practicals;

C: Complimentary courses; D : Open course; E :lective Course

Pattern of Theory Questions for core course (B) and Complimentary course (C)

Question type	No: of Questions to be answered	Question numbers	Weight	Total Weightage
I Objective type	All Questions	1 – 4 Multiple choice 5 – 8 Name the following 9 – 12 Fill in the blanks 13 – 16 Match the following 17 – 20 True / False	0.25 x 4 = 1 0.25 x 4 = 1 0.25 x 4 = 1 0.25 x 4 = 1 0.25 x 4 = 1	5
II Short Answer	Any Six	21 – 29	1 x 6 = 6	6
III Short Essay	Any Three	30 – 34	2 x 3 = 6	6
IV Essay	Any Two	35 – 38	4 x 2 = 8	8

Internal Assessment for Theory

Weightage	**Assignment Max 1 mark**	**Seminar Max 1 mark**	**Attendance Max 1 Mark**	**Test Papers Max 2 marks** (Best 2 out of 3)
Grade A	1	1 Excellent	1 90% +	2 80 % and above
B	0.75	0.75 Very good	0.75 85 – 89 %	1.5 70 – 79 %
C	0.50	0.50 Good	0.50 80 – 84 %	1.0 60 – 69 %
D	0.25	0.25 Average	0.25 75 – 79 %	0.5 40 – 59 %
E	0	0 Poor	0 < 75 %	0 < 40 %

Practical External: 75 %, Maximum Weightage 25

Pattern of Practical Questions

Practical course	Record 5	Procedure Spot test 5	Work done 5 x 2 = 10	Accuracy 2.5 X 2 = 5	Total weightage 25
Grade A	5	5	5 x 2 = 10	2.5 x 2 = 5	25
B	4	4	4 x 2 = 8	2 x 2 = 4	20
C	3	3	3 x 2 = 6	1.5 x 2 = 3	15
D	2	2	2 x 2 = 4	1 x 2 = 2	10
E	1	1	2 x 1 = 2	0.5 x 2 = 1	5

Practical Internal: 25%, Maximum Weightage 5

Practical Course	Practical Test 1	Attendance 1	Record Submission 1	Maximum Weightage 5
Grade A	3	1 90 % & above	1	5
B	2.5	0.75 85 – 89	0.75	4
C	2.0	0.50 80 – 84	0.50	3
D	1.5	0.25 75 – 79	0.25	2
E	0	0 < 75 %	0	0

Internal Assessment

Internal Assessment marks should be published in the department notice board. A grievance redress committee is constituted at the department level to look into the matter of any discrepancy. The internal assessments marks are to be tabulated and forwarded to the controller of examination at the end of each academic year by head of the department, through Principal of the college.

Project Work

Students of B. Sc Food Technology should undergo an project work for a period of 15 days, during the VIth semester. The programme is arranged by the department of Food technology in consultation with the food industries inside and outside Kerala. The purpose of the programme is to get hands-on experience on various aspects of food industries that forms the strong foundation for the young food technologists. The department will allot students to the industry, in consultation with the industry concerned and based on merit of the students. The selected student should report for the programme on the stipulated date and attend the programme regularly without any lapse. On completion, each student should prepare a project report duly certified by the supervisor in the industry. Consequently, a seminar should be conducted in the department to present the finding of the project work. The bonafide project report attested by the head of the department will be evaluated by the external examiner and a viva voce will be conducted. The scheme of the project report evaluation and *viva voce* is as given below.

External 75 % , Maximum Weightage 25

Project work	Report 20	Viva 5	Max. Weightage 25
Grade A	20	5	25
B	18	4	22
C	16	3	19
D	14	2	16
E	10	1	11

Internal 25 %, Maximum Weightage 5

Project work	Presentation 4	Audiability 1	Max. Weightage 5
Grade A	4	1	5
B	3	0.75	3.75
C	2	0.50	2.50
D	1	0.25	1.25
E	0	0	0

FT 1 B 01 Perspectives of Food Science

Theory - 2 credits

Module I Science and methods of science (3hrs)

1. Types of knowledge: Practical, theoretical, and scientific knowledge
   What is science, what is not science, hypothesis, theories and laws in science, observations, evidence and proofs

Module II Composition and nutritive value of plant foods (20 hours)

2. **Introduction**:- Introduction to food science. Nutrients and functions of food

Carbohydrates, Protein, Lipids, Vitamins, Minerals

3. **Cereals:** General outline, Composition & Nutritive value, Structure of wheat and Rice

4. **Pulses & Legumes**: Composition, Nutritive value, Antinutritional factors Changes during cooking, Factors affecting cooking time, Germination, Changes during germination.

5. **Nuts & Oilseeds:** Composition, sources of proteins and oil, Processing of oil seeds - Soya bean, coconut, Protein isolates, Texturised vegetable protein.

6. **Fruits & Vegetables:** Composition, Classification, Nutritive value, Vegetable Cookery, Changes during cooking, Ripening, Cliamateric, Noncliamaetric fruits, Changes during ripening.

7. **Spices:** Definition, Classification, Chemical composition, use of spices

Module III Composition and Nutritive Value of Animal Foods (10hrs)

8. **Eggs:** Structure, Composition, Nutritive value, Grading Changes during storage.

9. **Fish:** Composition, Nutritive value

10. **Meat:** Structure, Composition, Nutritive value

Module IV Health Foods (3 hrs)

11. **Health foods:** Functional foods, Prebiotics, Probiotics, Neutraceuticals, organic foods, GM foods

FT 1 B O2 (P) Perspectives of Food Science (PFS)

Practicals (2 credits)

1) Standardization of NaOH
2) Standardization of HCl
3) Determination of Moisture using
) Hot air oven b) . Distillation method c). Infrared method
4) Determination of Acidity & pH
5) Determination of T S S
6) Qualitative test for carbohydrates – Molisch's test, Benedict's test, Iodine test,

Anthrone test, Selivanoff's test.

7) Qualitative test for Protein – Ninhydrine reaction, Xanthoproteic test, Biuret test.

References :

Foods : Facts and Principles - N Shakuntalamanay M Shadakshara Swamy

Food Science - B Srilakshmi

Food science, Chemistry & Experimental Foods - M Swaminathan

Text Book on Foods storage and preservation - Vijayakhader

Model Question Paper

FT 1 B 01 Perspectives of Food Science

I. Objective type (All questions are compulsory, Weightage 0.25x20=5)

Multiple Choice

1. Glucose belongs to (Monosaccharide, Disaccharide, Oligosaccharide, Polysaccharide)
2. GM foods means (General Main foods, General Major foods, General modified foods, Genetically modified foods)
3. Which is not a major spice (a. Ginger, b. Turmeric c. Pepper d. Cumin)
4. Average weight of an egg is (a. 50g b.100g c.150g d. 200g)

Name the following

5. Proteins are made up of

6. Scurvy is due the deficiency of the vitamin
7. Scientific name of wheat is
8. The linkage between two amino acids in a protein

Fill in the blanks

9. Gluten is the protein present in _____
10. pH of water is _____
11. Vit.B_1 is also known as _____
12. Amla & Citrus fruits are good sources of vitamin_____.

Match the following.

13.	Monossacharide	–	Spices
14.	Starch	–	Polysaccharide
15.	Functional foods	–	Glucose
16.	Ginger	–	Neutracenticals

State whether True /False

17. Ash value of foods are denoting the mineral content
18. organic foods are obtained by organic farming
19. Vit.C is a fat soluble vitamin
20. Parboiling of paddy increases the nutritive value.
21.

II. Short answer (Answer any six, Weightage 1 X 6 = 6)

21. What are amino acids? Give example
22. What you mean by organic foods?
23. What are climacteric fruits? Give example
24. Write the importance of pulses in nutrition
25. Write down the importance of proteins in human diet.
26. Name any four oil seeds
27. What are antinutritonal factors in foods? Give example
28. Name any Four food preservation techniques
29. What are the sources of Vit.A Write one deficiency disease?

III. Short Essay (Answer any three , Weightage 2 x 3 = 6)

30. What are GM Foods? What is its importance
31. Write a note on structure of Rice Kernel
32. Outline the importance of fish in human nutrition
33. Write a note on Neutraceuticals
34. Write a note on anti-nutritional factors

IV. Essay (Answer any two, Weightage 4 x 2 = 8)

35. Explain in detail the Structure and Composition of egg
36. Briefly explain the structure of meat? What is the nutritional significance?
37. What are carbohydrates? How they are classified.
38. Write a short note on Health foods?

FT 2 B 03 Food Microbiology – I

Theory 2 credits

Module I Microscopy (4 hrs)

Microscopy: Light microscope – Bright field, Dark field, Electron microscope– Transmission Electron microscope, Scanning electron microscope Resolving power, Limits of resolution, Refractive index, Magnification, Parts of microscope

Module II: Evolution of Microorganisms in foods (5 hrs)

History of Microbiology, - theory of spontaneous generation, Germ theory of disease, Koch's postulates, Pure culture concept

Module III Microorganisms important in foods (22 hrs)

Bacteria : Structure, Morphology, Physical condition required for growth, growth curve,

Reproduction - Transformation, Transduction and Conjugation Nutritional requirements- Types of bacteria, Phototrophs, Chemotrophs, Autotrophs, Hectrotrophs

Fungi: Morphology, Classification, Phycomycetes, Ascomycetes, Basidiomycetes, Deutromycetes Reproduction-Sexual and Asexual

Virus Classification, Composition, Morphology, Replication of virus

Yeasts Structure, Morphology, Reproduction - Budding

FT 2 B 04 (P) Food Microbiology 1 (FM 1)

Practicals 2 credits

Introduction to equipments and glassware used in microbiology

Sterilization techniques: Dry heat and moist heat

Preparation of pure culture: streak plate, pour plate, spread plate

Staining techniques – simple staining, gram staining

References

Microbiology Michael J Pelzar,
Microbiology Principles & Applications Jacquelyn G Black
General Microbiology SB Sullia, S Santharam
Food Microbiology W. C. Frazier, D. C Westhoff
Modern Food Microbiology James M Jay
Basic Food Microbiology George J Banwart
Food Microbiology M R Adams, M.O Moss
Manual of Microbiology Kanika Sharma

Model Question Paper

FT 2 B 03 Food Microbiology – I

I. Objective type (All questions are compulsory, Weightage 0 .25x20 =5)

Multiple choice

1. Pure culture concept was first introduced by

   [a) Pastuer, b) Koch, c) Fleming, d) Jenner]

2. Agar solidifies at

3. [a). 30^{o}C b). 0^{o}C c) 45^{o}C d) 100^{o}C]

3. The causitive agent of Botulism

   [a) *Bacillus cereus*, b. *Salmonella*, c) *C. botulinum* d) *C. tetani*]

4. The body of fungi is known as

   [a) filament b). thallus c). spore d). conidia]

Name the following

5. Who is the father of microbiology ?
6. Which microscope is used for the observation of internal structure of micro organism
7. Who disproved the spontaneous generation theory?
8. Name an anaerobic bacteria

Fill in the blanks

9. The complete destruction of all micro organism including spores

is called_____

10. The causative agent of Anthrax disease is _____
11. An agent that kills bacteria is known as _____
12. Viruses that infect bacteria are called_____

Match the following.

13. Capsule – Disinfectant
14. Endospore _ Virulence
15. Louis Pasteur – Dipicolinic acid
16. Lysol – Fermentation

State weather True or False

17. Bacillusstearothermophilus is used for checking the sterility of auto clave
18. Ethylalcohol is used as on disinfectant.
18. The study of fungi called physiology
19. Agar is extracted from the cell wall of fungi

II. Short Answer (Answer any six, Weightage 1 x 6 = 6)

21. Define culture media and give two examples
22. What you mean by resolving power of a microscope?
23. What is auxotroph ?
24. What do you understand by the term "pure culture"?
25. Give three examples of spore forming anaerobic bacteria
26. Differentiate sterilization and disinfection
27. What is pasteurization?
28. What is transformation?
29. Name three molds useful in food industry

III. Short Essay (Answer any three, Weightage 2 x 3 = 6)

30 .Write short note on reproduction of fungi
31. Explain conjugation in bacteria
32 .Write down Koch's postulates
33 .What is Electron microscope? Differentiate TEM & SEM
35 .Explain Pure Culture techniques

IV. Essay (Answer any two, Weightage 4 x 2 = 8)

35. What are the characteristic features of viruses? Differentiate lytic & lysogenic cycle in virus
36. Describe the internal and external structure of bacteria with a neat diagram.
37. Write in detail the physical and chemical agents used for controlling microorganism

38. Explain genetic recombination methods taking place in bacteria.

FT 3 B 05 Technology of Food Preservation

Theory 3 credits

Module1Thermal Processing (8 hrs)

Thermal Processing Principles & application– Blanching, Pasteurization, Sterilization, Ultra high temp sterilization, Aseptic processing

Module II Drying (10 hrs)

Drying- Significance: Natural drying- Solar drying, Artificial drying- Hot air drying, Drum drying, Spray drying, Dehydrofreezing , Freeze drying Pre treatments- blanching, sulphuring

Module III Freezing (12 hrs)

Freezing Refrigeration, Effect of low temperature on Fresh Fruits, Vegetables, Meat & Fish products, Chill injury.

Freezing , Freezing rate Quick freezing, Slow freezing Air blast freezing, Contact freezing, Immerssion freezing, Cryogenic freezing

Quality of frozen foods- Retrogradation, Protein denaturation, Freezer burn

Module IV Irradiation (8hrs)

Irradiation - Source of ionization irradiation, Dose & Dosimetry, Mode of action, Scope of irradiation

Module V Fermentation (5 hrs)

Fermentation - Principles, Types of fermentation, Advantages

Module VI Chemical Preservation (7 hrs)

Chemical Preservatives - Natural preservatives-Mode of action, Chemical preservatives- Sulphur dioxide, , Benzoic acid , Sorbic acid , Antioxidants

Module VII Recent Trends (6 hrs)

Recent Trends Pulsed electric fields, High pressure technology, Ohmic heating,

Microwave heating, Hurdle technology

FT 3 B 06 (P) Technology of Food Preservation (TFP)

Practicals 2 credits

Estimation of purity of KMS

Qualitative determination of SO_2

Qualitative determination of benzoic acid

Qualitative estimation of SO2

Qualitative estimation of Benzoic acid

Sensory evaluation

Dehydration of fruits in sugar syrup

Drying Kinetics of vegetables using cabinet drier

Determination of moisture content

References

Food storage and preservation Vijayakhader

Food science B. Srilakshmi

Food preservation Desrosier

Physical principles of food preservation Fennema

Complete Technology Book on Processing , Dehydration Canning and Preservation of Fruit & vegetables NIIR

Fruit & vegetables preservation and practice K. Sanjeev & Srivastava R.P

Model Question Paper

FT 3 B 05 Technology of Food Preservation

I. Objective type (All questions are compulsory, Weightage 0.25x20=5)

Multiple choice

1 Examples for class II preservative is

a) Pepper b) Salt c) Oil d) Benzoic acid

Syruping is performed in

a) Vegetables b) Fruits c) Fruits & vegetables d) None

3 HTST pasteurization stands for

a) High Time slow Treatment b) High temperature slow treatment

c) High Temperature short Time d) High Thermal slow time

4. Which among the following is not a fermented food

a) Beer b) Bread c) Jam d) Idli

Name the following

5. Preservation method for foods below O^oc is known as

6. The process of brining down the temperature of frozen product into room temperature is

7. Vitamin B_1 is known as

8. Butylated hydroxyl Anisol (BHA) is an example for

Fill in the Blanks

9. Irradiation is known as ……..

10. The active component of the preservative potassium metabisulphite is …….

11. Spray drier is generally used for ……..foods

12. IQF in freezing stands for …….

Match the following

13. Food preservative – Raisins

14. Fermentation - canning

15. Drying –Yeast

16. Thermal processing –Benzoic acid

State whether True/False

17. There is no difference between quick freezing & slow freezing

18. Ohmic heating is not suited for food produce is

19. Fermentation is a method of food preservation

20. Canning is a good preservation method

II. Short answer (answer any six) weightage 1 X 6 = 6

21. Differentiate between quick & slow freezing?

22. Importance of blanching in fruits processing?

23. What do you mean class I preservatives? Give example

24. What do you mean by pasteurization

25. What are food preservatives? Give one example

26. What you mean by fermentation? Give example of a fermented foods

27. What you mean by protein denaturation?

28. What do you understand by chill injury?

29. What are antioxidants? Give example

III . Short Essay (Answer any three) weightage 2 X 3 = 6

30. Give an outline of food irradiation

31. Write a note on ohmic heating

32. Write a note on high pressure technology

33. Explain drum drying process

34. What do you mean by cryogenic freezing

IV. Essay (Answer any Two) weightage 4 x 2 = 8

35. Explain any four methods of food preservation

36. What you mean by freezing of foods? What are different methods of freezing

37. What are you mean by thermal processing? Explain the canning of foods?

38. With the help of a diagram explain the working of spray drier? How it helps in food preservation ?

FT 4 B 07 Food Chemistry and Nutrition

Theory 3 credits

Module 1 Carbodydrates, Proteins, Lipids (24 hrs)

Carbodydrates: Classification and properties Monosaccharides: Glucose, Fructose; Oligosaccharides: Maltose, Lactose, Sucrose; Polysacharides: Starch, Cellulose, Gums, Pectin

Proteins: Amino acids, Classification of protein, Structure of protein, Denaturation, Qualitative analysis of protein, Protein estimation-Kjeldahl's method

Lipids: Classification, Fatty acids: Saturated, Unsaturated, Polyunsaturated fatty acids, Rancidity, Hydrogenation, Refining of fats & oils

Module II Pigments Colloids and Enzymes (15 hrs)

Pigments: Chlorophyll, Flavanoids, Anthocyanins, Anthoxanthins

Colloids Colloidal chemistry, Properties of solutions, Sols & Suspensions, Food colloids, Emulsion, Types, Emulsifying Agents

Enzymes Enzymatic and non enzymatic reactions during storage, enzymes in food industry

Module III concept of Nutrition (20 hrs)

Concept of Nutrition

Definition of terms Nutrition, Under nutrition, Mal nutrition and balanced dict, Basic food groups, Digestion and absorption of basic nutrients

Energy: Definition of calorie & Joule Measurement of calorific value of food

Basic nutrients: Source, requirements and deficiencies of carbohydrates , lipids, Protein, Evaluation of protein quality, supplementation

Vitamins & Minerals: Classification, sources, function, requirements and deficiency

FT 4 B 08 (P) Food Chemistry (F C)

Practicals 2 credits

1. Chemical Analysis of Lipids

Determination of Iodine value, Determination of saponification value

Determination of peroxide value, Determination of Free Fatty Acid

2. Analysis of Protein

Kjeldahl's methods

3. Analysis of Water:

Total solids, Acidity of water, Alkalinity of water, Determination of Chloride,

Hardness of water

4. Paper chromatography

5. Ash content

References

1. Food and Nutrition M. Swaminathan
2. Fundamentals of Food & Nutrition S R. Mudambi, M.V. Rajagopal
3. A text book of foods, Nutrition and Dietetics M. Raheena Begum
4. Handbook of Food and Nutrition M Swaminathan
5. Food Chemistry O R. Fennema
6. Food Chemistry L H Meyer
7. Foods Facts and Principles N. Shakuntalamanay & M. Shadaksharaswamy
8. Food Science Norman N. Potter
9. Hand book of Analysis and Quality Control of Fruits & Vegetable Products S. Ranganna
10. Fats in Food Technology K K Rajah

Model Question Paper

FT 4 B 07 Food Chemistry and Nutrition

I. Objective type (All Questions are compulsory Weightage 0.25x20 =5)

Multiple choice

1. Kjeldhal's method is for estimation of

   a) Carbohydrate b) Fat c) Protein d) Minerals

2. Pectin belongs to

b) Monosaccharide b) disaccharide c) Polysaccharide d) Peptone

3. Deficiency of Iodine Leads to

a) Night blindness b) Scurvy c) Berri beri d) Goitre

4. Emulsion is a type of colloid with

a) Gas in solid b) Solid in gas c) Liquid in solid d) Liquid in Liquid

Name the following

5. The type of browning reaction in roasting of coffee is ----------

6. Write an example for an antioxidant

7. The basic units of proteins are called as----------

8. PUFA stands for _____

Fill in the blanks

9. PER stands for _____

10. Vitamin C is known as _____

11. The linkage between amino acids in a protein is _____

12. Fat soluble vitamins are A, D, E &_____

Match the following

13. Chlorophyll	-	Emulsion
14. Vitamin C	-	Pigment
15. Milk	-	Vanaspathi
16. Hydrogenation	-	Scurvy

State whether True or false

17. Antioxidants helps in preventing rancidity

18. Energy values foods can be measured in calorie

19. All polysaccharides are indigestible to humans

20. Saturation and unsaturation of fatty depends on the double bonds

II. Short Answer (Answer any six) weightage 1 X 6=6

21. What are monosaccharide ? Give example

22. What are essential amino acids ? Give any two examples.

23. What you mean by emulsion?

24. What you mean by denaturation of proteins?

25. How are proteins classified ?

26. What are pigments? Name any two.

27. What you mean by PER of protein rich foods? .

28. Expand BMR in Nutrition

29. Name four protein rich foods

III. Short Essay (Answer any three) weightage 2X3=6

30. Kjeldahl's Methods for estimation of Protein
31. Classification of Carbohydrates
32. Hydrogenation
33. Non-Enzymatic browning reaction
34. Balanced diet

IV. Essay (Answer any two) weightage 4x2=8

35. What are enzymes? What are the uses of enzymes in food industry.
36. Describe the important steps in refining of fats and oils
37. What is the importance of minerals in human diet? Discuss the classification of minerals
38. Discuss malnutrition and under-nutrition. Write a note on the basal metabolism to energy needs of the body.

FT 5 B 09 Food Microbiology II

Theory 4 credits

Module I Culture media and isolation of pure culture (12 hrs)

Culture Media: Bacteriological Media - Selective, Differential, Enrichment Media

Methods of isolating Pure culture Serial dilution, Pour plate, streak plate, stroke culture

Module II Control of Microorganism (10hrs)

Control of Microorganism Physical agents – high temperature, low temperature desiccation, osmotic pressure radiation, filtration,

Chemical agents-Characteristics of an ideal antimicrobial chemical agent, Alcohols, Aldehydes, Dyes, Halogens, Phenols, Acids, Alkalis, Gases

Module III Food spoilage (20 hrs)

Food spoilage: Sources of contamination, factors responsible for spoilage, factors affecting kinds and number of microorganisms in food. Chemical changes due to spoilage

Effect of spoilage: Contamination and spoilage, of Fruits & Vegetables, Meat & Meat products, Milk & Cream, Cereal & Cereal products, Spoilage of canned food

Module IV Microbial intoxications & Infections (12 hrs)

Intoxications & Infections Definition, Exotoxin, Endotoxin, intoxications and infections - sources, symptoms Methods of Prevention and investigation of food borne disease out break.

Module V Microbes in fermented foods (8 hrs)

Microbes in fermented foods Fermented vegetable products, Sauer Kraut, pickles, soy sauces, idli Fermented dairy products - Cheese, yoghurt

Module VI Water & Milk testing (6 hrs)

Water & Milk testing Microbiological testing of water & milk

Module VII Food sanitation (2 hrs)

Food sanitation Importance of personal hygiene, habits clothes, illness, education of food handles in handing & serving food

FT 5 B 12 (P) Food Microbiology –II (FM II)

Practicals 4 credits

Isolation of pure culture: Pourplate, Streak plate

Microbial analysis of meats – Total plate count - *Staphylococcus*

Microbial analysis of Milk – Total plate count, Yeast and Mold

Microbial analysis of water – Coliforms

References

Microbiology – M J Pelczar,

Microbiology Principles & Applications – J G Black

General Microbiology – S B Sullia, S Santharam

Food Macrobiology _ W C Frazier, D C Westhoff

Modern food microbiology – J M Jay

Basic food Microbiology – G J Banwart

Food Microbiology – M R Adams, M.O Moss

Model Question Paper

FT 5 B 09 Food Microbiology

I. Objective type(All questions are compulsory) Weightage 0.25x20 =5

Multiple choice

1. Micro-organism associated with food poisoning

   [a) *Streptococcus*, b) *C. tetanii*, c) *C . botulinum*, d). Lactic acid bacteria)

2. MPN test is used for the analysis of

   [a). Meat b). water c). blood d). fish]

3. Psychrophiles grow at a temperature of

   [a). O^{o}C, b). 45^{o}C, c). 70^{o}C, d). 100^{o}C]

4. Sauerkraut is fermented by

   [a). *Acetobacter,* b). *Pediococcus,* c). *Pseudomonas*, d).*Salmonella*]

Name the following

5. Study of fungi?
6. Name the selective media for *Staphylococcus*
7. Which is the bread mold?
8. Which is the organism responsible for fermentation of yoghurt?

Fill in the blanks

9. Fermentation of grape juice is brought about by……..
10. The process of heating a liquid at a controlled temperature is known as …….
11. *E. coli* ferments --------sugar
12. ……..is an example for differential media

Match the following

13. Yeast	Food poisoning
14. Rhizopus	Antibiotic
15. Penicillin	Bread mold
16. Botulism	*S. cerevisiae*

State whether True or False

17. UV radiation is used for the surface sterilization
18. Sauerkraut is a fermented vegetable product
19. EMB is an enriched media
20. Yoghurt is fermented diary product

II. Short answer [Answer any six] weightage 1x 6 =6

21. What do you mean by Asepsis?
22. What is food intoxication? Give an example
23. Name any three viruses associated with food poisoning
24. What is yoghurt?
25. What do you mean by spoilage?
26. Differentiate yeast and mold
27. Name any two bacteria and two molds involved in spoilage of meat
28. Define coli forms
29. What is pasteurization?

III. Short Essay (Answer any three) Weightage 2x3=6

30. Explain food poisoning caused by *C. botulinum*
31. Describe spoilage of egg
32. Explain preservation by high temperature
33. What is sauerkraut? Describe the process involved in the production of sauerkraut
34. Differentiate Endotoxin and Exotoxin

IV. Essay (Answer any two) Weightage 4x2=8

35. Explain food poisoning caused by bacteria
36. What is MPN? Describe the methods involved in testing of water
37. Explain the general preservation techniques
38. Write the importance of molds in food industry

FT 5 B 10 Grain Science & Technology

Theory 4 credits

Module I Technology of Wheat and Rice (20 hrs)

Wheat Milling of wheat, byproducts - Whole wheat flour, Maida, semolina, Gluten

Rice Milling of rice, byproducts of rice milling - Husk, Bran, Broken rice Parboiling- Merits and demerits, Curing, Aging of rice, Rice products - Flaked rice, Puffed rice

Baking Principles of baking, classification of baked foods

Module II (Bakery and confectionary) (34 hrs)

Bread Bread making –Role of ingredients, Bread faults & remedies, staling of bread.

Cake Cake making, Role of ingredients, Types of making, cake, faults and remedies

Biscuit Biscuits & Cookies, Crackers and Wafers, technology of Biscuits, faults & remedies

Confectionary Raw materials, Hard candy, Toffee, Caramel

FT 5 B 13 (P) Grain Science & Technology (GST)

Practicals 4 credits

1. Determination of Moisture
2. Determination of Ash
3. Sedimentation value
4. Maltose value
5. Estimation of Gluten

6 Determination of Water absorption power

7 Qualitative analysis of gluten – Belshanke value

8 Determination of falling number

9 Preparation of Bread

10 Preparation of Biscuit

11 Preparation of Cake

12 Determination of Physical parameters of wheat and rice.

REFERENCES

Kents Technology of Cereals N L Kent and AD Evers

Cereals and Cereal Processing: Chemistry and Technology DAV Dendy & BJ Dobrazczyk

Chemistry and Technology of Cereal Food and Feed S A Matz

Bakery Technology and Engineering S A Matz

Bakery Flour Confectionary L J Hanneman

Baking Science Technology E J Pyler

Model Question Paper

FT 5 B 10 Grain Science & Technology

I Objective type - (All Questions are compulsory, Weightage .25 x 20 = 5)

1. The ratio of ----- to------ in bread is about 3:1

a) Flour : Water. b) Gluten : Water

c) Water : Gluten d) Water : Flour

2. Which sequence is the correct one for bread making?

a) Mixing, Sheeting, Panning, Fermentation. b) Mixing, Fermenting, Proofing, and Baking. c) Mixing, Proofing, Fermentation, Baking. d) Molding, Kneading, Proofing, Panning.

3. Which term does not belong to wheat?

a) Gluten, b) Glutamine, c) Glutelin, d) Glutenin.

4. Parboiled rice is superior than Raw Rice because.

a) Milling recovery is more. b) Retains more protein, vitamins, minerals.

c) More digestible. d) Increased shelf life. e) All the above.

Name the following.

5. Which is the variety suitable for the production of biscuit from wheat?

6. Which is the vitamin available more in rice bran?

7. Write the botanical name of rice.

8. Give an example for a bread improver.

Fill in the blanks.

9. -------- is an example of a biological leavening agent.

10. Tempering of Wheat refers to the addition of ----- to bran and endosperm.

11. Cereals are generally low in the content of an amino acid namely-----.

12. Wheat milling fractions are whole wheat flour, refined wheat flour, and ----------

Match the following.

13.	Oryzanal.	Product of Rice
14.	Flake Rice.	Hard boiled Candy.
15.	Lolly Pop.	Bread mold.

16. Ropiness. Rice bran oil.

True or False.

17. Rice bean obtained from parboiled rice give lower percentage of oil.

18. All the grains above $3/4^{th}$ grain size are considered as head rice.

19. Parboiling is a well developed post milling treatment.

20. Bread is baked at temperature less than 200 C.

II. Short answer (Answer any six weightage 1x 6 =6)

21. What do you mean by leavening action.

22. Give various species of *Triticum* genera.

Differentiate between.

23. Toffee and Fruit toffee.

24. Cookies and Biscuits.

25. Crackers and Waffers.

26. Give the principle of baking.

27. What is liquid glucose? Give its importance in candy preparation.

28. What is Gluten ? Give its importance.

29. Name the cereals found in common use. Explain their importance in our diet.

III. Short Essay (Answer any three Weightage 2x 3=6)

30. What is staling of bread?

31. Write the importance of role of ingredients in bread.

32. Explain toffee manufacturing briefly.

33. What is the impact of ageing of wheat flour? How ageing could be minimized by using chemicals?

34. What do you mean by curing of rice?

35. Explain the action of fast acting baking powder with suitable example.

IV. Essay (Answer any two, Weightage 4 x 2 = 8)

36. Explain the milling of wheat in detail.

37. What is parboiling and differentiate between single boiled and double boiled rice. Write the merits and demerits of Parboiling.

38. Write in detail about various processing steps of bread manufacture.

39. What is the principles of increase in volume of cake batter while baking? Write the steps in processing of Cake.

FT 5 B 11 Technology of Animal Foods

Theory 4 credits

Module I Slaughter and Inspection of Meat (25 hrs)

Slaughter: Humane method, Inspection of meat- Antemortem and postmortem inspection, Slaughter of sheep, pigs, poultry Post mortem changes, aging, Factors affecting tenderness of meat, Effect of cooking on texture, colour and flavour

Module II Cured Meat (8 hrs)

Cured Meat - Role of ingredients, Methods of curing, Processing of Ham, Bacon, Sausage - classification, emulsion, ground sausage, processing, casings, Factors affecting quality of cured meat

Module III Preservation (6 hrs)

Preservation Methods - Refrigeration, freezing, thermal processing, dehydration irradiation, chemical, antibiotics

Module IV By products (2 hrs)

By products Rendering, Feeds, Hides, Skins, Hoofs, Horns

Module V Egg (15 hrs)

Egg quality Factors affecting egg quality, Measures of egg quality, Effect of cooking, Factors affecting coagulation, Industrial use of egg

Preservation of egg Refrigeration, Freezing, Thermal processing, Dehydration, Coating

Module VI Fish & Fish Products (10 hrs)

Preservation Cold storage, freezing, preservation, smoking, pickling, canning of fish, Drying

Fish products Fish protein concentrate, Fish oils- Body oil, Liver oil, Fish meal, Fish Ensilage, Chitosan, pearl Essence, Glue Gelatin.

FT 6 B 17 (P) Technology of Animal Foods (T A F)

Practicals 4 credits

1. Acidity of Milk & curd
2. Fat content in Milk
3. Determination of total solids, SNF and specific gravity of milk
4. Determination of Total ash in milk
5. Acidity of butter
6. Moisture content of butter
7. Salt content in butter
8. Adulteration in milk
9. Preparation of Khoa, Peda
10. Moisture content in Ghee
11. FFA of Ghee
12. Internal & External quality of egg
13. Proximate composition of Meat & Fish

References

Meat Hygiene J F Gracey, D S Collins

Processed Meals A M Pearson, TA Gillet

Lawries Meat Science RA Lawrie

Poultry Products Technology T Mountney G. Carmen R Prakhurst

Animal Byproduct Processing H W Ockerman C L Manson

Tropical Fishery Products K Gopakumar

Fish & Fisheries of India V G Jhingran

A Text Book of Fish and Fisheries Technology K P Biswas

Model Question Paper

FT 5 B 13 Technology of Animal Foods

I. Objective type (All questions are compulsory Weightage 0.25X20=5)

Multiple choice

1. Temperature for cold storage of eggs

   (a. 0 t0 - 1^{o}c b. 10^{o}c c. -18 to -23^{o}c)

2. Fish liver oil is rich in

   (a. Vit A, b. Vit C, c. Vit B)

3. AA quality egg has Haugh unit

   (a. above 72, b. 60-72, c. 31-60)

4. Fish Fat is composed of

5. (a. PUFA, b. Unsaturated Fatty acid, c. Cholesterol, d Saturated Fatty acid)

Name the following

5. Which acid is formed during Rigor Mortis
6. Rendered Fat in pig
7. Which portion of pig is Bacon
8. Pigment responsible for red color in meat

Fill in the blanks

9. Egg shell is rich in _____.
10. Bone meal is rich in _____and _____.
11. Distribution of fat in Meat is called _____.
12. _____is removed during drying of egg to prevent Maillard reaction.

Match the following

13. Connective tissue proteins	Water holding capacity
14. Nitrite	Myoglobin
15. Poly phosphate	Collagen, Elastin
16. Sarcoplasmic protein	Pink color

State whether True or False

17. Ultimate PH of meat is 7.0.
18. Egg white is rich in all essential amino acids.
19. Animal fat is rich in saturated fatty acids.
20. Candling is used for external evaluation of egg.

II. Short Answer (Answer any six) Weightage 1x 6=6

21. What is Humane method of slaughter?
22 What is the role of nitrite in curing of meat?
23 How is egg preserved by coating?
24 What is candling?
25 What is Fish sauce?

26 What are the changes that occur during storage of eggs?

27 Define Sausage.

28 What is ageing of meat?

29 What is ultimate pH.

III. Short Essay (Answer any three) **Weightage 2x3=6**

30 Egg quality determination

31. Post Mortem Inspection

32 Fish Meal

33 Meat curing Method

34 Freezing of eggs

IV. Essay (Answer any two) **Weightage 2x4=8**

35 Explain steps in slaughter of pig.

36 Explain the Technology of sausage preparation.

37 What is industrial importance of eggs?

38 Explain any two by products in fish processing industry.

FT 6 B 14 Technology of Fruit & Vegetables

Theory 4 credits

Module I Pectin , Jam, Jelly and Marmalade (10 hrs)

Pectin Definition of pectin, classification, Pectic enzymes, Properties, jelly grade of pectin, Testing of pectin

Jam, Jelly and Marmalade Definition, jam making, jelly making, Defects.

Module II Fruits juices & Fruit preparations (21 hrs)

Fruit Juices Ready to serve beverages, Squashes Cordials, Nectars, Concentrates Fruit

juice powder- Freeze drying, Foam mat drying

Fruit preparations Preserves, Candies Crystallized fruits & Glazed fruits

Pickle and chutneys - Action of preservatives Pickling process, defects

Module III Tomato products(5 hrs)

Tomato juice, puree, paste& Ketchup specification of the above products

Module IV Canning (10 hrs)

Classification of canning of fruits- Pineapple, Oranges, Canning of vegetables - Peas, Carrots, syrups & brines for canning

Module V Drying & Dehydration (10 hrs)

Drying & Dehydration Enzyme Inactivation, Sulphuring Sun drying - grapes and dates. Dehydration of vegetables and Fruits. Tunnel & cabinet drier

Module VI Browning, Pigments and flavours (12 hrs)

Browning: Enzyme activity enzymic browning Non enzymic browning, its prevention.

Pigments & flavours Pigments & flavors of fruits & vegetables Chlorophyll, Carotenes, Flavanoids

FT 6 B 18 (P) Technology of Fruits and Vegetables (TFV)

Practicals 4 credits

1. Determination of Sulphur dioxide
2. Estimation of Vitamin C
3. Estimation of tannin – colori metric method
4. Estimation of alcohol content
5. Determination of salt content in pickles
6. Determination of reducing sugar

7. Lye peeling
8. Adequacy of blanching
9. Preparation of ketchup
10. Preparation of Jam & Jelly
11. Preparation of squash

References:

Hand book of analysis and quality control for fruit and vegetable products S. Ranganna

Commercial Fruits and Vegetable Products W V Cruess

Preservation of Fruits and Vegetables Girdharilal, Siddappaa & Tandon

Processing, Dehydration, Canning and Preservation of Fruits & Vegetables N I I R

Fruit & Vegetable Preservation & Practice K Sanjeev , R P Srivastava

Complete text book on Preservation of Fruit & Vegetable N I I R

Model Question Paper

FT 6 B 14 Technology of Fruit & Vegetables

I. Objective type(All questions are compulsory) Weightage 0.25X20=5

Multiple choice

1. PH of High acid food
   [a. above 5.0, b. 5.0-4.5, c. 4.5-3.7, d. 3.7 and below]
2. Which acid is present in apple
   [a. Malic acid, b. Citric acid, c.. Tartaric acid, d.. Oxalic acid]
3. Which instrument is used for measuring total soluble solids
   [a. Hydrometer, b. Refractometer, c. pH meter d. Salinometer]
4. FPO specification for total soluble solids in Jam
   [a. 68.5^{o}B b. 70^{o}B c. 75^{o}B d. 65^{o} B]

Name the following

5. Which method is used for inactivation of enzymes
6. Acid formed during fermentation of pickle
7. Instrument used to measure salt content
8. Chemical used for fruit juice clarification

Fill in the blanks

9. Pigment present in Tomato _____
10. Enzyme responsible for browning of fruits
11. Citrus fruits are rich in _____
12. Pectins are chemically_____

Match the following

	Product	**% T S S**
13.	RTS	40
14.	Squash	30
15.	Cordial	5
16.	Tomato juice	10

State whether true or false

17. Chlorophyll is converted to pheophytin during cooking
18. Avocado is high in fat content
19. % juice content in squash is 30%
20. Protopectin is the parent pectic compound

II. Short answer (write any six) weightage 1 X 6 = 6

21. What is blanching ?
22. Define Jam
23. What is the function of salt in pickling
24. Differentiate between squash and cordials.
25. What are the factors affecting gel formation
26. Differentiate glazed fruit & candied fruit
27. Why is sulphuring done during dehydration
28. What is a preserve
29. How is browning prevented

III Short Essay (Answer any three) weightage 2 x 3 = 6

30. Describe in brief the steps involved in dehydration vegetables.
31. Describe the process preparation of fruit cordial
32. What are pectic enzymes? Discuss their importance in ripening of fruits.
33. What is enzymatic browing with respect to fruit & vegetables
34. Which are the different methods of peeling

IV. Essay (Answer any two) weightage 4 x 2 = 8

35. What are the steps involved in canning of fruits

36. Steps involved in manufacture of Jams. Discuss defects in Jam prepration

37. Explain steps in manufacture of fruit juice powder canning oh fruit

38. Briefly explain preparation of tomato ketchup. Give the specification.

FT 6 B 15 Dairy Technology

Theory 4 credits

Module I Composition and Milk processing (25 hrs)

Composition Composition of milk, factors affecting composition of milk

Properties Physical and Chemical properties- Physical state of milk, Flavor Color, Freezing point, Specific gravity, Effect of heat, Acid, Alkali, and Enzymes on milk

Processing of Milk Production, processing distribution and storage of liquid milk

Types of milk- Toned, Double toned milk, Standardized milk, Homogenized milk, Recombined milk

Module II Dairy products (15 hrs)

Dairy products: Technology of Butter, Ice cream, Skim & Whole milk powder,

Cheese – Classification, Cottage Cheddar Cheese,

Fermented Milk - Butter milk, yoghurt, Acidophilus milk

References:

Outlines of Dairy technology – Sukumar De

Milk and milk products – C H Ecles W B Combs

The Technology of Milk processing _ Ananthakrishnan, Khan, Padmanabhan

Modern Technology of Milk processing & Dairy products _ NIIR

Dairy Technology _ P Walstra & T. J Geurts

Model Question Paper

FT 6 B 15 Dairy Technology

I. Objective type (All questions are compulsory) Weightage 0.25 x 20 = 5

Multiple choice

1. Percentage of fat present in cow milk

   [a). 3% b). 5% c). 7% d). 8%]

2. Freezing point of milk

   [a). $0^{o}C$, b). $1\ ^{o}C$ c). $-5\ ^{o}C$ d). $-\ 0.61\ ^{o}C$]

3. pH of fresh cow milk

   [a). Below 4, b). 5, c). 6.5 - 6.6 d). 7]

4. Pigment responsible for yellow color of milk

   [a). carotene, b). Riboflavin c). xanthophyll, d). Calcium Caseinete]

Name the following

5. The carbohydrate present in milk
6. Acid form during fermentation of milk
7. Organism added in manufacture of Yoghurt
8. Enzyme added for coagulation of cheese

Fill in the blanks

9. The protein present in milk is _____.

10. Milk is rich in _____ mineral.

11. White color of milk is due to _____.

12. _____ organism present in acidophilus milk.

Match the following

13. Toned	1.5
14. Double toned	4.5
15. Standardized milk	<0.5 %
16. Skim milk powder	2.0 %

State whether True or False

17. During fermentation of milk lactose is converted to lactic acid

18. Specific gravity of milk average 1.032

19. Water added to milk can be measured using lactometer

20. Buffalo milk has high fat content.

II. Short answer (Answer any six) weightage 1 x 6= 6

21. What is SNF

22. Define recombined milk

23. Differentiate toned milk and double toned milk.

24. Which are the importance fermented milk products?

25. How is skim milk powder different from whole milk powder

26. What is homogenized milk

27. Which are the minor constituents of milk.

28. What are total solids

29. Write the approximate composition of milk

III. Short Essay (Answer any three) weightage 2 x 3 = 6

30. What are the factors affect composition of milk

31. Write short note on acidity of milk

32. Write short note on Yoghurt

33. What are the major components of milk

34. Describe the physical state of milk

IV Essay (Answer any two) weightage 4 x 2 = 8

35. Explain the technology of butter

36. Which are the important steps in production of ice cream?

37. Describe the production of skim milk powder with flow chart

38. Explain the process of cheddar cheese

FT 6 B 16 Food informatics, Regulations and Packaging

Theory 4 credits

Module I Informatics & Food Technology updates (20 hrs)

Informatics Major centers of food research in India - CFTRI, DFRL & CIFT. Food Research & Development. Ministry of Food Processing Industries and major Food Industries in India, APEDA and MPEDA

Food Technology updates Journals of Food Science & Technology, Indian Food Industry, Beverage Food World, Indian Food Packer, Fisheries Technology, Sea Food Export Journal, AFST (I)

Module II Food Adulteration (10hrs)

Common adulterants and their tests, Milk, Vegetable oil, Spices, Tea, Pulses

Module III Food laws and regulations (10hrs)

Need for food laws, National & International regulations. FAO, ISO, GMP,TQM, HACCP, PFA, MFPO, FPO, Agmark, ISI, BIS & Food Safety and Security Act, Codex. Alimentarious

Module IV Packaging Technology (10hrs)

Package evolution, Functions and design of different types of packaging materials – Metal, Glass, Paper, Plastic, Retortable Pouches

References

Foods: Facts and principles N Shakuntalamany & M Shadaksharaswamy

Handbook of Analysis and Quality Control for Fruit and Vegetable Products

Ranganna

Food Packaging Technology Hand book NIIR New Delhi

Model Question Paper

FT 6 B 16 Food Informatics, Regulations and Packaging

I. Objective type (All questions are compulsory) Weightage 0.25 x 20 = 5

Multiple choice

1. CFTRI is situated in

   (a) Kerala (b) Tamil Nadu (c) Karnataka (d) Delhi

2. C I F T stands for

   (a) Central Institute of Food Technology

   (b) Central Institute of Forest Techniques

   (c) Central Institute of Fisheries Technology

   (d) Central Indian Food Technology

3. World Food Day is

   (a) May 10 (b) May 16 (c) October 10 (d) October 16

4. MPEDA is related to

   (a) Fruit products (b) Milk Products (c) Meat Product

   (d) Marine Products

Name the following

5. Name one product which comes under Agmark
6. Name one adulterant in milk
7. AFST (I) stands for
8. ISO stands for

Fill in the blanks

9. DFRL is situated in _____ state of India
10. BIS stands for _____
11. Starch is used as a _____ in milk
12. FAO stands for _____

Match the following

13. CIFT - APEDA

14. Journal - Indian Food Industry

15. Agriculture - Cochin

16. Packaging - Aluminum foil

State whether True or False

17. Canned products do not require packing

18. FPO means food product order

19. In India there is not ministry for food processing

20. Food adulteration is a good practice

II. Short answer (answer any six) weightage 1x 6=6

21. What do you mean by adulteration in foods?

22. Expand 'SOP' in food plant management.

23. What you mean by FPO

24. What are the advantages of glass as a packaging material.

25. What is the importance of Research & Development in food processing?

26. Write on the importance of metals in food packaging

27. Expand CFTRI

28. What you mean by ISO

29. Write any four functions of packaging.

III. Short Essay (Answer any three) weightage 2 x 3=6

30. Agmark standards

31. HACCP

32. Plastics in food packaging

33. PFA

34. Comment on CIFT at Cochin

IV. Essay (Answer any two) weightage 4x2=8

35. What are the importance of food Laws? Explain any two laws in detail.

36. What are the design considerations in food packaging? Write the advantages and disadvantages of metal packages.

37. Discuss in detail about the food research centers CFTRI & DFRL.

38. What are food adulterants? Explain about food adulteration? Enlist any two tests for adulterants.

Open course

FT 5 D 01 Technology of Spices.

Theory 3 credits

Module 1- Spices, Spice oils & Oleoresin (20 Hrs)
Definition, Classification, Chemical composition , Use of Spices.

Spice oil and Oleoresins—Definition, Technology of Manufacturing

Module 11—Major Spices (35 Hrs)

Pepper Refining and processing of pepper

Pepper products:- White pepper, dehydrated green pepper, Pepper oil, Oleoresin.

Chillies:- Drying of chillies, quality attributes of chillies and paprika

Cardamom:- Composition, Drying of fruits, Bleaching, Grading, Cardamom products, Essential oil and oleoresins

Ginger:-Curing, Bleaching, Grading Ginger Products, Ginger oils, Ginger oleoresin, Dehydrated Ginger, Bleached Ginger

Turmeric:-Curing, Grading, Turmeric powder, Essential oil, oleoresin

REFERENCES

Major spices of India J S Pruthi

Quality assurance in spices and spice products J S Pruthi

Model Question Paper

FT 5 D 01 Technology of Spices.

Objective Type. (All Questions are Compulsory) Weightage 25 x 20 = 5

Multiple choice

1. The pleasing aroma of Ginger is due to

(a) Essential oil, b) Oleoresin, c) Capsanthin. d) Eugenol)

2. The major pigment from Turmeric

{ a) Capsanthin, b) Citral, c) Curcumin d) Lycopene)

3. Which of the following spice contain eugenol?

(a) Clove, b) Cinnamon, c) Coriander, d) Capsicum)

4. Approximate moisture content of dried spice,

(less than 14 %, 80 %, 20 %.)

Name the following.

5. Name an Aromatic spice.
6. Name a Pungent spice.
7. Chemical used for bleaching Cardamom.
8. Name the alkaloid responsible for biting taste of Pepper.

Fill in the Blanks.

9 ---------- is known as King of Spices.

10. ---------- is obtained by steam distillation.

11. ---------- represents total flavour of spices.

12 ---------- is a pungent spice.

Match the following.

13..	Paprika	Cinnamon
14.	Pepper	Capsaicin.
15.	Bark	Colour
16.	Pungency	Piperin.

State whether True or False.

17. Cardamom is the queen of Spices.
18. Spice oils are extracted by solvent extraction.
19. Coriander is a Major spice.
20. Paprica is known as *Capsicum annum*

II. Short Answer (Answer any six, Weightage 1x6=6)

21. Name the major spices of India.

22. What do you mean by “Garbling”?.
23. Define Spice.
24. What are Spice oils?.
25. What are Oleoresins?.
26. What is the important use of Paprika?.
27. Mention the uses of Ginger oils.
28. Mention the important factors that affect quality of Chillies
29. What is function of “Aspirator” in processing Spices?.

III. Short Essay (Answer any three, Weightage 3 x 2 = 6)

30. Mention important uses of spices.
31. How are Spices classified?.
32. Briefly explain production of Oleoresin.
33. Write short note on important Ginger products.
34. Explain steps in curing of Turmeric.

IV Essay (Answer any two, Weightage 2 x 4 = 8)

35. Explain the different steps involved in processing of Black Pepper.
36. Explain important steps in extraction of Oleoresin.
37. Mention the important steps in production of Spice oils.
38. Which are the important Turmeric products & mention its uses?

Open Course

FT 5 D 02 Introduction to Food Technology (3+0)

Theory 3 credits

Module I Introduction , Food composition & Food groups (15 hrs)

Introduction Introduction to food science and technology

Food composition Food composition - Carbohydrates protein, fat vitamins and minerals

water,

Food groups Composition and nutritive value of Cereals, Pulses, Legumes, Oil seeds, Fruits, Vegetables, Meat, Fish, Poultry and Milk.

Module II Food preservation (5 hrs)

High temperature, low temperature and chemical preservations.

Module III Nutrition (10 hrs)

Concept of nutrition, Digestion and absorption of nutrients, balanced diet, malnutrition

Module IV Packaging (10 hrs)

Functions of packaging, types of food packaging materials

Module V Microbiology (10hrs)

Microorganisms important in foods, food contamination, food spoilage, food born diseases

Module VI Engineering (10

Unit operation, principles of heat exchangers, Pasteurizer, refrigerator, freezer and drier.

References

Food Science N N. Potter & J Hotchkiss

Food Processing and Preservation G Subbalakshmi

Food Packaging Technology Handbook NIIR

A practical Guide for Implementation of ISO HACCP Sohrab

Model Question Paper

FT 5 D 02 Introduction to Food Technology

I. Objective type (All questions are compulsory) Weightage .25 x 20 = 5

Multiple choice

1. Amino acids are the basic unit of

(a) fat (b) carbohydrates (c) protein (d) starch

2. Glucose belongs to

(a) Disaccharide (b) Polysaccharide (c)Oligosaccharide

(d)Monosaccharide

3 . pH of water is

(a) 3 (b) 4 (c) 6 (d) 7

4. Energy values of foods are measured in

(a) Cal (b) Kg (c) Ampere (d) Ohms

Name the following

5. Name a water soluble vitamin
6. Which food group is known as body builders
7. Example for cereal crop is ----------
8. Name one chemical preservative

Fill in the blanks

9. Deficiency of iodine leads to _____
10. Amino acids contain an acid group and a _____ group
11. Glucose is having _____ number of carbon atoms
12. Example for a natural preservative is _____

Match the following

13. Vitamin B – canning
14. Wheat – amino acid
15. Protein – water soluble
16. Thermal processing – Cereal

State whether True or False

17. In marketing of food product, there is no role in packaging.
18. Food spoilage may occur due to microorganisms.
19. There is no difference between refrigeration and freezing.
20. Some fishes contain poly unsaturated fatty acids.

II. Short Answer (Answer any six) weightage 1x 6 = 6

21. What are carbohydrates? Give example.
22. What are fat soluble vitamins? Give example.
23. Name any four oil seeds.
24. What are microorganisms? Name any two.
25. What do you mean by balanced diet?
26. What are pulses? Give example.
27. Uses of ovens in food processing?
28. Functions of protein in body?
29. What are food additives? Give example.

III. (Answer any three) weightage 2 x 3 = 6

30. Functions of food packaging
31. Refrigeration & Freezing
32. Chemical Preservation
33. Vitamins
34. Driers in Food Processing & Preservation.

IV. Essay (Answer any two) weightage 4 x 2 = 8

35. Explain briefly about the food preservation methods?
36. What are microorganisms? Outline different groups?
37. Discuss about the general composition of foods?
38. Enlist the sources of food contamination? Name two microorganisms associated with food spoilage.

Open Course

FT 5 D 03 Fruits and Vegetables Processing

Theory 3 credits

Module 1. Fruits and Vegetables (15 hrs)
Definition, Composition, Classification, Nutritive value, changes during ripening.

Flavors of Fruits and Vegetables. Vegetable cookery, changes during cooking

Browning and its prevention

Module II. Preservation of Fruits and Vegetables (8 hrs)
Heat, Salt, Sugar, Freezing , Food additives and Preservatives.

Module III. Fruit and Vegetable Products (25 hrs)
Fruit Juice, Squashes, Cordials, Nectar, Concentrates, Fruit juice Powder, Jam, Jelly.

Different types of Pickles and Chutneys. Product Specification

Module IV. Tomato Products (6Hrs)
Tomato juice, Puree, Paste, Ketchup

References:
Commercial Fruits and Vegetable Products: WVCruess

Preservation of Fruits & Vegetables: Girdharilal, G S Siddappa, & G LTandon.

Fruit and Vegetable Preservation and Practice: Kumar Sanjeev & RPSrivastava.

Fruit and Vegetable Processing: Suman Bhatti.

Food Science: Norman. N. Potter, Joseph H Hotchkis.

Model Question Paper.

FT 5 D 03 Fruit and Vegetable Processing.

I.Objective Type (All Questions are Compulsory, Weightage 0. 25x20=5)

1. Amla is a good source of,
   a) Vit.A b) Vit B c) Vit C d) Vit D
2. Ripening can be hastened in fruits by ,
   a) Nacl b) Sugar c)Ethylene d) Co2
3. Which is not a preservation method in fruit and vegetables,
   a) Pickling b) Peeling c) Refrigeration d) Canning.
4. Hand Refractometer is used to measure,
   A) Air b) Water c) Sugar d) Salt.

Name the following:

5 Name a Tomato based product.

6. Type of browning reaction in cut surface of Apples.

7. Name a fruit coming under the group Drupe.

8. Name a food additive.

Fill in the Blanks.

9 ---------- is a class 11 Preservative.

10. Chemically Table salt is ----------

11. Example for a climatric fruit is ------

12. Naturally occurring green pigment in Green leafy vegetable is ------

Match the following:

13.	Tomato.	Jam.
14.	Mango.	Ketchup.
15.	Sodium chloride.	Citrus fruits.
16.	Vit. C.	Preservative.

State whether True or False.

17. Common salt is not a preservative.

18. Pickling is not a preservation technique.

19. Canning is a preservation method for fruits only.

20. Jelly can be prepared only from vegetables.

II. Short Answer (Answer any Six) (Weightage 1x6=6)

21 What are Non-climatric Fruits ? (Give example)

22. What do you mean by Encymatic browning ?

23. Write any four changes during ripening of fruits.

24. What do you mean by fermentation? Name a fermented fruit based product.

25. Name four mango based products available in market.

26. What do you mean by blanching of vegetables.

27. What are class 11 preservatives.

28. Write the Ph of low acid and High acid foods.

29. Which are the different methods of peeling.

III. Short Essay (Answer any three) Weightage 2x3=6

30. Canning as a preservation technique

31. Food additives.

32. Browning of fruits.

33. Ripening of Fruits.

34. Composition of leafy vegetables.

IV. Essay (Answer any two) (Weightage 4x2=8)

35. Write a note on classification of fruits. Discuss the general

composition & Nutritive value.

36. Discuss on methods of preservation of fruits and vegetables.
37. Write a note on pickling. Give the function of ingredients.
38. Explain the method of preparation of Tomato ketchup.

Open course

FT 6 B 01 (E) Food Engineering

Theory 3 credits

Module I Unit operations & Heat transfer (10hrs)

Unit operations and Heat transfer Mode of heat transfer – Conduction, Convection, Radiation

Module II Heat exchanger (30 hrs)

Classification, contact type heat exchange - Immersion, Non-contact type heat exchanger, Plate Heat exchanger, Scraped surface Heat exchanger, Tubular Heat exchanger, Double & Triple tube Heat exchanger, Shell & Tube Heat exchanger

Pasteurization HTST, UHT, Pasteurizing equipments

Module III Refrigeration & Freezing (10hrs)

Refrigeration Principle of refrigeration, Vapour compression refrigeration cycle

Freezing Principle of freezing & freezing rate

Module IV Evaporation(10 hrs)

Principle, single effect evaporation, multiple effect evaporation,

Types of evaporators - Horizontal tube, Vertical tube, Falling film evaporator, Raising film evaporator.

Module V Driers & Boilers (15 hrs)

Driers Principle , constant rate & falling rate of period of drying, Types of driers - Drum drier, Cabinet drier, Tunnel drier, Spray drier, Fluidized bed drier

Boiler Principle, working of water tube & fire tube boiler

Module VI Rheology (5 hrs)

Definition, Rheological characteristics of foods, viscosity, apparent viscosity- Newtonian and Non Newtonian

References

Unit operations of Agricultural processing K.M sahay & K.K Singh

Refrigeration & Air conditioning P Kurmy & Guptha

Introduction to Food Engineering R. Paul singh, Dennis R Heldman

Introduction to Food Process Engineering Ramco.T. Toledero

Unit Operations of Chemical Engineering Warren L Macabe, Julian C Smith, Peter Hariot

Model Question Paper

FT 6 B 01 (E) Food Engineering

I. Objective Type (All questions are compulsory, Weightage .25 x 20 = 5)

Multiple choice

1. Heat Exchanges are used to

   a) Heat the product b) Cool the product c) Heat or cool the product

   d) Maintain constant temperature

2. Freezing temperature of brine is

   a) Lower than water b) Higher than water c) Equal d) Less than equal to water

3. Solid food materials are generally

   a) Elastic b) Viscoplastic c) Visco elastic d) Plastic

4. Thermal energy is transmitted by conduction in a solid medium by

   a) Collision between free Molecules b) Vibration of bound Molecules

   c) Collision between free electrons d) None of these

Name the following

5. Who developed the pasteurization process ?

6. The heat of pasteurized milk was used to warm up cold incoming raw milk. What is the Method called?

7. What is the nature of curve between shear stress (Y-axis) and rate of shear (x-axis) for Bingham plastic liquid?

8. What is the equation for the Fourier's law of conduction?

Fill in the blanks

9. An example for non- contact type heat exchanger is----------.

10. The difference between a pasteurizer sterilizer is only in ----------

11. The space between the two walls of thermo flask is evacuated because vacuum is a --------- conductor of heat

12. Steam economy of multiple evaporator is more than ----------.

Match the following

Convective heat transfer	135 to 150^{o}C
UHT Sterilization of milk	70^{o}C
HTST Pasteurization	Newton's law of Cooling
Freezing time (or) Freezing rate	Plank's Equation

State whether True or False

17. The viscosity at oil increases with increase in temperature

18. Small ice crystals are formed in quick freezing

19. Co-current drier has higher thermal efficiency than counter current drier

20. In a black body, all radiations are rejected

II. Short answers (Answer any six) weightage 1 x 6 = 6

21. Differentiate driers and Evaporators
22. What are all the unit operations involved in fruit juice industry?
23. What are the laws involved in conduction and convection.
24. Briefly explain the working Principle of boiler
25. Define Rheology?
26. Which evaporator is having more steam economy? Why?
27. What do you mean by the term heat transfer coefficient?
28. Mention main difference between drying & dehydration
29. Where the overall transfer co-efficient came into picture ?

III. Short essay (Answer any three) weightage 2 x 3 = 6

30. Explain the working at plate heat exchanger with Diagram
31. Explain Single and Multiple effect evaporator schematically?
32. Differentiate water tube & fire tube boilers
33. Explain different drying rate period involved in grain drying?
34. Explain different methods of drying ? Brief any one

IV. Essay (Answer any two) weightage 4 x 2 = 8

35. Describe the classification at heat exchangers?
36. Describe different types of driers employed in food industries.
37. What is refrigeration, ton of refrigeration and Explain the application of refrigeration in food industries.
38. Differentiate (i) Sterization & pasteurization process (ii) quick freezing & slow freezing (iii) Drying & Evaporation.

B. Sc. Food Science and Quality Control
Complimentary Course
FT 1 C 01 Principles of Nutrition

Theory 4 credits

Module I Concept of nutrition (25 hrs)

1. Definition of terms - Nutrition, under nutrition, malnutrition, symptoms and remedy, Health and nutritional status-adequate optimum and good nutrition Energy – Definition of calorie and Joule, Energy value of foods, Basal

Metabolic Rate (BMR), factors affecting BMR

2. Food Guide - Nutrients supplied by foods. Basic five food groups – Cereals, pulses, fruits and vegetables, milk and meat, fats and sugar.

Module II Nutrients and Health (40 hrs)

3. **Water** – Importance, distribution in body, function, sources, water balance, regulation and requirement, abnormalities in water balance.
4. **Carbohydrates** – Functions, sources, requirement digestion and absorption, effects of deficiency.
5. **Fibers** Definition, classification, sources, role of fiber in human nutrition
6. **Protein** Functions, sources, requirement, essential amino acids, determination of nutritional quality of proteins, digestion and absorption.
7. **Lipids** – Functions, sources, digestion and absorption, role of essential fatty acids, Health concerns in lipid nutrition-obesity, hypertension, atherosclerosis, requirements and effects of deficiency,
8. **Vitamins** – Classification, sources, requirement, deficiency of Vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid.
9. **Minerals** – Functions, sources, deficiency of calcium, phosphorus, sodium, potassium, iron, iodine and fluorine.
10. **Balanced diet** – Meal planning, factors affecting meal planning, principles of meal planning.

11. RDA –Factors affecting RDA, principles deriving RDA..

References

Fundamentals of Food & Nutrition S R Mudambi & M V Rajagopal

A text book of foods, Nutrition and Dietetics M Raheena Begum

Handbook of Food and Nutrition M Swaminathan

Model Question Paper

FT 1 C 01 Principles of Nutrition

I. Objective type (All questions are compulsory, Weightage 0.25x20=5)

Multiple Choice

1. Deficiency of iodine leads to

   a) Night blindness b) Scurvy c) Beriberi d) Goiter

2. Fat soluble vitamins are vit A D E

   a) Vit B b)Vit K c) Vit B d) Vit B

3. Calorificvalue of protein is

a)4.1 b)9.5 C) 5.7 d) 3.0

4. Energy Value of food is expressed in

(a) Calories b) Kilo calories c) Joule d) Celsius

Name the following

5 Chemical name of Vitamin E is

6 Mineral present in haemoglobin?

7 Name two flavin coenzymes.

8 Mineral required for growth of bones

Fill in the blanks

9 _____ is the hormone which regulate water balance.

10 RDA stands for _____

11 _____ is known as antiscurvy vitamin.

12 Pancreatic secretion contains the starch enzyme _____

Match the Following

13 Vit A Spinach

14 Vit E Citrus Fruits

15 Vit k Liver

16 Vit C Veg oils

State whether True or False

17 Vit C Iis also known as ascorbic acid

18 Pellagara is caused by deficiency of vit B1

19 Riboflavin is the yellow green pigment present in Skim milk

20 Vit B6 is also called Cyanocobalamine

11 . Short answer (Answer any Six) Weightage 1x 6 = 6

21What is the daily energy requirement for a man and woman?

22 What is flurosis?

23 What is PER?

24 Name the hormones in which iodine plays an important role.

25 Write two sources of calcium.

26 What is Kwashiorkor?

27 Write two sources of Vitamin B_6.

28 What are the functions of sodium?

29 What is Osteoporosis? Why it occurs?

111. Short essay (Answer any three) Weightage 2x3=6

30 What are the functions of protein?

31 What is the role of bile in fat digestion?

32 What are micro minerals? Give two examples.

33 What are the deficiency symptoms of riboflavin?

34 Define balanced diet.

IV. Essay (Answer any two) Weightage 4 x 2 = 8

35 Write the basic five food groups. Write the principles of meal planning.

36 How is nutritive value of protein determined? Compare animal and plant protein quality .

37 Name the vitamins which come under the category of Vitamin B complex. Briefly indicate their importance in human nutrition.

38 Classify minerals based on their requirement. Write about the role, sources and daily requirement of any two minerals

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Complimentary course

FT 2 C 02 Food Chemistry

Theory 2 Credits

Module I Carbohydrates, proteins, Fats & Enzymes (20 hrs)

Carbohydrates – Classification, Structure, browning reaction, changes during cooking

Pectin – Composition & structure

Protein – Introduction to food proteins, classification, structure, physico chemical properties, denatuaration, reactions, protein determination, changes during cooking

Fats & Oils – Classification, saturated, unsaturated, polyunsaturated fatty acids physical and chemical properties, refining of fats and oils,-bleaching, deodorizing, hydroxylation, shortening, Products of fat - margarine, vanaspati, lard, tallow.

Enzymes – Classification, nomenclature, enzyme specificity, factors affecting enzyme activity, enzyme inhibition, role in food processing

Water Introduction, physical and chemical properties of water, moisture in foods,

hydrogen bonding, bound water

Module II Pigments and flavours (10 hrs)

Pigments - Pigments in foods, chlorophyll, flavanoids, anthocyanin, anthoxanthins, quinines, xanthones, betalains, Effect of processing and storage on pigments, physical and chemical properties

Flavours - Flavour compounds in foods - terpenoids, flavanoids, and sulphur compounds, effect of processing and storage on flavours

Module III Properties of foods (5 hrs)

Colloids – Properties, sols, gels, foam, emulsion and suspension

FT 2 C 03 (P) Food Chemistry

Practicals 2 credits

1. a) Colour reactions of carbohydrates
   b) Estimation of reducing sugar
2. a) Colour reactions of proteins
   b) Estimation of protein.
3. Determination of acid value and free fatty acid.
4. Determination of acidity in fruit juices.
5. Determination of ascorbic acid

. **References**

FoodChemistry	Owen R Fennema
Food Chemistry	Lillian Hoagland Meyer
Foods Facts and Principles	N Shakuntalamanay M Shadaksharaswamy
Food science	Norman N. Potter

Model Question Paper

FT 2 C 02 Food Chemistry

I. Objective type (All questions are compulsory, Weightage 0.25 x 20 = 5)

Multiple Choice

1 Percentage of protein present in Cow's milk

a) 3.5% b). 6% c).7% d).2%

2 Which is an example for a complete protein.

a). Egg b) Milk c).Fish d) Meat

3 Which is the storage polysaccharide in animals.

a) Glucose b) Glycogen c) Starch d) Cellulose

4 Which pigments are responsible for the red, purple and blue colour of Fruits & Vegetables

a). Anthocyanins b).Anthoxanthins c) Carotenoids d) Chlorophyll

Name the following

5 Name a reducing sugar

6 W hich is the simplest amino acid?

7 What is wood sugar?

8 Name the ester responsible for the flavour of banana.

Fill in the blanks

9 Enzymatic browning in fruits is due to the action of the enzyme _____

10_____ is the enzyme that hydrolyses sucrose to glucose and fructose.

11_____ is an example for oil-in-water emulsion.

12 F ructose is otherwise known as _____

Match the following

13 Myoglobin Lycopene

14 Mango Meat

15 Tomato Xanthophyll

16 Egg yolk Carote ne

State Whether True or False

17 Oleic acid is an unsaturated fatty acid

18 Proteins are made up of amino acids

19 Vit D is chemically Ascorbic acid

20 Cane sugar is called invert sugar

II.Short Answer (Answer any six) Weightage 1x 6 = 6

21 Give an example for competitive inhibition of an enzyme.

22 Name the element and four rings present in chlorophyll

23 Which is the prosthetic group in haemoglobin?

24 What is citral?

25 What is meant by enzyme specifity?

26 What are essential amino acids? Give 2 examples.

27 Define iodine value of oils.

28 What are suspensions

29 Why sucrose is a non-reducing sugar

III. Short Essay (Answer any three) Weightage 2 x 3 = 6

30 What are betalains?

31 Write the structural difference between chlorophyll a and b.

32 Write the role of fibre?

33 What is native protein?

34 Write the composition of butter.

1V. Essay (Answer any two) Weightage 4 x 2 =8

35 Write the effect of processing and storage on chlorophyll pigments in foods.

36 Write nomenclature and method of classification of enzymes and discuss any four important enzymes of metabolic importance.

37 What are carbohydrates and how they are classified? Explain any one reaction involved in the identification of sugars.

38 Write the classification of lipids. Explain the chemical properties of fats and oils.

Complimentary course

FT 3 C 04 Principles of Food Science

Theory 3 credits

Module 1 Plant Foods (20hrs)

1. Introduction to food science.
2. **Cereals, pulses and legumes** – Composition, nutritive value, antinutritional factors, changes during cooking. Germination and changes during Germination.
3. **Fruits and vegetables** – classification, composition, nutritive value, changes during cooking of vegetables, ripening of fruits.
4. **Spices and condiments** – Classification, composition and use

Module II Animal Foods(25 hrs)

5. Milk and milk products – Composition, nutritive value, effect of acid, heat enzyme, salt on milk, Processing of milk – clarification, pasteurization and homogenization, cheese, butter, skim milk powder, whole milk powder, condensed milk, yoghurt.

6. Egg – Structure, composition, nutritive value, grading, changes during storage, role of egg in food industry.

7 Meat – Structure, composition, nutritive value, post mortem changes, changes during cooking, ageing.

8. Fish and poultry – Composition and nutritive value, fish products – fish meal, fish flour and fish oils.

Module 111 Sugars (10 hrs)

9. Sugars – Liquid sweetners, properties of sugar, reactions of sugar, stages of heating.

FT 3 C 05 (P) – Principles of Food Science

Practicals 2 credits

1. Determination of Moisture content – Hot air oven method.
2. Determination of Ash content.
3. Determination of Gluten content in wheat flour.
4. Determination of Water absorption power of Maida
5. Preparation of jam.

References

Foods : Facts and principles N Shakuntalamanay & M S Swamy

Food Science - B Srilakshmi

Food science, Chemistry & Experimental foods M Swaminathan

Text Book on Foods storage And preservation Vijayakhader

Model Question Paper

FT 3 C 04 Principles of Food Science

I . Objective type (All questions are compulsory) Weightage 0.25 x 20 = 5

Multiple Choice

1. Pigment present in Tomato

a (Lycopene, b Chlorophyll c) Xanthophyll d) Carotene.

1 Egg white injury factor is

a) Avidin b) Ovalbumin c) Ovoglobin d) Ovomucin

2 Enzyme present in meat

a) Cathepsin b) Amylase c) Poly phenolase d) Lipase

3 Egg Shellis rich in

a) Calcium b)Phosphorou s c) Potassium d) Hagnesium.

Name the following

5 The coloring principle of turmeric

6 Example for liquid sweetener.

7 Name the chemical used in "color fixing" in meat.

8 Name the chief muscle pigment?

Fill in the blanks

9_____ is the neurotoxin responsible for lathyrism.

10_____ is the functional protein of wheat.

11 The fat content of butter is generally about _____

12_____ is the chief milk protein.

Match the following

13 Mango Calcium

14 Egg Carbohydrate

15 Milk Protein

16 Rice Vitamins & Minerals

State whether True or False

17 Haemoglobin is the chief muscle pigment

18 What is the colouring principle of saffron?

19 The pigment present in blue grapes is anthocyanin.

20 Fish liver oils is rich in Vit B

II . Short Answer (Answer any six) Weightage 1x6=6

21 What is MFCS?

22 Which are the Muscle proteins

23 Name an enzyme which is used to tenderize meat.

24 Which is the Queen of spices

25 What is ageing of meat?

26 What are the pigments present in fruits and vegetables?

27 Name any antinutritional factor present in pulses

28 What is rigor mortis

29 Name the proteins present in egg

III. Short answers (Answer any three) Weightage 2 x 3 = 6

30 What is enzymatic browning?

31 What are the properties of sugars?

32 What is phosphatase test?

33 Define retrogradation of starch.

34 What is sterilization of milk?

IV. Essay (Answer any two Weightage 4 x 2 = 8)

35. Explain in detail the structure and composition of egg Highlight its importance in food industry.

36 Explain the physical and chemical changes that occur during heating of sugar What is its application in food industry?

37 Explain the composition of milk and effect of heat on it. Explain in detail the production of any one milk product of commercial importance.

38. Write a brief note on changes taking place in meat during curing and smoking.

Complementary course

FT 4 C 06 Food Preservation and Quality Control

Theory 3 credits

Module 1 Food Preservation 20 hrs

Significance of preservation, Methods of food preservation - low temperature, high temperature, preservatives, osmotic pressure, dehydration, irradiation. **Module 2 Food Additives 15 hrs**

Food additives – Role of food additives, antioxidants, chelating agents, colouring agents, curing agents, emulsifiers, flavour enhancers, flavour improvers, humectants and ant caking agents, leavening agents, stabilizers and thickners, artificial sweeteners, preservatives, food fortifiers.

Module 3 Food Adulteration 10 hrs

Food adulteration – types of adulterants, common adulterants in foods, toxicants in foods, impact of food adulteration in humans.

Module 4. Food Laws and Quality Control 10hrs

Food laws and quality control – HACCP, Codex alimentarius, PFA, FPO, MFPO, BIS, AGMARK.

FT 4 C 07 (P) Food Preservation and Quality Control

Practicals 2 credits

1. Detection of adulterants in foods such as milk, honey etc. .

2. Estimation of SO_2 in fruit products.
3. Estimation of purity of potassium metabisulphite
4. Qualitative determination of benzoic acid

Model Question paper

FT 4 C 06 Food preservation and Quality Control

I . Objective type (All questions are compulsory) Weightage 0.25 x 20 = 5

Multiple choice

1. Sodium nitrate is

[a). anticaking agent b) antioxidant c) curing agent d) colorant

5. Which of the following is a sequesterant?

[a) EDTA b) Pectin c) Hydrogen peroxide d) vinegar

6. Preservative used in tomato products

[a) ascorbic acid b) benzoic acid c) sodium chloride d) sorbic acid]

4. World food day is celebrated on

[a) Oct 16 b) Oct 10 c) March 8 d) April 23]

Name the following

5. A food emulsifier
6. Anticaking agent
7. Antimicroboial agent
8. Leavening agent

Fill in the blanks

9. Botulism is caused by the toxins of _____
10. _____ is a substance which is used to enhance the flavour
11. Prophyl gallate is an example for _____
12. _____ is an example for synthetic colour.

Match the following

13. PFA Act	1933
14. FDA	1954
15 Agmark	1906
16 BIS	1986

State whether true or false

17. Frozen storage generally requires a temperature of -18 C
18. UV rays are used for surface sterilization
19. Smoke does not act as a preservative
20. Calcium propionate is not used as a preservative

II . Short Answer (Answer any six) Weightage 1x 6=6

21. What does GRAS stands for?
22. What is MFPO?
23. What is sharp freezing?
24. Name two foods which are preserved by the principle of osmosis.
25. What is the unit of radiation?

26. Name the only permitted inorganic preservative in fruits and vegetable products?

27. Name two natural colours

28. Name the pathogen commonly found in cereal products

29. What is food adulteration?

III. Short answers (Answer any three) Weightage 2 x 3 = 6

30. What are the causes of food spoilage?

31. What are artificial sweeteners? Name any two.

32. What is codex Alimentarius?

33. What is food fortification?

34. Explain how salt acts as a preservative?

IV. Essay (Answer any two) Weightage 4 x 2 = 8

35. Describe food additives with suitable examples? How are they classified?

36. How do you classify preservatives? Give two examples for each category.

37. Write in detail different methods of preservation

38. Explain the incidental contaminants and their harmful effects on the body.