

Chattogram Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2021
Subject: Technology of Food Preservation (Theory)
Course Code: TFP-201 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any **four** questions from each section, where question no. **1 and 6 are compulsory**, Split answer is not allowed)

Section-A

1. Define food processing and preservation. Summarize the techniques of food preservation. 2+3=5
2. a) Enumerate the most common food borne illness. Discuss the causes of food infections. 5
b) Define food spoilage. How can we prevent food spoilage? 5
3. a) Discuss the principles of chemical preservation of food. 4
b) Explain the commonly used food preservatives. 3
c) How natural preservatives preserve the food? 3
4. a) Define irradiation process. How does irradiation destroy microorganisms? 6
b) Why irradiation process is called cold sterilization? Does irradiation make food radioactive? 4
5. a) What is fluidization? How does a fluidized bed work? 5
b) Summarize the effects of quick freezing. Enumerate the changes that occur in food during freezing. 5

Section-B

6. What is meant by double seaming? Why double seaming is important in canning? 5
7. a) Illustrate the properties of microwaves. How do microwaves generate heat? 6
b) How ohmic heating is different from conventional heating? 4
8. a) Enumerate the main purpose of using pulsed electric field technology in the food processing industry. 6
b) How does pulsed electric field cause irreversible damage to bacterial cells? 4
9. a) Define ultrasonication technique. Distinguish between quick freezing and slow freezing. 3
b) Enlist the antimicrobial constituents. Describe the mechanisms of action of antimicrobials. 7
10. a) Why pH is important in preserving food? Why nitrites are added to meat? 4
b) Differentiate between active and intelligent packaging. How moisture sorption isotherm is related to the moisture content and water activity in a food? 6

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2021
Subject: Basic Electrical and Electronic Engineering
Course Code: EEE-201(T)

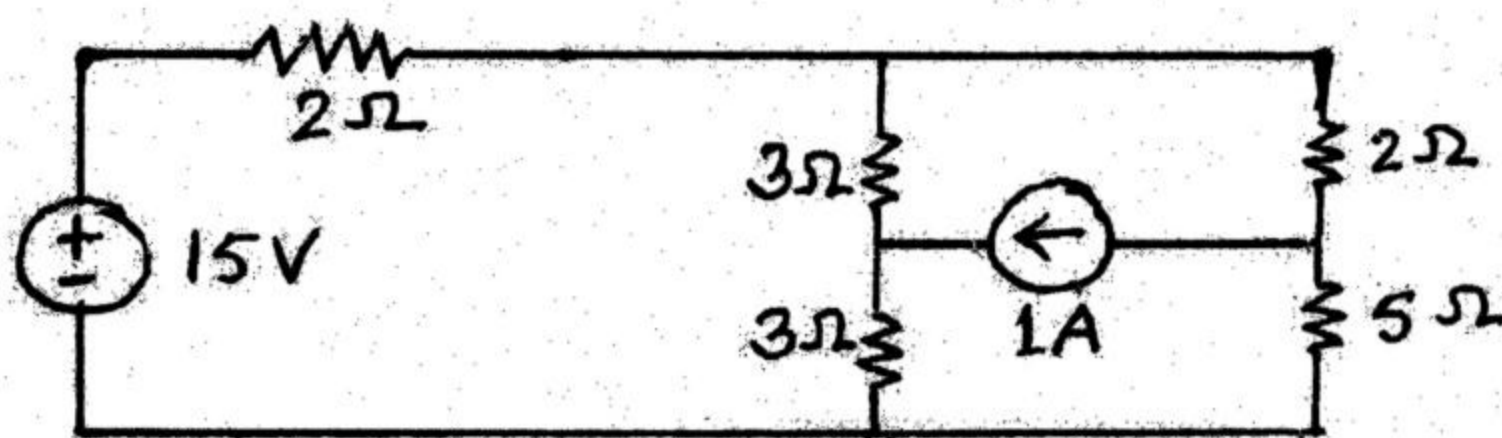
Full Marks: 70

Time: 3 hours

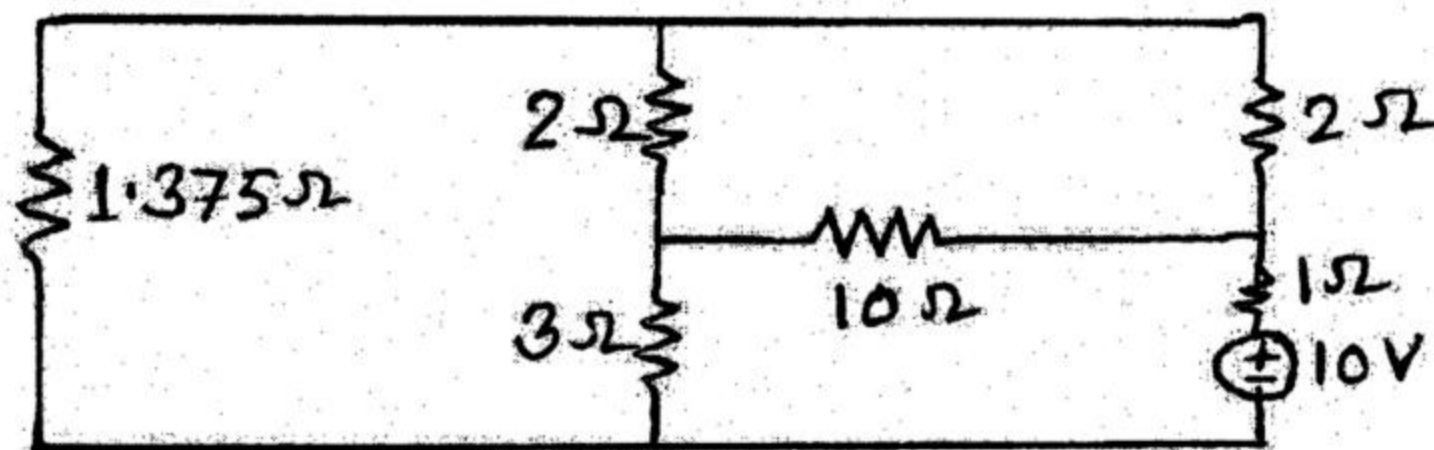
(Figures in the right margin indicate full marks. Answer Four (4) questions from each section where question no. 1 and 6 are compulsory. Use separate answer script for each section. Split answer is strongly discouraged.)

Section-A

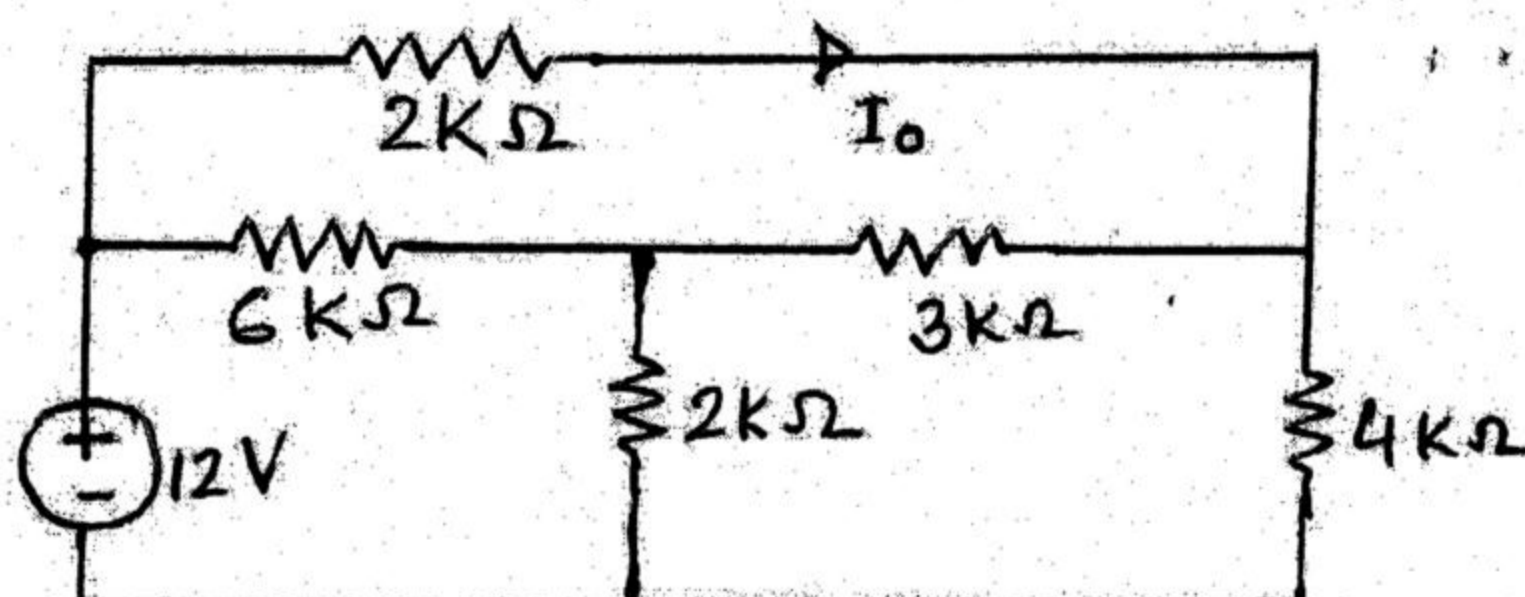
1. a) Define transformer. Derive an expression for the electromotive force (emf) equation of a transformer. 1+4=5
2. a) State Thevenin's theorem and justify this theorem for a relevant network. 5
 b) Find the mesh currents I_1 , I_2 and I_3 using supermesh analysis: 5



3. a) Discuss the formation mechanism of a pn junction diode and hence, mention its characteristics under forward and reverse biasing conditions. 5
 b) Explain the "hole current" concept for semiconductors. Represent the $V-I$ characteristics curves of a pn junction diode and discuss the terms "knee voltage" and "breakdown voltage". 5
4. a) What are the crystalline and amorphous solids? Write down the name of different crystal systems. 2
 b) What is the band theory of solids? Distinction between metal, insulator and semiconductor in terms of band theory of solids with necessary diagram. 6
 c) Why is silicon preferred to germanium in the manufacture of semiconductor devices? 2
5. a) In the circuit below, find current through the 1.375Ω resistor and hence, verify the reciprocity theorem. 5

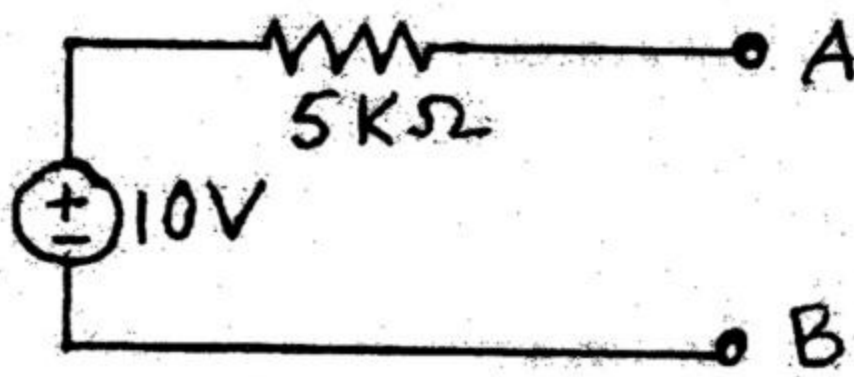


- b) In the circuit diagram below, find the voltage drop across the load resistor $2k\Omega$ using Norton's equivalent network. 5



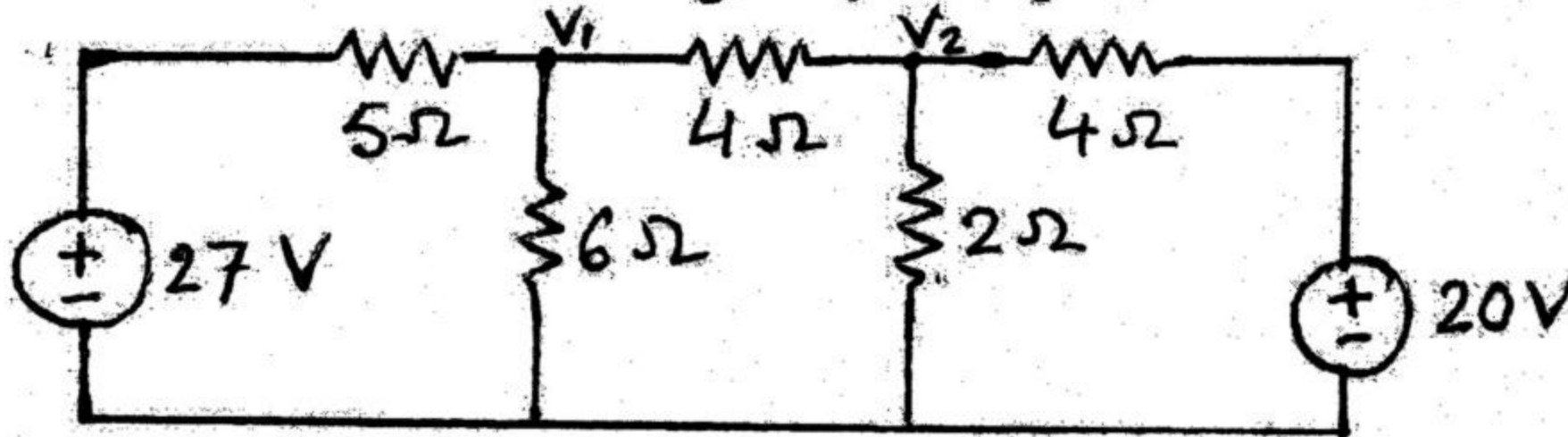
Section-B

6. a) Convert the voltage source of following figure into an equivalent current source. 2



- b) Draw the V-I characteristics of a current source and voltage source to identify the ideal and practical behaviors and explain the reason discrepancy between the behaviors for both. 3

7. a) Obtain the unknown node voltages V_1 and V_2 of the circuit below: 5



- b) State superposition theorem and justify this theorem for any network. 5

8. a) What is transistor? Explain the working principle of *npn* transistor with necessary circuit diagram. 4

- b) Describe the construction and working principle of *n*-channel JFET. 4

- c) What is the difference between a JFET and a bipolar transistor? 2

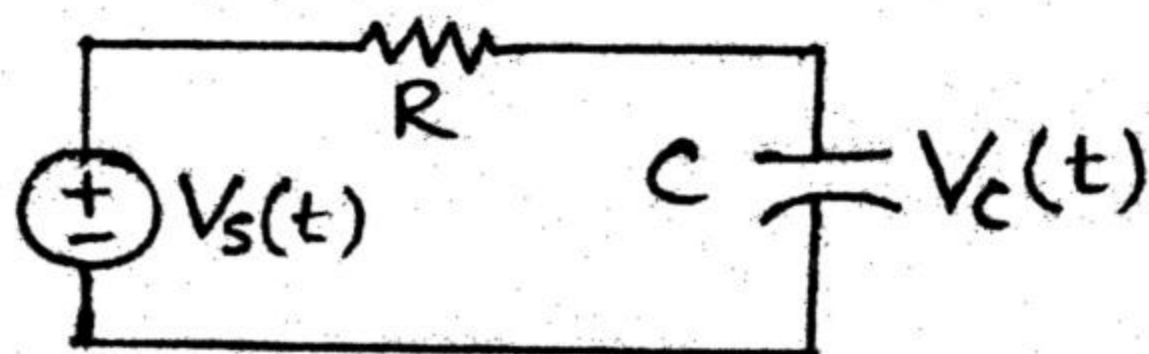
9. a) Apply maximum power transfer theory to show that the power delivered to the load resistor is maximum and is equal to 50% of the total power when the value of the load resistor is equal to that of internal resistor of the source. 5

- b) Derive the equations used to transform three terminal networks from Y- configuration to Δ -configuration or vice-versa. 5

10. a) Draw the hysteresis loop for ferromagnetic materials to explain the terms magnetic saturation, retentivity and coercivity. 4

- b) Establish the relationship between the peak and root mean square value of AC generator for a simple electrical circuit. 3

- c) Determine the voltage $V_C(t)$ in the RC circuit below using AC analysis. Assuming $V_S(t) = V_{\text{peak}} \cos \omega t$ volt. 3



Chattogram Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2021
Subject: General Microbiology (Theory)
Course Code: GMC-201 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answers any 5 (five) questions from each section)

Section-A

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|---|----|--|-----|
| 1 | a. | Write down the major contributions of Antony van Leeuwenhoek and Robert Koch in the history of Microbiology. | 4.0 |
| | b. | What are the four (4) Koch's postulates? | 3.0 |
| 2 | a. | Differentiate Gram positive and Gram negative bacteria on the basis of cell wall. | 4.0 |
| | b. | Classify bacteria on the basis of flagellar distribution. | 3.0 |
| 3 | a. | Classify bacteria on the basis of cellular morphology. | 3.0 |
| | b. | Differentiate fungi from bacteria. | 4.0 |
| 4 | a. | Mention the characteristics of an ideal disinfectant. | 4.0 |
| | b. | Categorize bacteriological media on the basis of purpose. | 3.0 |
| 5 | a. | Define pure culture of bacteria. | 1.0 |
| | b. | Briefly describe the methods of obtaining pure culture of bacteria. | 6.0 |
| 6 | a. | What are the essential microbial nutrients? | 2.0 |
| | b. | Enlist the factors influencing the growth of microorganisms and briefly describe the influence of temperature on bacterial growth. | 5.0 |

Section-B

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|----|----|--|-----|
| 7 | a. | Briefly describe the transcription process in bacteria. | 4.0 |
| | b. | What is bacterial mutation and reversion? How can you differentiate between missense mutation and silent mutation. | 3.0 |
| 8 | a. | What is genetic recombination? | 2.0 |
| | b. | Explain Griffith's experiment on genetic transformation. | 5.0 |
| 9 | a. | Define virus. | 1.0 |
| | b. | Which features make viruses different from other organisms and how? | 6.0 |
| 10 | a. | State the general characteristics of mycotoxin. | 1.0 |
| | b. | Enlist some important mycotoxin with the name of associated fungus. | 6.0 |
| 11 | a. | What are fungi imperfecti? | 1.0 |
| | b. | Describe asexual or anamorphic pathway of fungal reproduction. | 6.0 |
| 12 | a. | How did the term pasteurization come from? Explain pasteurization process. | 4.0 |
| | b. | Define the term antiseptic and disinfectants. | 3.0 |

Chattogram Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 2nd year 1st Semester Final Examination-2021

Subject: Applied Nutrition (Theory)

Course Code: APN-201

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full mark. Answer any 4 (Four) questions from each section, where question no. one (1) and six (6) are compulsory. Split answer is not allowed.)

Section-A

1. Define nutritional status and nutritional emergency. List some nutritional problems faced by developing country like Bangladesh. 5
2. a) Define SAM (Severe Acute Malnutrition). Describe inpatient management of SAM with medical complications. 1+5
b) Summarize the feeding program strategy. 4
3. a) Discuss on the importance of nutritional assessment. 4
b) Biochemical assessments are precise than any other assessment- Justify your answer. 3
c) Write down the clinical sign and symptoms of VADD. 3
4. a) What do you mean by SFP and TFP? 3
b) Write the schedule for the implementation of selective feeding program. 4
c) What kinds of food commodities are used during nutritional emergencies? 3
5. a) Explain bio-fortification. 2
b) Give a brief outline on dietary assessment techniques. 5
c) Differentiate between Kwashiorkor and Marasmus. 3

Section-B

6. Illustrate a framework for understanding the causes of malnutrition. 5
7. a) Write the following information on vitamin C- 6
i) Chemical Name ii) Deficiency Disease
iii) Requirement and prevention of vitamin C deficiency.
b) Define hidden hunger. What are the major Micronutrient deficiencies in Bangladesh? 4
8. a) Define the term Hunger, Appetite, Satiation and Satiety using in the feeding cycle. 4
b) List the strategies to combat micronutrient deficiencies. 2
c) Briefly describe approaches for fortifying complementary foods. 4
9. a) Discuss the edema formation mechanism due to protein deficiency. 3
b) Write down the retrospective method of dietary assessment. 4
c) What are the most often used index of biochemical assessment? 3
10. a) Why freeze-drying foods are inappropriate for emergency feeding? 2
b) Distinguish between food fortification and food enrichment methods. 3
c) Define anthropometry. Which anthropometric measurements are applicable for adults to identify nutritional status? 2+3

Chattogram Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination 2021
Subject: Organic Chemistry (Theory)
Course Code: OCM-201 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any four questions from each section, where 1 and 6 are compulsory. Use separate answer script for each section. Split answer is strongly discouraged.)

Section-A

1. a) What is isomerism and isomers? 3
b) What is R and R* in organic chemistry? 2
2. a) Discuss about the chemical structure of alkanes. 3
b) Classify carbon present in alkanes. What is alkyl group? 3
c) Describe the following process of alkane preparation- 2+2=4
i) Decarboxylation of carboxylic acids.
ii) Wurtz synthesis
3. a) Why do alkenes are more reactive than alkanes? Mention the mechanism of addition reaction to carbon-carbon double bond. 4
b) What is peroxide effect? Describe the mechanism of peroxide effect. 3
c) Express the different oxidation reaction of alkenes. 3
4. a) Why do alcohols show higher boiling points than corresponding alkanes? 3
b) Mention classification of alcohols. How will we produce different alcohols using Grignard reagent? 4
c) How alcohol is prepared in industry 3
5. a) Why do aldehyde and ketones have lower boiling point than corresponding alcohols and carboxylic acids? 2
b) Write down nucleophilic addition reaction mechanism for carbonyl compounds. 4
c) How do you make ether from alcohol? Which will show haloform test? 4

Section-B

6. a) What is aromaticity? 1
b) Explain the criteria for aromaticity with suitable example. 4
7. a) "Acetylene and 1-alkynes are acidic in nature"- defend the statement. 3
b) What are vicinal dihalides? How will you produce alkynes from vicinal dihalides? Explain with suitable example. 4
c) How will you distinguish between 1-alkynes and other alkynes? Write down the related reactions. 3
8. a) Why does benzene undergo electrophilic substitution reactions whereas alkenes undergo addition reactions? 4
b) Briefly discuss about the structure of benzene. 6
9. a) With mechanism describe "Esterification" reaction. 3
b) Describe the structure of amines. 3
b) What is the difference between amines and aniline? What happens when an amines reacts with an acid? 4
10. Write a short note on following 2.5x4=10
a) Pyrolysis.
b) Reimer-Tiemann reaction.
c) Aldol condensation.
d) Oxidation with ozone of alkanes.

Chattogram Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 2nd year 1st Semester Final Examination, 2021

Subject: Unit Operations in Food Processing (Theory)

Course Code: UFP-201 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any four questions from each section, where question no. 1 and 6 are compulsory, Split answer is not allowed)

Section-A

1. Define unit operations in Food Processing. Derive the interrelationship expression for Moisture Content wet basis (MC_{wb}) and Moisture Content dry basis (MC_{db}). 2+3=5
2. a) State the law of conservation and Write down the basic Principles of mass and energy balance. 5
b) If 35000 Kg of whole milk containing 4% fat is to be separated in a 6 hour period into skim milk with 0.45% fat and cream with 45% fat. What are the flow rates of two output streams from a continuous centrifuge which accomplish the separation? 5
3. a) What do you mean by critical moisture content? Describe the principle and theory of thin layer drying. 5
b) A drum dryer is being designed for drying of a product from an initial total solid content of 12% to a moisture content of 5%. An overall heat transfer co-efficient (U) of 300 BTU/hrft²°F is being estimated for the product. An average temperature difference between the roller surface and the product of 150°F will be used for design purpose. Determine the surface area of the roller required to provide a production rate of 50 lbm/hr, where enthalpy change is 1000 BTU/lbm. 5
4. a) Show the arrangement of freeze drying process and explain its working mechanism shortly. 4
b) Enumerate in brief the Brunauer-Emmet-Teller (BET) adsorption theory. 3
c) Define water activity, hygroscopic and hygroemissive product. 3
5. a) Briefly describe how water activity affects the microbial stability, enzymatic reactions and lipid oxidation of foods. 4
b) Write short note on any three of the following: i) Air blast freezer, 3x2=6
ii) Tunnel dryer,
iii) Freezing point depression,
iv) Thawing.

Section-B

6. a) "Desorption isotherm usually lies above the adsorption isotherm"- explain the statement. 2.5
b) Show the functional relationship between water activity and equilibrium moisture content of food at constant temperature and pressure. 2.5
7. a) Show how drying rate constant is dependent on product thickness. Differentiate between conventional and freeze dehydration. 5
b) A tunnel dryer is used to dry a product from 80% m.c. (db) to 4% m.c. (db). The total drying time is 2 hours. The product moves through the dryer is 5 ft x 5ft trays, which are carried on with 20 trays per cart. Each tray contains 50 lbm. Determine the average output/ capacity of the dryer, if the tunnel length is 30 ft and latent heat 970 lbm/hr. 5
8. a) Derive the Planks equation for determining freezing time. 6
b) Find the ton of refrigeration required to overcome heat loss through 4 sides of wall of storage room dimension 10ft x 10ft x 10ft. The outside temperature is 100°F and inside temperature -20°F. Overall heat transfer co-efficient (U) 0.04 Btu/hr ft²°F and consider 25% safety value. 4

9. a) List the basic factors which affect the rate of evaporation. Illustrate the material and enthalpy balance on forward feed triple effect evaporator. 6
- b) A multiple -pass continuous type evaporator is being used to evaporate the moisture from 100gal. of product. The desired concentration allows the product to be removed at a rate of 10 gal/min. Compute the retention time for 10% of the Product. 4
10. a) How does freezer burn affect product quality during preservation? 3
- b) Derive a mathematical expression for conduction modes of heat transfer. 3
- c) Find out a value of K (permeability of water with respect to vapour transport) of freeze drying process for mango pulp. When the initial weight of mango pulp=1.85 Kg. Drying time 56 hr, vapour pressure at drying temperature of $47^{\circ}\text{C}=82$ mm of Hg. Total pressure in the drying chamber=0.16 mm of Hg. Thickness of the dried mango pulp=1.54 cm and final weight of dried mango pulp=1.5 Kg. 4