

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2013
Subject: General Microbiology (Theory)
Course Code: GMC-201

Full Marks: 70

Time: 3 Hours

(Figures in the right margin indicate full marks. Answer **three (3)** questions from each section of which question number 1 and 5 are compulsory. **Split answer is not allowed.** Use separate answer scripts for each section.)

Section: A

- | | | | |
|----|----|---|---|
| 1. | a) | Write down the contribution of the following scientists in Microbiology | 4 |
| | | i. Edward Jenner ii. Louis Pasteur iii. Robert Koch iv. Alexander Fleming | |
| | b) | What are the features that distinguish prokaryotes from eukaryotes? | 4 |
| | c) | What do you mean by theory spontaneous generation? | 3 |
| 2. | a) | What is meant by microbial growth? | 2 |
| | b) | Discuss the factors that influence the growth and survival of microbes | 8 |
| | c) | What is archeabacteria ? | 2 |
| 3. | a) | Define the terms sterilization and disinfectants. | 2 |
| | b) | What do you understand by botulism? | 2 |
| | c) | Describe different measures that are helpful in keeping microbes' away. | 8 |
| 4. | a) | Point out the important characteristics of <i>Rickettsia</i> and <i>Chlamydothila</i> . | 6 |
| | b) | Describe the bacterial virulence factors. | 6 |

Section: B

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|----|----|--|---|
| 5. | a) | Draw and label a typical viral structure. Virus is alive or dead - Justify your answer? | 7 |
| | b) | Classify bacteria based on O ₂ and nutrient requirements | 4 |
| 6. | a) | Explain the following terms; transduction, bacterial endospore, eurythermic bacteria, glycocalyx, conidia and viral species. | 7 |
| | b) | Compare and contrast the exotoxin and endotoxin produced by bacteria. | 5 |
| 7. | a) | Mention the characteristics of <i>Mycoplasma</i> . | 3 |
| | b) | How does protein synthesis occur in prokaryotes? | 7 |
| | c) | Define point and silent mutation. | 2 |
| 8. | a) | Describe the process of germination of bacteria. | 4 |
| | b) | Illustrate the colicinogenic and drug resistant transfer plasmids. | 4 |
| | c) | How do you secure homogenous bacterial culture from suspected field samples? | 4 |

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2013
Subject: Applied Nutritional Science (Theory)
Course Code: ANS-201

(Figures in the right margin indicate full marks. Answer any **four (4)** questions from each section of which question number 1 and 6 are compulsory. **Split answer is not allowed.** Use separate answer scripts for each section.)

Section: A

- | | | |
|----|--|---|
| 1. | Explain "Nutrition throughout the life cycle". | 5 |
| 2. | a) Briefly describe the nutrient requirement for pregnant women. | 5 |
| | b) Define low birth weight. Write the consequences of low birth weight. | 5 |
| 3. | a) Why weaning is a dangerous time? | 2 |
| | b) Explain the role of hormone in production of breast milk. | 4 |
| | c) What are the indicators to assess the nutritional status of an adult man? | 4 |
| 4. | a) Define weaning. Explain the three stages of weaning. | 4 |
| | b) Write the criteria of an ideal weaning food. | 3 |
| | c) How complementary food can be kept clean and safe. | 3 |
| 5. | a) What is TFR? | 2 |
| | b) How can you evaluate a nutritional intervention program? | 4 |
| | c) Write the techniques of nutrition communication | 4 |

Section: B

- | | | |
|----|--|--------|
| 6. | What are the services provided by the national nutritional program? | 5 |
| 7. | a) What is nutritional education? Explain its importance. | 3 |
| | b) Describe the concept of nutrition education. | 2 |
| | c) What factors should be considered to improve food consumption behavior? | 5 |
| 8. | a) Explain the process of pre and post testing of nutritional knowledge among mass people. | 5 |
| | b) Describe FGD (Focus group discussion). | 2 |
| | c) What do you mean by nutritional survey and surveillance? | 3 |
| 9) | a) Define anti-nutrients with examples. | 2 |
| | b) What is fortified food? Describe the role of food fortification to reduce micronutrient deficiency. | 5 |
| | c) What are the criteria to select a food to be fortified? | 3 |
| 10 | Write short notes on (any two): | 2x5=10 |
| | a) Indicators to access nutritional status. | |
| | b) Nutritional requirement of adolescent girl. | |
| | c) IYCF | |

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2013
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 1 and 6 are compulsory. Use separate answer script for each section. **Split answer is not allowed**)

Section: A

1. a) Write down IUPAC name of the following compounds 3
 - i) $\text{CH}_3\text{-C}(\text{Cl}_2)\text{-CH=CH-CH}_2\text{-CH}_3$
 - ii) $\text{CH}_2\text{Cl-CH}_2\text{-C}(\text{CH}_3)_2\text{-COOH}$
 - iii) $\text{CH}_2\text{OH-CH}(\text{OH})\text{-COOH}$
- b) What do you mean by carbonium ion and carbaion? 2
2. a) What kind of reaction can be expected of the carbon-carbon single bond and why? Explain with at least two examples. 5
- b) What are Markonikov's and anti-Markonikov's rules? Explain with an example. 5
3. a) Outline two general methods of preparation of benzene. 4
- b) Discuss the facts that support Kekule formula for the structure of benzene. 6
4. a) How can you distinguish primary, secondary and tertiary alcohols by oxidation test and Victor Meyer test? 6
- b) Outline two general methods of preparation of alcohol. 4
5. a) What do you mean by absolute alcohol, denatured alcohol and power alcohol? 3
- b) Write down the addition and substitution reaction of ethers. 4
- c) Compare the chemical properties of ethers and alcohols. 3

Section: B

6. a) Write three isomers of the molecule $\text{C}_3\text{H}_6\text{O}$. 2
- b) How will you synthesis ethylamine from methylamine and vice versa? 3
7. a) Discuss the reducing characteristics of acetaldehyde with example. 3
- b) State some points of difference between aldehydes and ketones. 3
- c) Despite the same molecular weight (MW 74) why the boiling points of n-butanol and diethylether are different - 118°C and 35°C , respectively? 4
8. a) Discuss the mechanism of esterification of carboxylic acids. 4
- b) Arrange the following compounds in order of increasing acidity: 2
 - i) CH_3COOH ; ii) BrCH_2COOH ; iii) Br_2CHCOOH
- c) What happens in: 4
 - i) Oxidation of ethylene glycol.
 - ii) Propionic acid reacting with bromine in the presence of a small amount of red phosphorus.
 - iii) Propionic acid reacting with thionyl chloride.
 - iv) Acetic acid reacting with sodium.

9. a) Describe the following methods of preparation of phenol:

6

- i) Hydrolysis of aryl halide
- ii) Decarboxylation of phenolic acids
- iii) Alkali fusion of sodium arrensulphate
- iv) Hydrolysis of diazonium salts.

b) Describe with reaction:

4

- i) Production of phenol from cumene derived from petroleum
- ii) Coupling reaction of phenyl diazonium chloride and phenol
- iii) Oxidation of phenol

10. Write down short notes (any four) on:

2.5×4=10

- a) Hinsberg method for separation of mixture of amines
- b) Houben-Hoesch reaction
- c) Reimer-Tiemann reaction
- d) Aldol condensation
- e) Lederer -Manasse reaction
- f) Acidity of carboxylic acid.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2013
Subject: Basic Electrical and Electronic Engineering
Course Code: EEE-201

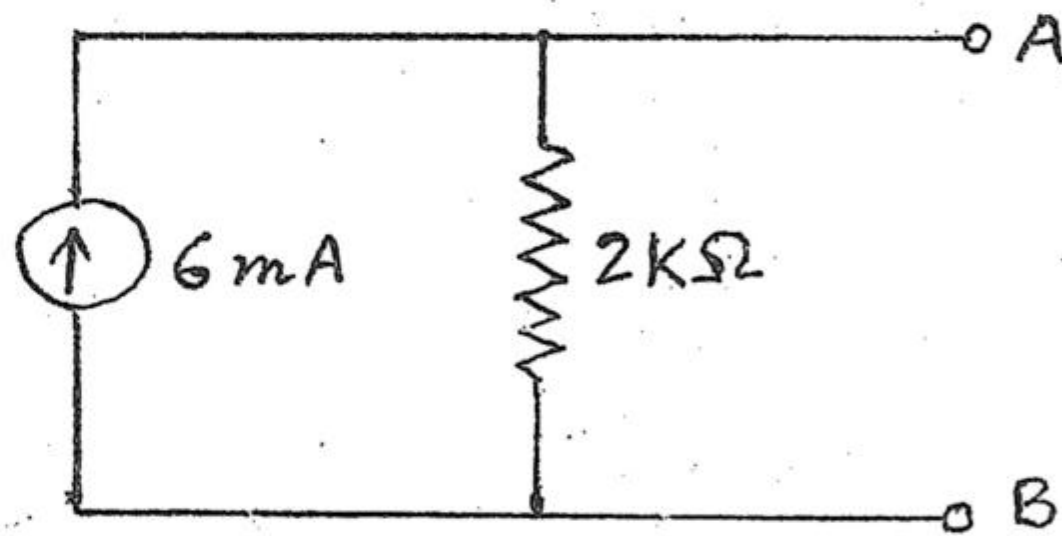
Full Marks: 70

Time: 3 hours

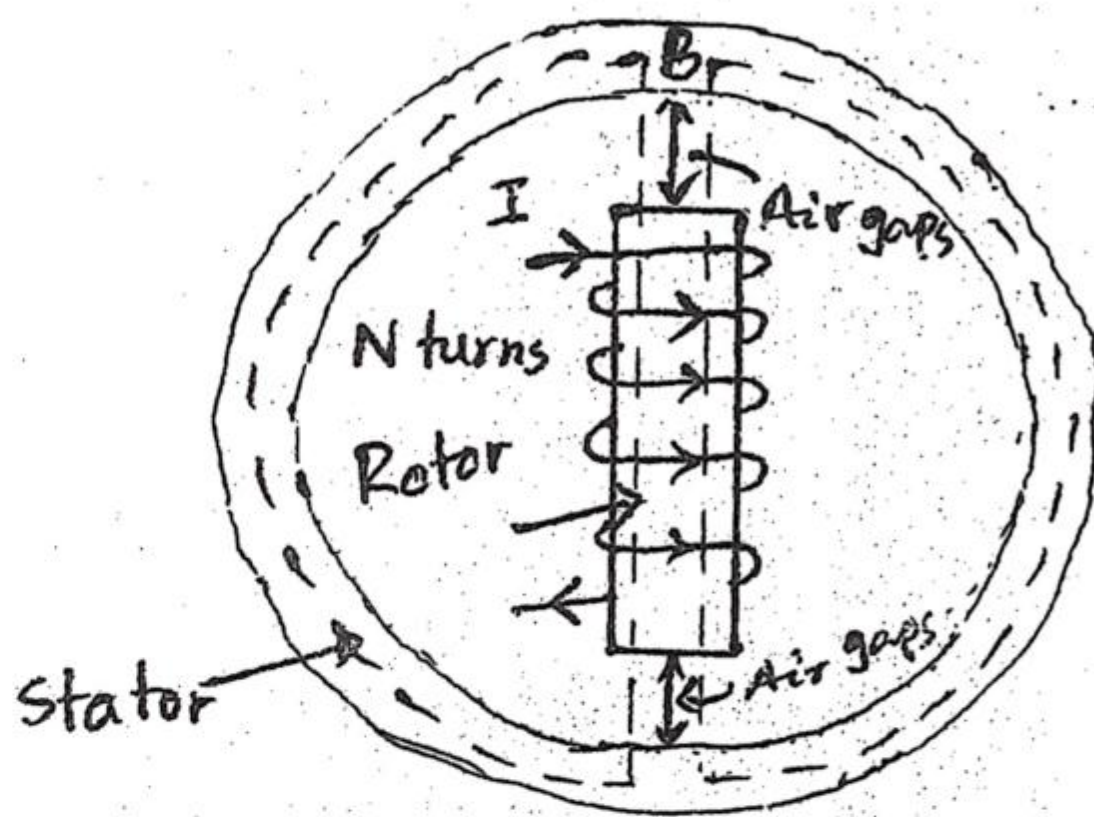
(Figures in the right margin indicate full marks. Answer **Four (4)** questions from each section where question no. **1** and **6** are compulsory. Use separate answer script for each section.)

SECTION: A

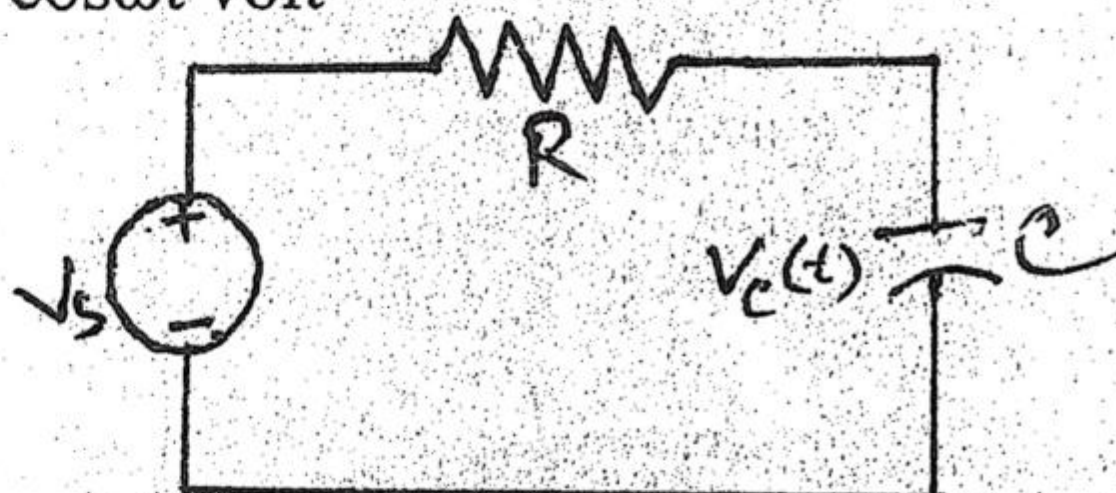
1. a) Draw the V-I characteristics of a current source and voltage source to identify the ideal and practical behaviors, and explain the reason of discrepancy between the behaviors for both. 4
- b) Convert the constant current source below to its equivalent voltage source: 1



2. a) What is a p-n junction? Discuss the behavior of a p-n junction under forward and reverse biasing condition. 3.5
- b) Draw and explain the V-I characteristics of a p-n junction. 3
- c) Derive an expression for the efficiency of a half wave rectifier. 3.5
3. a) Draw the Hysteresis loop for ferromagnetic materials to explain the terms- magnetic saturation, retentivity and coercivity. 4
- b) The figure below shows the synchronous machine in which the air gap length between stator and rotor of pole face area 0.2 m^2 is 1 cm . If 10 A current flows through a coil of 1000 turns, then determine: 5
- (i) The magneto-motive force in the magnetic circuit.
- (ii) The reluctance of each air gap.
- (iii) The magnetic flux density in each gap [Assume the rotor and stator to have negligible reluctance].

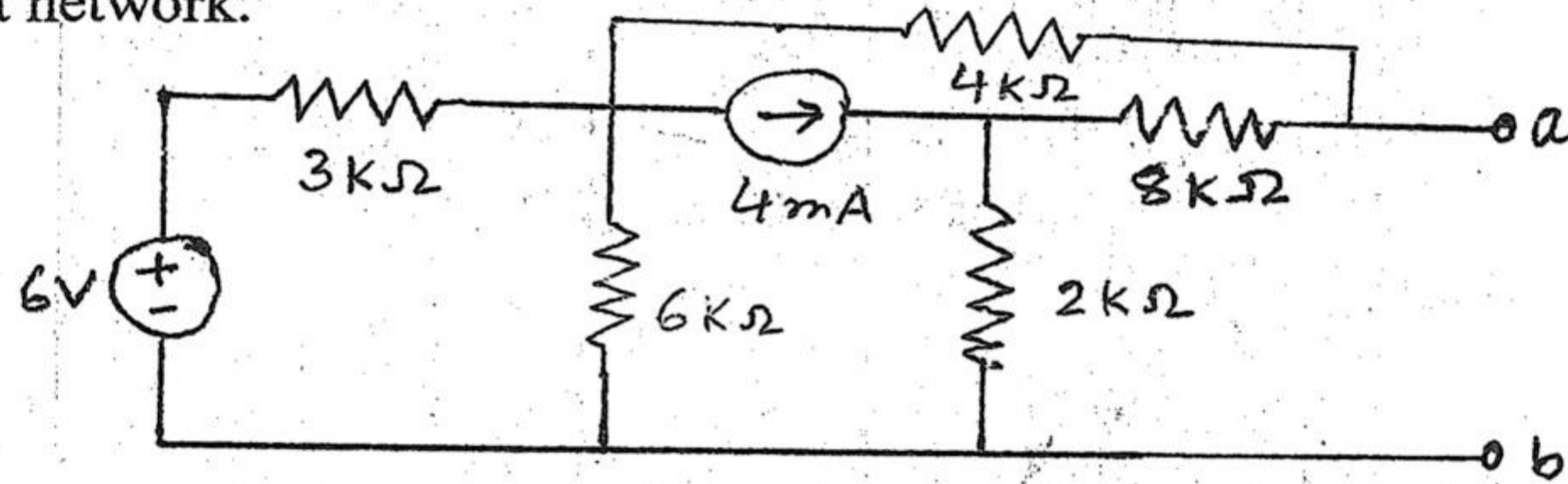


- c) How does an electric circuit analogous to a magnetic circuit state Ohm's law? 1
4. a) Derive an expression for the e.m.f equation of a transformer. Give the structural concept of step-up and step-down transformer on the basis of the equation. 4
- b) Establish the relationship between the peak and root mean square value of AC generator for a simple electrical circuit. 3
- c) Determine the voltage $V_c(t)$ in the R-C circuit below using AC analysis. Assuming $V_s(t) = V_{\text{peak}} \cos \omega t$ volt 3



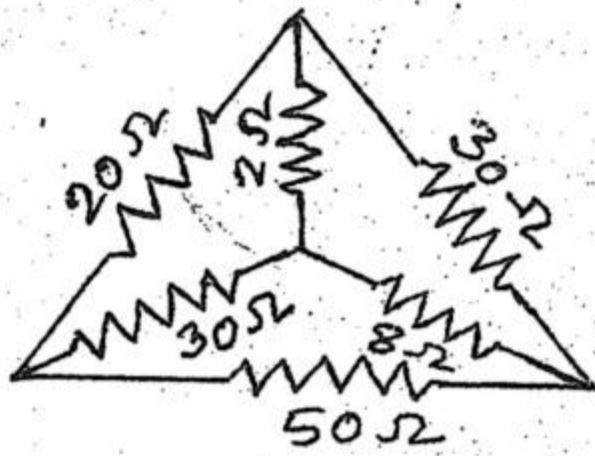
5. a) Determine superposition theorem and justify this theorem for a relevant network. 2+4=6

- b) In the circuit below, find the voltage drop across the terminals a-b using Norton's equivalent network. 4



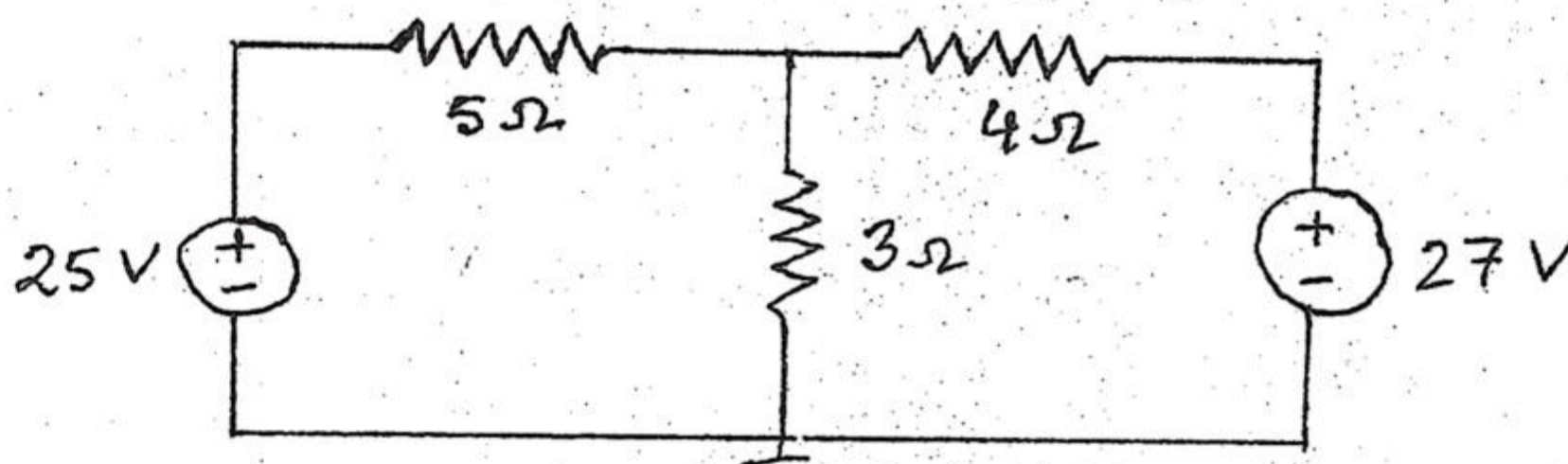
SECTION: B

6. a) What do you mean by Active and Passive element of an electric network? 1
 b) Find the resistance between the points A&B; A&C of a three terminal electrical network below using Y to Δ conversion. 4

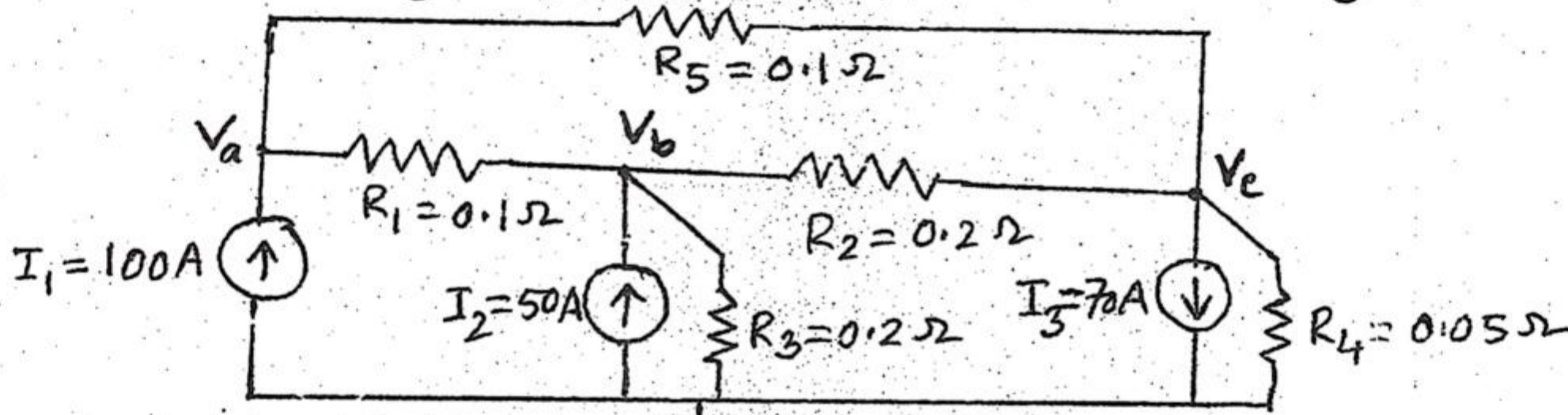


7. a) Define extrinsic material. Show the energy levels of n-type and p-type semiconductor material with necessary diagram. 2+4=6
 b) Draw the common emitter configuration of pnp transistor with symbol and proper identification of current. 4

8. a) Obtain the mesh currents I_1 and I_2 of the circuit diagram below: 4

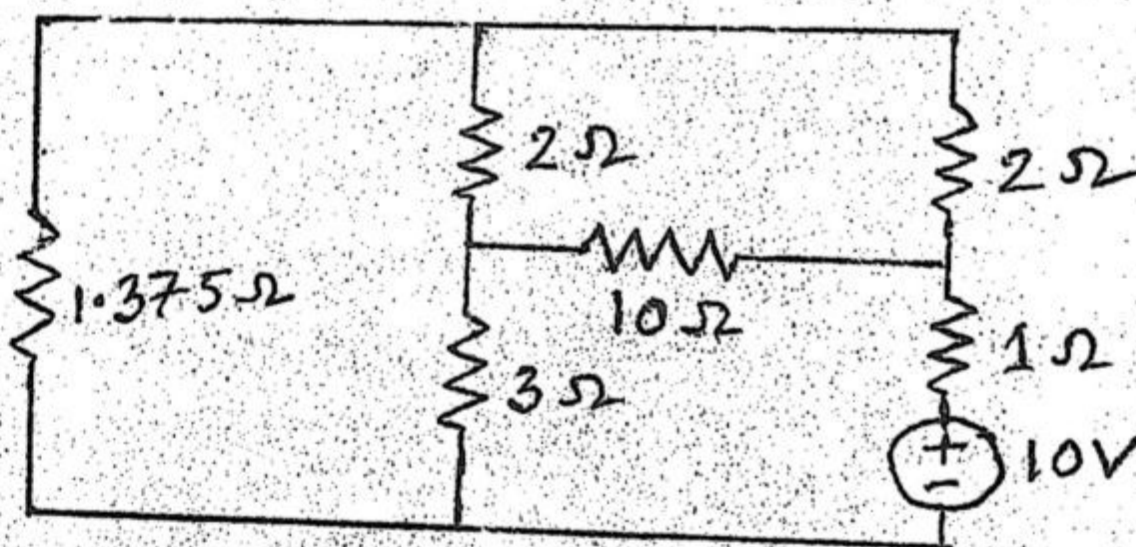


- b) Obtain the node voltages V_a, V_b and V_c of the circuit diagram below: 6

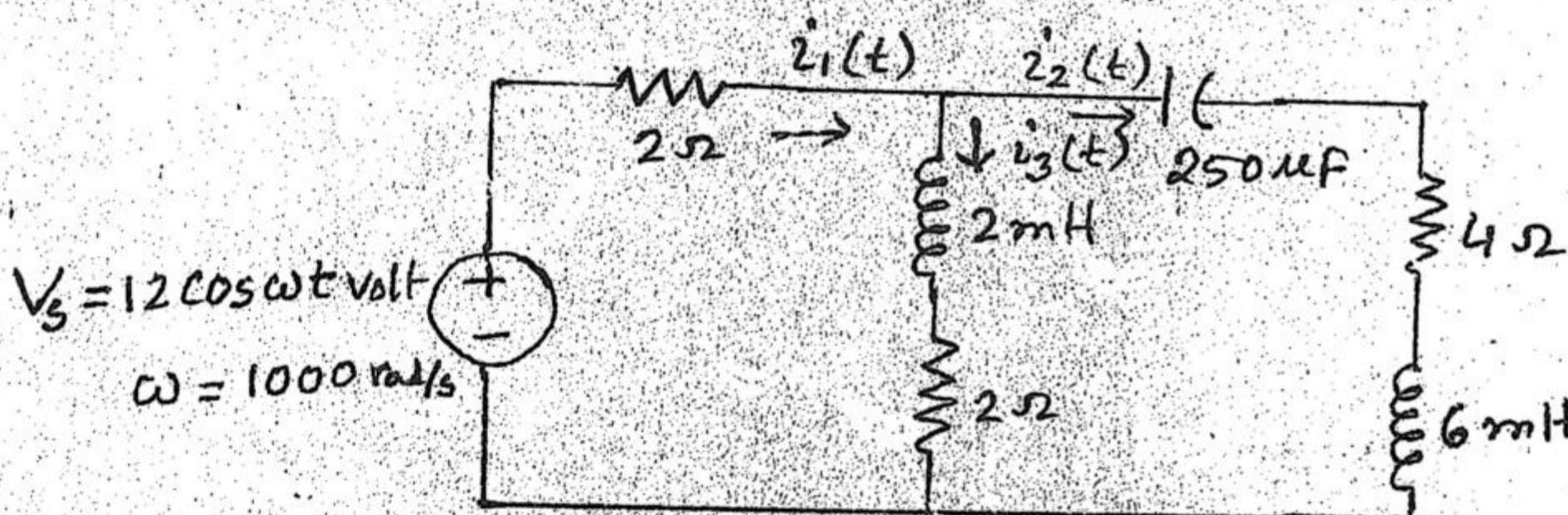


9. a) What is the basic difference between Energy band and Energy level? Distinguish between conductors, semiconductors and insulators in terms of energy band diagram. 3.5
 b) What do you mean by 'Atomic packing factor'? Calculate Atomic Packing factor for simple cubic, body centered cubic and face centered cubic structure. 3.5
 d) Find the density of molybdenum having B.C.C structure from the following data: Atomic weight=95.94 gm/mol., lattice constant =3.148 Å; Avogadro's number = 6.023×10^{23} Atoms/mol. 3

10. a) In the circuit below, find the current through the 1.375Ω resistance and hence verify Reciprocity theorem 5



- b) Determine the currents $i_1(t), i_2(t)$ and $i_3(t)$ in the circuit below using AC analysis. 5



(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.)

SECTION: A

1. a) Define order and degree of a differential equation. Give an example of second order and first degree differential equation. 3
 b) What is the area of a parallelogram whose sides are \bar{A} and \bar{B} ? 2
2. a) Find the equation of the family of all orthogonal trajectories of the family of circles which passes through origin. 4
 b) Solve the following differential equations(**any two**): 3×2=6
 (i) $\frac{dy}{dx} - x \tan(y - x) = 1$ (ii) $2(y - 4x^2)dx + xdy = 0$
 (iii) $(1 + y^2)dx + (1 + x^2)dy = 0$ when $x=0, y=-1$
3. a) The rate at which a body cools is proportional to the difference between the temperature of the body and that of surrounding air. If a body in air at $25^\circ C$ will cool from $100^\circ C$ to $75^\circ C$ in one minute, find its temperature at the end of three minutes. 4
 b) Solve the following differential equations (**any two**): 3×2=6
 i) $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 5y = 0$
 ii) $(D^2 5D + 6)y = e^x \sin 2x$
 iii) $(D^2 + 5D + 4)y = 3 - 2x^2$
4. a) Find the angles which the vector $\bar{A} = 3\hat{i} - 6\hat{j} + 2\hat{k}$ makes with the co-ordinate axes. 5
 d) Determine a unit vector perpendicular to the plane of $\bar{A} = 2\hat{i} - 6\hat{j} - 3\hat{k}$ and $\bar{B} = 4\hat{i} + 3\hat{j} - \hat{k}$. 5
5. a) Discuss divergence and curl of a vector. What are their physical meanings? 5
 b) If $\phi(x, y, z) = 3x^2y - y^3z^2$ find $\bar{\nabla}\phi$ at the point $(1, -2, -1)$. 5

SECTION: B

6. a) Describe the errors in numerical calculation. 2
 b) What are periodic function, even function and odd function? 3
7. a) Discuss Simpson's rule for numerical integration. 5
 b) Evaluate $I = \int_0^1 \frac{1}{1+x^2} dx$ using the rule in 7(a). 5
8. a) What do you understand by divided differences? Show that divided differences are Symmetric. 4
 b) The population of a town in decennial census was as given below. Estimate the population for the year 1955. 6

Year	1921	1931	1941	1951	1961
Population	46	66	81	93	101

9. a) Draw the graphs of the periodic function $\sin x$, $\sin 2x$ and $\sin 3x$. 3
b) Find a Fourier series to represent $f(x) = \pi - x$ for $0 < x < 2\pi$. 5
d) What do you mean by absolute and relative errors? 2
10. a) Describe Newton-Raphson method to find a root of an algebraic equation. 5
b) Use the method in 10(a) to evaluate the equation $xe^x - 1 = 0$ on $[0, 1]$ 5

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 2nd Year 1st Semester Final Examination, 2013

Subject: Applied Nutrition (Theory)

Course Code: APN-201

Full Marks: 70

Time: 3 Hours

(Figures in the right margin indicate full marks. Answer any four (4) questions from each section of which question number 1 and 6 are compulsory. Split answer is not allowed. Use separate answer scripts for each section.)

Section: A

1. Write brief notes on: 2x2.5= 5
 - a) Hunger Gap and b) Natural disaster
2.
 - a) Write down the causes of food crisis in nutritional emergency. 5
 - b) Write down the causes and impact of natural disaster. 5
3.
 - a) What is nutritional transition? 2
 - b) Explain that "Poverty and Malnutrition is a vicious cycle". 4
 - c) Why nutrient supply is significant in emergency condition? 4
4.
 - a) Define malnutrition. Write down the causes, sign and symptoms of malnutrition. 4
 - b) What is hidden hunger? State the causes and importance of hidden hunger. 4
 - c) How do you control malnutrition? 2
5.
 - a) Why food supplements are considered risk for health? 2
 - b) Elaborately describe about the fortification procedure used in food industry. 5
 - c) Write down the necessary conditions for successful food fortification programme. 3

Section: B

6.
 - a) What is nutritional emergency? 2
 - b) Explain the "Hazard profile of Bangladesh". 3
7.
 - a) What is emergency food distribution programme? Classify it. 2
 - b) Differentiate between supplementary feeding programme and therapeutic feeding programme. 3
 - c) Write down the distribution system of supplemented food programme with its advantages. 5
8.
 - a) What is nutritional education? 2
 - b) How do you construct nutritional awareness among poor people? 4
 - c) What do you mean by nutritional message? List the guiding principles for nutritional message. 4
9.
 - a) How do gender issues affect nutritional status? 2
 - b) What is the food taboo? State the consequences of food taboos with example. 5
 - c) Why gender inequity is bad for all? 3
10.
 - a) What types of natural disasters take place each year in Bangladesh? 2
 - b) Why disaster management is fundamental in our country? 4
 - c) Explain the disaster management cycle with diagram. 4

Full Marks: 70

Time: 3 Hours

(Figures in the right margin indicate full marks. Answer **Four (4)** questions from each section where question **1** and **6** are compulsory. Use separate answer script for each section. **Split answer is not allowed**)

Section: A

1. Define thin layer drying and show how drying rate constant is dependent on product thickness from Fick's law. 5
2. a) Diagrammatically show and prove basic principles of mass and energy balance. 4
b) Problem: Skim milk is prepared by removal of some of the fat from whole milk. This skim milk is found to contain 90.5% water, 3.5% protein, 5.1% carbohydrate, 0.1% fat and 0.8% ash. If the original milk contained 4.5% fat, calculate its composition assuming that fat only was removed to make the skim milk and that there are no losses in the processing. 6
3. a) Write down the semi-theoretical drying equation and prove empirical equation from Fick's law. 4
b) Problem: A tunnel dryer is used to dry a product from 80% m.c to 4% m.c (db). Total drying time is 2 hours. The product moves through the drier is 5' × 5' trays, which are carried on with 20 trays per cart. Each tray contains 50 lbm. Determine the average output/capacity, if the tunnel length is 20'. 6
4. a) Derive Plank's equation for determining freezing time. 4
b) Shortly explain how refrigeration operation is accomplished in a refrigerator (with figure). 4
c) How does freezer burn affect product quality during preservation? 2
5. a) Enumerate in brief Brunauer-Emmet Teller (BET) adsorption theory. 4
b) Define ERH. Find the ton of refrigeration required to overcome heat loss through 4 sides of wall of storage room dimension 10' × 10' × 10'. The outside temperature is 100°F and inside temperature -20°F and $U = 0.04 \text{ Btu/hr.ft}^2\text{°F}$. 6

Section B

6. a) Define hygroscopic and hygroemissive product. 2
b) Describe the basic principle of immersion freezer. 3
7. a) Show arrangement of freeze drying process and explain its method of mechanism. 4
b) Find out the value of K (permeability of water with respect to vapour transport) of freeze drying process. When quantity of water removed 200 gm, time of drying 5 hrs, vapour pressure at 47°C is 82 mmHg. Total pressure in the freeze drying chamber 0.16 mmHg and the thickness of dried product is 2 cm. 6

8. a) Write down the basic factors which affect the rate of evaporation. 2
b) Draw and explain the triple effect evaporator. 4
c) A multiple-pass continuous type evaporator is being used to evaporate the moisture from 100 gallons of product. The desired concentration allows the product to be removed at a rate of 10 gal/ min. Compute the reactions time for 10% of the product. 4
9. a) Differentiate between K and U. 3
b) Why votator is widely used in food industry for heat exchange? 3
c) A wall has an overall heat transfer coefficient of 1.5 kcal/m.hr °C. The inside air temperature is 22 °C and the outside air temperature -30°C. The sun conductance's are $h_i = 7.5 \text{ kcal/m}^2\text{.hr. } ^\circ\text{C}$ and $h_o = 30 \text{ kcal/m}^2\text{.hr. } ^\circ\text{C}$. Find out the inside and outside wall temperature? 4
10. a) Draw and label Forward, Backward and Parallel triple effect evaporator. 4
b) Write short note on (any three): $3 \times 2 = 6$
i) Log mean temperature
ii) Freezing point depression
iii) Conduction heat transfer
iv) Drum dryer.

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Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2013
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 **1** and **6** are compulsory. Use separate answer script for each section. **Split answer is not allowed**)

Section: A

1. What do you mean by food preservation? Describe in brief the methods of food preservation. 5
2. a) Compare the shear stress-rate of shear relationship of Newtonian and non-Newtonian fluid with figure and equations. 3
b) What is rheology? What are the importances of rheology? 3
c) Compare Einstein equation, Guth and Simha equations and Manley and Mensor equation when predicting the viscosity of a 15% by volume slurry and a 35% by volume suspension. The viscosity of the liquid suspending medium is 1.3×10^{-3} lbm/ft sec. 4
3. a) Define food quality. 2
b) Describe in brief the quality characteristics desired for fruits and vegetables intended for processing. 5
c) Indicate the effect of cultural practices of fruits and vegetables on quality. 3
4. a) Write down the principle of canning. 3
b) Classify food on the basis of pH. 2
c) Mention the advantages of canning over other methods of preservation. 3
d) In which way heat can transfer in canned food? 2
5. a) Compare the freezing curve for pure water and an aqueous solution containing one solute. 2
b) Briefly describe the factors to be considered in connection with chilling storage. 4
c) Compute the temperature at which ice formation begins in an ice formation beings in an ice-cream mix with the following compositions: 10% butter fat, 12% solid-not fat, 15% sucrose, 0.22% stabilizers. 4

Section: B

6. a) What are the importances of chemical additives? Enumerate in brief the function of chemical additives application. 5
7. a) In tabular form describe various quality characteristics of foods. 2
b) Explain viscosity and consistency of foods. Describe the principles of measurements of viscosity of foods. 4
c) Mention the textural qualities of foods. Describe in brief the various methods of measuring the textural properties of foods with special reference to fruits and vegetables. 4

8. a) Describe the texture profile analysis curve of a food product to applied cyclic force. 3
- b) Describe hazards analysis of frozen foods with example. 3
- c) Compare the arithmetic, surface and volume-surface mean diameters for particles in a dry food product with the following distribution of sizes: 4

Number	Size in micron
1	40
4	30
25	20
20	15
10	10
4	5

9. a) Write down the basic principles of dehydration. 2
- b) Develop thin layer drying theory with figures and equations. 2
- c) Differentiate between slow freezing and quick freezing. 2
- d) A drum dryer is being designed for drying of a product from an initial total solid content of 12% to a moisture content of 4%. An overall heat transfer coefficient of 300 BTU/hr.ft².°F is being estimated for the products. 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 product/hr. 4
10. a) Write down the advantages of dehydration over sun drying. 2
- b) Develop equation for refrigeration requirements in frozen foods. 4
- c) Compare the energy requirements of a pressure nozzle and a rotary atomizer for skim milk at a flow rate of 40 lbm/min. The pressure nozzle is operating at 100 lbf/in², while the rotary atomizer is operating at a rotation speed of 6000 rpm and the diameter is 5 in. The product density is 81 lbm/gal. 4