Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: General Microbiology (Theory)
Course Code: GMC- 201

Full Marks: 70 **Time: 3 hours**

(Figures in the right margin indicate full marks. Answer ~~Four (4)~~ Three(3) questions from each section where question No. 1 and 5 are compulsory. Use separate answer script for each section. Split answer is discouraged.)

Section-A

1. a) Compare and contrast gram positive and gram negative bacterial cell wall. 6
   b) Describe the characteristics of a prokaryotic cell. 3
   c) Discuss Koch's postulates. 2

2. a) Define the term antiseptic and disinfectants. 2
   b) How did the term pasteurization come from? Does this process mean sterilization? Justify your answer. 4
   c) Write down the major groups of disinfectants used in microbiological purposes. 6

3. a) Compare and contrast DNA and RNA. 5
   b) Describe the translation process during the time of protein synthesis. 5
   c) Define gene. 2

4. a) Classify bacteria on the basis of morphology, flagellar distribution, O_2 requirement for growth, temperature requirement and location of endo-spore. 7
   b) Draw and label a flagellum of gram positive and gram negative bacterium. 5

Section-B

5. a) Name the polymerase enzymes which are used in DNA replication in case of prokaryotes. 2
   b) Discuss the major classes of RNA with their roles. 4
   c) Write down the transcription process in case of prokaryotes. 5

6. a) Describe asexual and sexual reproduction of fungi. 6
   b) Mention name of industrial molds and yeast with usage. 6

7. a) Differentiate virus from other microorganisms. 2
   b) Differentiate exotoxin from endotoxin. 4
   c) Lit the enzymes which are secreted by bacteria with mentioning their roles. 6

8. Write short notes on (any four): 4X3= 12

   a) Prion
   b) Mycoplasma
   c) Rickettsia
   d) Shine-Delgarno sequence
   e) Genetic engineering
   f) Operon
   g) Promoter

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: Technology of Food Preservation (Theory)
Course Code: TFP-201

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 discouraged.)

Section-A

1. What is the importance of chemical additives in food processing? Mention the undesirable uses of additives in foods. 5

2. a) Explain in brief the process associated with fruit ripening. 4
   b) Make a list of recommended storage temperature, relative humidities, approximate storage life and average freezing points of fruits. 3
   c) Find out the factors to be considered for packaging of foods. 3

3. a) Indicate the benefits of freeze drying over other conventional drying. 3
   b) Give a flow sheet for drying of fruits and vegetables. 3
   c) What type of spoilage can be occurred in dried foods and how to prevent them? 4

4. a) Develop an expression for strain by Kelvin Model to obtain the elastic and viscous properties of solid food products. 4
   b) Differentiate between Laminar flow and Turbulent flow. 2
   c) Compare Einstein equation, Guth and Simha equations and Manley and Mension equation when predicting the viscosity of a 15% by volume slurry and 35% by volume suspension. The viscosity of the liquid suspending medium is 1.3×10^{-3} lbm/ft.sec. 4

5. a) Write short notes on:(a) I.M.F, 2.5x4=10
   (b) Hazard categories for frozen foods,
   (c) Food Irradiation,
   (d) Nature of Harvested crops.

Section-B

6. Describe the texture profile analysis curve of a food product to cyclic force application. 5

7. a) Define food quality. Describe the various appearances, textural and flavour factors of foods. 6
   b) Give the classification of defects for foods with examples. 4

8. a) With equation and sketch compare the shear stress - rate of shear relationship of Newtonian and Non Newtonian fluids. 4
   b) Differentiate between slurry and suspension. 2

c) Compare the arithmetic , surface and volume surface mean diameter for particles in a dry food products with the following distribution of sizes: 4

Number	Size(micron)
1	40
5	35
25	20
20	22
10	10
5	15

9. a) Which drying process is best for food products when having high initial moisture contents? Mention briefly its classification with sketch. 7

b) Specify the factors to be considered during chilling storage. 3

10 a) Find out the benefits of quick freezing over slow freezing. 3

b) How to compute the total refrigeration requirements to freeze foods in cold storage for several months? 7

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: Basic Electrical and Electronic Engineering (Theory)
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 discouraged)

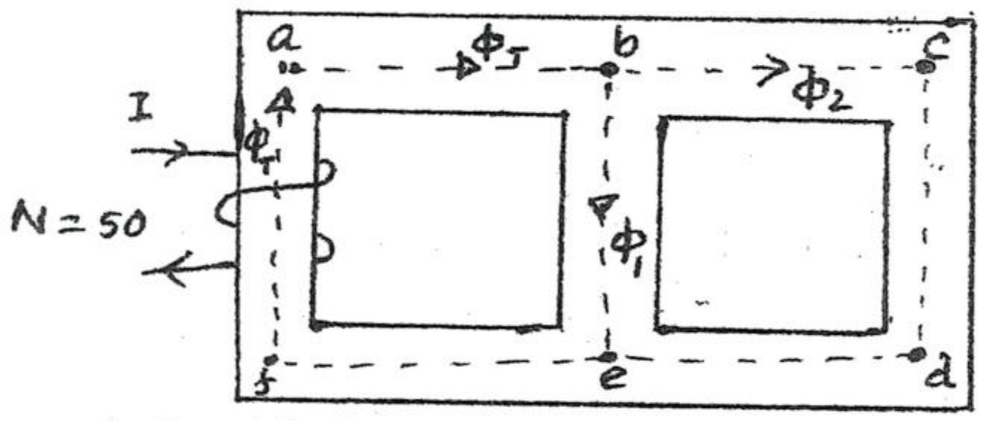
Section: A

1. a) What do you mean by Crystalline and Amorphous solids? Mention different crystal systems with their unit cell specifications. 3

   b) Calculate the number of atoms per unit cell of a metal having lattice parameter 2.9 Å and density 7.87 gm/cc. Atomic weight of the metal is 55.85 gm and Avogradro's number is 6.028×10^{23} atom/mol. 2

2. a) State and explain Ohm's law for both electrical and magnetic circuits. 1

   b) Determine the value of I required to establish a magnetic flux of $\phi_2= 1.54\times10^{-4}$ wb in the section of the core indicated in figure below. The relative permeability and length for the steel at region bcde, be and efab are $\mu_2=4972$, $\mu_1=4821$ and $\mu_T=2426$ respectively; $L_{bcde}=L_{efab}=0.2m$, $L_{be}=0.05m$. The cross sectional area throughout the circuit for the steel is 6×10^{-4} m^2. 5



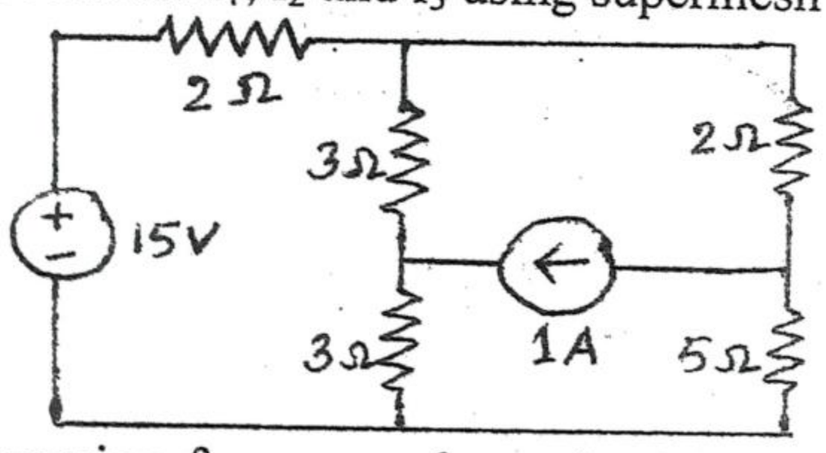
   c) Establish a relationship between the peak and root mean square value of current for AC generator using simple electrical circuit. 4

3. a) What is a p-n junction? Discuss the behavior of a p-n junction under forward and reverse biasing condition. 4

   b) Describe the principle and working of a full-wave rectifier. Derive an expression for efficiency of it. 6

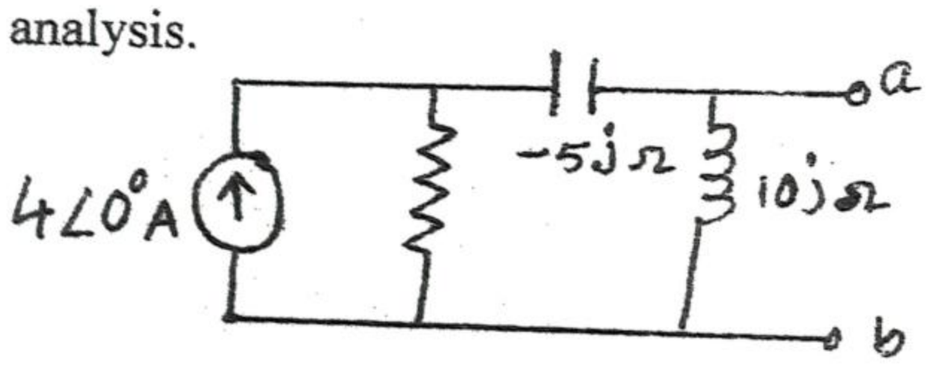
4. a) State Thevenin's theorem and justify this theorem for a relevant network 5

   b) Find the mesh currents I_1, I_2 and I_3 using supermesh analysis: 5



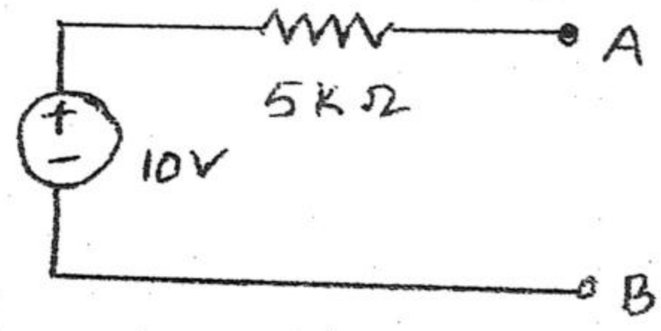
5. a) Derive an expression for power factor in AC circuit analysis and hence define real power and apparent power. 5

   b) Find the Thevenin and Norton equivalent circuits at the terminals a-b for the circuit below using AC analysis. 5

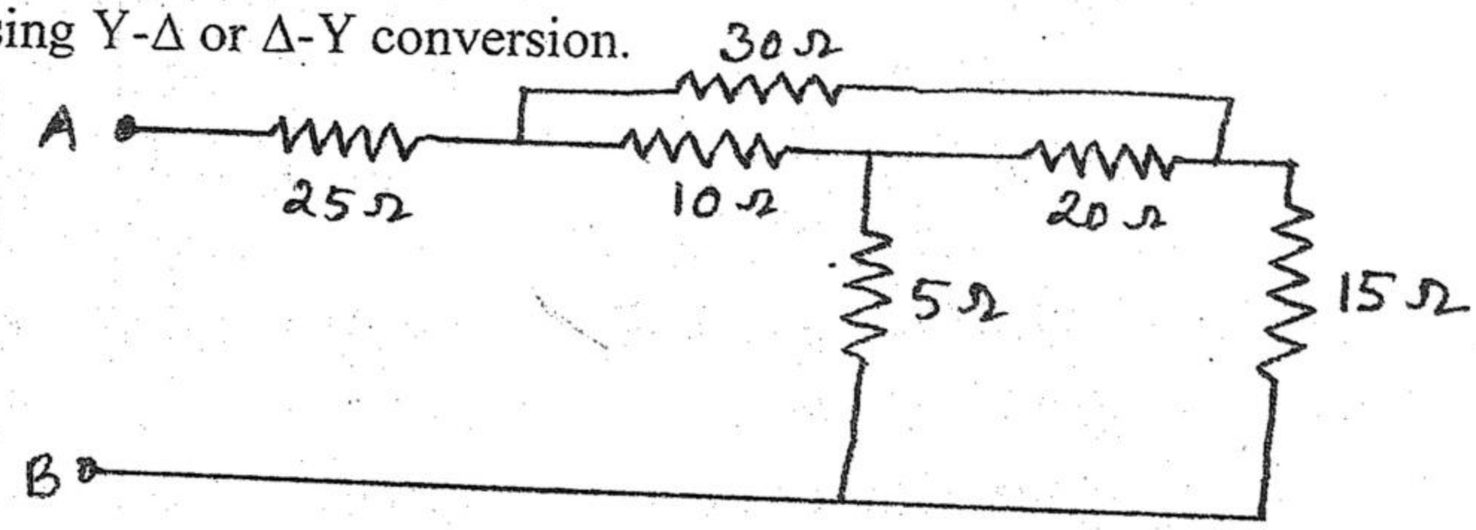


Section: B

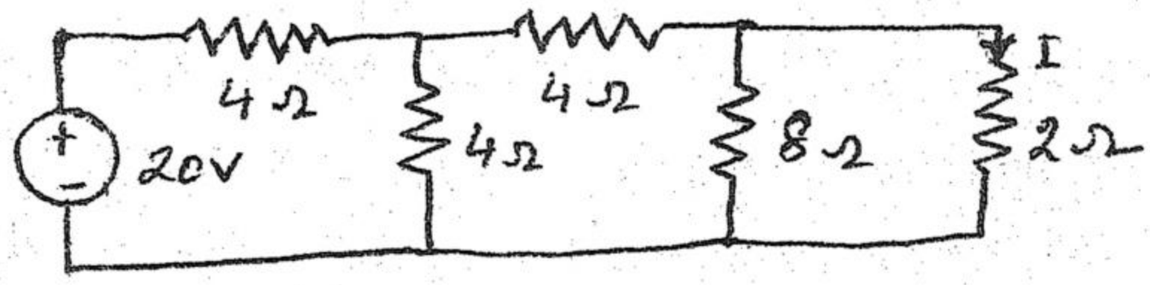
6. a) Convert the voltage source of following figure into an equivalent current source. 1



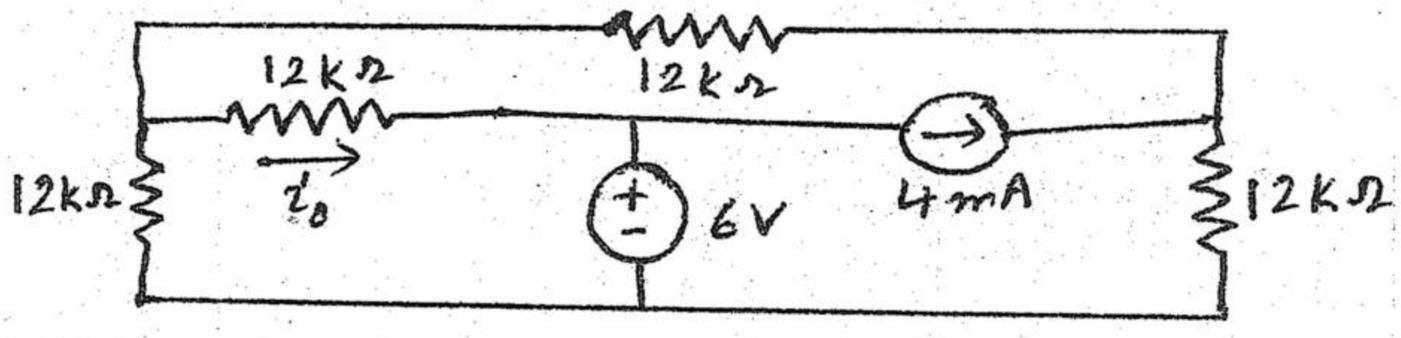
b) Obtain the equivalent resistance between the points A and B of the electrical network below using Y-Δ or Δ-Y conversion. 4



7. a) Find the current in 2Ω resistor and hence verify reciprocity theorem. 5



b) Find i_0 in the network shown using superposition theorem. 5

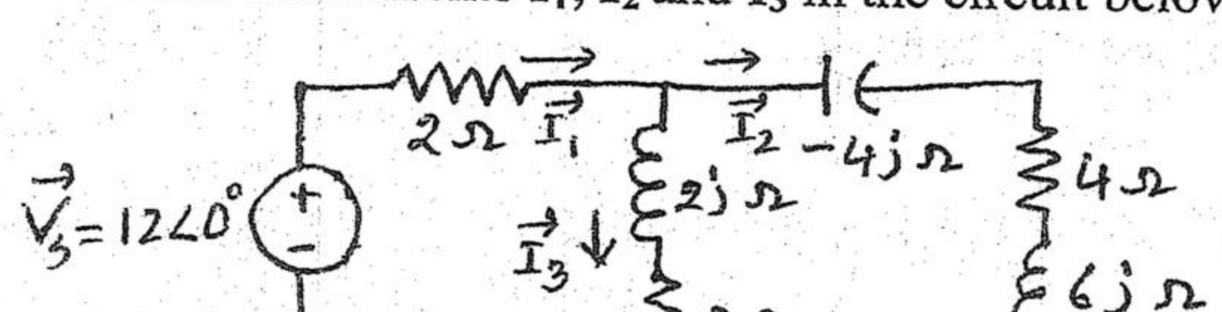


8. a) Explain the formation of potential barrier in a p-n junction. 4

b) Draw the common emitter configuration of pnp and npn transistors with symbol and proper identification of current. 4

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

9. a) Determine the currents $\mathbf{I_1}$, $\mathbf{I_2}$ and $\mathbf{I_3}$ in the circuit below using AC Nodal analysis: 5



b) What will be the value of Z_L that will absorb maximum average power and what will be the value of maximum power in the AC circuit below using maximum power transfer theorem? 5

10. a) What do you mean by ideal voltage source and ideal current source? Show their V-I characteristics. 4

b) Derive an expression for the e.m.f equation of a transformer. Give the structural concept of step-up and step-down transformer on the basis of the equation. 4

c) Draw the Hysteresis loop for ferromagnetic materials to explain the terms magnetic saturation, retentivity and coercivity. 2

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: Unit Operations in Food Processing (Theory)
Course Code: UFP-201

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 discouraged.)

SECTION: A

1. What is the purpose of material and energy balance? Draw a typical input output diagram for a process and indicate the various energy inputs. 5

2. (a) Describe the principle and theory of deep bed drying. Also enumerate the fixed bed drying equation. 5
   (b) In manufacturing of jam, the crushed fruit is mixed with sufficient sugar to give mixture of 45 parts by weight of fruits to 55 parts by weight of sugar and sufficient pectin (5 oz / 100 lbs of fruits) and the citric acid at the rate of 0.4 % of fruit added. The mixture is evaporated until the soluble solids are 67%. What yield of jam can be expected from a fruit which has 14% soluble solids? 5

3. (a) Show the relationship between Diffusion co-efficient and activation energy. 3
   (b) Compare the energy requirements of a pressure nozzle and a rotary atomizer for skim milk of flow rate of 40 lbm/min. The pressure nozzle is operating at 100 lbf/in^2 and rotary atomizer is operating at a rotational speed of 6000 rpm, the diameter is 5 inch. Product density is 80 lbm/gal. 7

4. (a) Differentiate between conventional and freeze dehydration. 3
   (b) Describe shortly the following freezing equipment: Air blast freezer, Plate freezer and immersion freezer. 7

5. (a) Define freezing point depression. How does thawing affect product quality during processing? 3
   (b) A IQF tunnel is being used for straw berry. The product conveyor is 5 ft wide and 25.5 ft long. The air used as freezing medium is at -30°F. If the straw berries enter the tunnel at 40°F. Compute the refrigeration capacity of freezer in ton. 7
   Assume, L=150 btu/lbm,
   ρ=60 lbm/ft^3,
   diameter of straw berry,a=0.5 in,
   hc= 50 $btu/hr.ft^{2o}F$,
   K=1.2 $btu/hr.ft^oF$,
   p=1/6 and R=1/24.

SECTION-B

6. Enumerate in brief the feeding of multiple effect evaporator. 5

7. (a) List the various guide lines required for evaporation and derive an enthalpy balance equation for single effect evaporation system with figure. 6
   (b) Define steam economy. Draw and label forward and backward triple effect evaporator. 4

8. (a) A multiple pass continuous type evaporator is being used to evaporate the moisture from 100 gal of product. The desired concentration allows the product to be removed at a rate of 10 gal/min. Compute the reaction time for 10% of the product. 5

(b) Define conduction and convection. Develop an expression for three dimensional heat conduction equations in an isotropic solid. 5

9. (a) Draw and explain Tabular heat exchanger and Plate heat exchanger. 5

(b) A Tubular heat exchanger is being designed for honey. The equipment will have a 2 in diameter and 10 ft length. If the heat exchanger is operated at 1000 lbm/min, Compute the flim heat transfer co-efficient. Assume K=0.26 btu/hr.ft°F and Cp=0.6 btu/lbm°F. 5

10. (a) How can you measure content for desired food? 4

(b) Define equilibrium relative humidity. Explain in brief effect of water activity on different deteriorative reactions in dried foods. 6

Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: Organic Chemistry (Theory)
Course Code: OCM-201

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 discouraged.)

Section-A

1. a) Write down the IUPAC name of the following compounds: 2
   (i) $CH_3CH(OCH_2CH_3)CH_2CH_3$
   (ii) $CH_3CH_2(OH)CH_2(OH)$
   b) Explain the following terms with suitable examples: 3
   (i) Electrophiles and
   (ii) Nuclephiles

2. a) Explain the term Aromaticity. 2
   b) How will you distinguish between benzene and cyclohexene? 2
   c) Give general mechanism of electrophilic aromatic substitution reaction. 4
   d) How will you synthesize chlorobenzene from benzene? 2

3. a) Explain peroxide effect. Why HCl and HI do not give peroxide effect? 4
   b) What is isomerism? Explain the isomerism showed by C_4H_6. 3
   c) Give the mechanism of addition to carbon carbon double bond. 3

4. a) Give two methods of preparation of alkanes. 4
   b) Write down the mechanism of chlorination of methane. 4
   c) "Alkanes do not react with acids, alkalis, oxidizing agents etc. at room temperature". Explain. 2

5. a) Write short notes on any three of the following: 6
   (i) Fridel Craft alkylation
   (ii) Williamson ether synthesis
   (iii)Bayer test
   (iv)Ozonolysis of alkynes
   (v) Pyrolysis of alkane
   b) Give some uses of ether. 2
   c) Write down the oxidation reaction of alcohols. 2

Section-B

6. a) Draw the chemical structure of a weed killer and a powerful antiseptic. 3
   b) Write the uses of phenol. 2

7. a) What are phenols and how do they differ structurally from aromatic alcohols? 2
   b) How is phenol obtained from coal tar? Give a modern synthetic method for the preparation of phenol from a petroleum source. 5
   c) Describe the following methods of preparation of phenol: 3
   (i) Alkali fusion of sodium arensulphonates
   (ii) Decarboxylation of phenolic acids

8. a) What are amines? How are they prepared? Describe any two of the methods. 5
   b) How will you distinguish between primary, secondary and tertiary amines? 3
   c) Discuss the basicity of amines. 2

9. a) What are aldehydes and ketones? Point out the structural relationship between the two types of compounds. 2
   b) Describe three general methods for preparation of aldehydes and ketones. 6
   c) Write a short note on "The Clemmensen reduction". 2

10. a) Arrange the following compounds in order of increasing acidity: 2

(i) CH_3COOH (ii) $BrCH_2COOH$ (iii) $Br_2CHCOOH$

b) Discuss the mechanism of esterification of carboxylic acids. 4

c) What will happen (Only reaction)? 4

(i) Hydrolysis of esters

(ii) Ethanoic acid reacts with thionyl chloride

(iii)Ethanoic acid reacts with bromine in the presence of red phosphorus

(iv)Ethylene glycol reacts with $K_2Cr_2O_7$ in the presence of H_2SO_4

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2014
Subject: Applied Nutrition (Theory)
Course Code: APN-201

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 discouraged.)

SECTION: A

1. Briefly write about Hidden hunger and Hunger gap. 5

2. a. What is Nutritional Emergency? What are the central reasons for nutritional emergency? 4
   b. When does an emergency condition become a nutritional emergency? 2
   c. Outline the negative effect of different types of natural disaster with their possible causes of occurrence. 4

3. a. List the names of natural disasters commonly occurred in Bangladesh. 2
   b. Discuss disaster management cycle with diagram. 4
   c. "Disaster management is a fundamental issue in our country"- Explain. 4

4. a. What do you mean by nutritional problem? Describe different nutritional problems. 4
   b. How do you control nutritional problem? 2
   c. Discuss cause, sign, symptoms and treatment of anemia and scurvy. 4

5. a. Define nutrition education with examples. 2
   b. How do you plan for arranging a nutrition education program? 4
   c. Describe the strategies involved in community outreach nutrition program. 4

SECTION: B

6. a. What do you know about food crisis? How do food distribution mechanisms in a country result in food scarcity? 4
   b. Who are in danger during emergency condition? 1

7. a. What is planning process? State the major characteristics of planning. 4
   b. Discuss "Hazard profile in Bangladesh". 4
   c. Who play very important role during emergency situation management? 2

8. a. Why food supplements are considered risk for health? 2
   b. Discuss the fortification procedure used in food industry. 5
   c. What are the necessary conditions for successful food fortification program? 3

9. a. What is gender inequality? How does it affect nutritional status of a nation? 4
   b. Explain briefly about how women become victims of gender discrimination in our country? 6

10 a. What do you know about emergency feeding program? Classify it. 2
   b. Describe about supplementary feeding program. 4
   c. Differentiate between on-site food ration and take home food ration in a supplementary food distribution system. 4