Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 2nd Year 1st Semester Final Examination - 2012
Subject: General Microbiology (Theory)
Course Code: GMC-201 (T)

Full Marks: 70 **Time: 3 Hours**

Figure in the right margin indicate full marks.
(Answer **Three** questions from each section of which question no. **1 & 5** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section A

1. (a) Give the differential features of fungi and bacteria. 3
   (b) Describe the different ways of fungal reproduction. 4
   (c) What is dimorphic fungus? Enumerate important Mycotoxins along with the name of fungi that produce them. 4

2. (a) Differentiate between exotoxin and endotoxin. 4
   (b) What is phenol co-efficient? Briefly describe the physical methods to control microbial growth. 8

3. (a) Compare the structure and chemistry of Gram positive and Gram negative bacterial Cell wall. 4
   (b) What do you mean by bacteriological media? 2
   (c) Classify bacteriological media along with the names of some enriched media and selective media. 6

4. (a) Describe bacterial growth curve with graphical representation. 4
   (b) Show the relationship between bacterial nutrients to their metabolism. 6
   (c) How can you prepare a bacteriological media? 2

Section B

5 (a) Draw and label a typical bacterium. 3
   (b) Describe cell wall. Mention the function of flagella, pilli and capsule. 1+3=4
   (c) Write down the contribution of Hippocrates and Louis Pasteur. 4

6. (a) Define genome, plasmid, Codon and Anticodon. 4
   (b) How does F^- cell become F^+ Thorough genetic conjugation mating? Explain. 4
   (c) Discuss the importance of Genetic recombination in bacteria. 4

7. (a) Define the following terms- 4
   Glycocalyx, endospore, mycoses and Bacterial mutation.
   (b) Compare among Virus, Rickettsia and Mycoplasma. 5
   (c) What do you mean by Autotrophs and Heterotrophs. Give example of each. 3

8. Write short notes on (Any three). 4×3=12
   (a) Koch's Postulate.
   (b) Bacterial transduction.
   (c) Pasteurization.
   (d) How to obtain a pure culture of bacteria?

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 2nd Year 1st Semester Final Examination - 2012
Subject: Mathematics- II (Theory)
Course Code: MTH -201 (T)

Full Marks: 70 **Time: 3 Hours**

Figure in the right margin indicate full marks.
(Answer **Four** questions from each section of which question no. **1 & 6** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section A

1. (a) Write the order and degree of the following differential equations: 3

i) $\frac{d^2y}{dx^2}+a^2x=0$ ii) $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}=\frac{d^2y}{dx^2}$

iii) $x^2\left(\frac{d^2y}{dx^2}\right)^3+y\left(\frac{dy}{dx}\right)^4+y^4=0$

(b) Obtain the differential equation of which $y^2=4a(x+a)$ is a solution. 2

2. (a) Find the orthogonal trajectories of all parabolas with vertices at the origin and foci on the x-axis. 6

(b) Solve the following differential equation (any one) 4

i) $\frac{dy}{dx}-x\tan(y-x)=1$ ii) $y(x+y)dx+(x+2y-1)dy=0$

3. (a) If the population of a country doubles in 50 years, in how many years will it treble, assuming that the rate of increase is proportional to the number of inhabitants? 4

(b) Solve the following higher order differential equation (any two) 2×3=6

i) $\frac{d^3y}{dx^3}-\frac{d^2y}{dx^2}+4\frac{dy}{dx}-4y=e^x$ ii) $(D^2-4D+3)y=x^3$

iii) $(D^2-4D+4)y=x^3e^{2x}$

4. (a) Prove that $\overline{A}.(\overline{B}\times\overline{C})=\overline{B}.(\overline{C}\times\overline{A})=\overline{C}.(\overline{A}\times\overline{B})$ 5

(b) The temperature at any point in space is given by $T=xy+yz+zx$. Determine the derivative of T in the direction of the vector $3\hat{i}-4\hat{k}$ at the point (1,1,1) 5

5. (a) State divergence theorem and stokes theorem. 3

(b) If a force $\overline{F} = 2x^2y\hat{i} + 3xy\hat{j}$ displaces a particle in the xy plane from (0,0) to (1,4) along a curve $y = 4x^2$. Find the work done. 4

(c) Find the angle between two vectors $\bar{a}$ and $\bar{b}$ if $|\bar{a} \times \bar{b}| = \bar{a}.\bar{b}$ 3

Section B

6. (a) Define interpolation and Numerical differentiation. 2

(b) Show that the equation $x^3 + 3x^2 - 5x - 3 = 0$ has 3 real roots. Find the intervals where the roots lie. 3

7. (a) What do you understand by Fourier Series? Write down the Euler formulas for Fourier Coefficient. 3

(b) Find the Fourier coefficients of the periodic function f (x) given by 7

$$f(x) = \begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < \pi \end{cases}$$

Also, draw the first three partial sums of the corresponding Fourier Series.

8. (a) Describe Trapezoidal rule for numerical integration and its geometrical interpretation. 5

(b) The velocities of a car (running on a straight road) at intervals of 2 minutes are given below: 5

Times in minutes	0	2	4	6	8	10	12
Velocity in Km/hr	0	22	30	27	18	7	0

Apply Simpson's rule to find the distance covered by the car.

9. (a) Describe different types of errors in numerical calculation. Give example. 5

(b) Use bisection method to find a solution accurate to four significant figures for $e^x - x^2 + 3x - 2 = 0$ on $[0,1]$. 5

10. (a) Derive Newton's formula for forward interpolation. 5

(b) The population of a certain town (as obtained from census data) is shown in the following table. 5

Year	1951	1961	1971	1981	1991
Population	19.96	36.65	58.81	77.21	94.61

Find the rate of growth of the population in the year 1981

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2012
Subject: Unit Operations in Food processing (Theory)
Course Code: UFP-201

Full Marks: 70 **Time: 3 Hours**

Figure in the right margin indicate full marks.
(Answer **FOUR** questions from each section where question no. **1** and **6** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section: A

1. a) What do you mean by unit operations? Write down the name of common unit operations used in food Industry. 2

   b) The viscosity of water at 60°F is given as 7.8×10^{-4} lb ft^{-1} S^{-1}, calculate this viscosity in NSm^{-2}. 3

2. a) Describe the principle of thin layer drying and deep bed drying. 4

   b) A drum dryer is going to designed for drying of milk with initial solid content of 25% to a final moisture content 2% (db). An overall heat transfer coefficient of 300 btu/hr.ft^2 °F. Temperature difference between the roller surface and the product of 150°F is being used for design purpose. Determine the surface area of the roller required to provide production rate of 50 lbm/hr and Enthalpy change 1200 btu/lbm. 6

3. a) Define thermal conductivity and diffusivity. Write down there physical significance. 3

   b) A cold store has a wall comprising 11 cm of brick on the outside, then 7.5 cm of concrete and then 10 cm of cork. The mean temperature within the store is maintained at -18°C and the mean temperature of the outside surface of the wall is 18°C. Calculate the rate of heat transfer through the wall. The appropriate thermal conductivities are for brick, concrete and cork respectively 0.69, 0.76 and 0.043 $Jm^{-1}s^{-1}$ oc^{-1}. Determine also the temperature at the interfaces between the concrete and cork layers and the brick and concrete layers. 7

4. a) Describe Sorption Isotherm & Sorption hysteresis. 5

   b) Describe how mono molecular layer of adsorbed water represent optimum moisture level in a dried food. 3

   c) Differentiate between adsorbed water and absorbed water. 2

5. a) Define evaporation? Design with neat sketch a single effect evaporation systems with useable equations. 4.5

   b) Define boiling point elevation. Compute the boiling point rise at a 15% Nacl solution at atmospheric pressure. Where gas constant 1.987 Btu/lbm °R, latent heat content 970 Btu/lbm, if any data missing assume gauge standard data. 3.5

   c) Define steam economy. Develop a relationship between moisture content wet basis and moisture content dry basis. 2

Section B

6. a) Define : Critical m.c, Equilibrium m.c, Constant rate drying period. 3

b) "desorption isotherm usually lies above the adsorption isotherm"—explain the statement. 2

7. a) What do you mean by Kinetic energy, Potential energy and Internal energy? 1.5

b) Why surface of plate heat exchanger is turbulent. 2

c) Baker's yeast is to be grown in a continuous fermentation system using a fermenter volume of 20 m^3 in which the flow residence time is 16 h. A 2% inoculum containing 1.2% of yeast cells is included in the growth medium. this is then passed to the fermenter, in which the yeast grows with a steady doubling time of 2.9 h. The broth leaving the fermenter then passes to a continuous centrifuge which produces a yeast cream containing 7% the yeast, 97% of the total yeast in the broth. Calculate the rate of flow of the yeast cream and of the residual broth from the centrifuge. 6.5

8. a) Differentiate between conventional dehydration & freeze dehydration. 3

b) An 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 and moves through the product bed at a velocity such that the convective heat transfer co-efficient is 50 Btu/hr.ft^2°F if the straw berries enter the tunnel at 40°F, Compute the refrigeration capacity of the freezer in ton of refrigeration. Assume, L =150 Btu/lbm, ρ=60 lbm/ft^3, a diameter of straw berry 0.5 in, K=1.2 Btu/hr. ft^2°F, P=$\frac{1}{6}$ & R=$\frac{1}{24}$ for sphere shaped product. 7

9. a) Define enthalpy latent heat, sensible heat and specific heat, Write down the Newton's law of cooling. 3

b) Derive the equation of overall heat transfer co-efficient. 3

c) Draw and label of a spray drier and describe the operation of this dryer to produce instant milk powder. 4

10. a) Describe briefly how water activity effects the microbial stability, enzymatic reactions & lipid oxidation of foods. 4

b) Write short note on any three of the following: 3×2=6

(i) Freezer burn

(ii) Refrigerant

(iii) Air blast freezer

(iv) Tunnel dryer

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 2nd Year 1st Semester Final Examination - 2012
Subject: Applied Nutritional Science (Theory)
Course Code: ANS-201 (T)

Full Marks: 70 **Time: 3 Hours**

Figure in the right margin indicate full marks.
(Answer **Five** questions from each section of which question no. **1 & 7** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section A

(Answer **Five** questions where question no. **1** is compulsory)

1. (a) Define Nutrition & Malnutrition. 2
   (b) Briefly describe the nutritional requirement of a pregnant mother. 5

2. (a) Define Antenatal Care. 1
   (b) Write down the objectives of postnatal care. 2
   (c) Briefly describe the care during antenatal period. 4

3. (a) What is Low Birth Weight (L.B.W)? What are the risk factors of Low Birth Weight? 1.5×2
   (b) Write down the long term consequence of L.B.W in human life. 4

4. (a) Give the nutritional comparison between breast milk & cow's milk. 2
   (b) What are the advantages of Breastfeeding? 2
   (c) Briefly discuss the importance of colostrums on child health & development. 3

5. (a) What is IYCF? What are the principles of IYCF? 1+2.5
   (b) Define Weaning & Supplementary Feeding. Write down the types of supplementary foods that are used for children. 2+1.5

6. (a) What is Nutrition Program? 2
   (b) Describe different programs taken by the Govt. of Bangladesh on nutrition throughout the country. 5

Section B

(Answer **Five** questions where question no. **7** is compulsory)

7. (a) Define Nutrition Education. 2
   (b) Explain the process of pretesting of nutritional knowledge among mass people. 5

8. (a) Write down the purpose & concept of Nutrition Education. 4
   (b) What factors should be considered to bring a change in food behavior? 3

P.T.O.

9. (a) What is General food distribution? 2
(b) Which factors should be considered to start a supplementary feeding programme? 2
(c) Give an example of adequate rations providing 2200 Kcal per person per day in emergency situation. 3

10. (a) Define demography. 1
(b) Illustrate demographic stages through which a country passes. 3
(c) Why do we study demography? What are the sources of demography? 1.5×2

11. (a) What do you know about Nutritional Survey and Surveillance? 2
(b) Classify intervention and non intervention study in doing research. 2
(c) What is reproductive health? Discuss reproductive health problems in Bangladesh as a developing country. 1+2

12. Write down short notes on the following ~ (Any two) 3.5×2
(a) Migration
(b) Crude Birth Rate & Total Fertility Rate.
(c) Sampling Methods.

Chittagong Veterinary and Animal Sciences University
BFST Second Year First Semester Final Examination, 2012
Course Title: Fundamentals of Food Engineering (Theory)
Course Code: FFE -201
Full Marks – 70, Time: 3 hours

(Figures in the right margin indicate full marks. Answer any [redacted] (4) questions from each section. Where question no. **1** and **6** are compulsory. Use separate answer scripts for each section. A Split answering is not allowed.)

Section-A

1. (a) Define Food Science, food engineering and food technology. 3.0
   (b) What are the aims of food Science and technology? 2.0

2. (a) What are the characteristics of food raw materials? 1.5
   (b) Describe in brief the different cleaning methods and write down the advantages and disadvantages of wet cleaning methods. 4.0
   (c) Write a note on grading parameters and grading methods. 1.5
   (d) Define cake filtration. Describe in brief the types of equipment used in food industry for size reduction. 3.0

3. (a) What is emulsification? Write the name of natural and synthetic emulsifying agent (3 of each) 4.0
   (b) Discuss briefly the principles and applications of membrane separation methods in food industry. 2.0
   (c) What are heat processing operations? How, heat applied to food? 4.0

4. (a) Write down the name of major commercial food preservation methods and objectives of commercial preservation of food. 3.0
   (b) What is sterilization? Describe the methods of sterilization used in food industry. 3.0
   (c) What is blanching? Why is it carried out? 2.5
   (d) Distinguish between drying and dehydration. 1.5

5. (a) What are ionizing radiations? How they are effective against in microorganisms? 3.0
   (b) Why irradiation process is called cold sterilization? Write down the effect of water activity on foods. 2.5
   (c) Define food spoilage? Write down the causes of spoilage of food: 2.5
   (d) Define hurdle technology. What is the effect of heat treatment on fats and oils? 2.0

Section-B

6. (a) How pH of food play an important role in canning? 2.0

   (b) What is 'Head space'? Describe importance of contact equilibrium process. 3.0

7. (a) Describe major components of a Double seam of tin can with figure. 3.0

   (b) Describe general graphical method of calculating process time using TDT Curve. 4.0

   (c) What is exhausting? Describe about the factors which affect the heat penetration in canned food. 3.0

8. (a) Give a flow chart of canning and retort classification. 3.0

   (b) Enumerate causes of spoilage of can. 3.0

   (c) What is 12D concept and why its knowing is important in processing. 3.0

   (d) Differentiate between D-value and TDT Curve. 1.0

9. (a) What is leaching? Explain the leaching system with triangular phase diagram with the location of different streams and equilibrium relationship. 4.0

   (b) Define extraction process and its importance and derive expression for the rate of extraction. 4.0

   (c) What is 'distillation' and fractionation? 2.0

10. Write short notes on any five of the following : 5X2=10

    (a) Pasteurization

    (b) Chilling plants.

    (c) Boiler for food plant

    (d) Flow of fluid food.

    (e) Gas absorption

    (f) Liquid liquid Extraction.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 2nd Year 1st Semester Final Examination - 2012
Subject: Computer Application in Food Technology (Theory)
Course Code: CSC-201 (T)

Full Marks: 70 **Time: 3 Hours**

Figure in the right margin indicate full marks.
(Answer **Four** questions from each section of which question no. **1 & 6** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section A

1. (a) What is structured Program? Is C a structured program? Justify your answer. 05

2. (a) Define constants. Classify the type of constants used in C programming. 05
   (b) Write a program to find out the grade of a student when the marks of 4 subjects are given. The methods of assigning grade is as 05

Per> =85	Grade=A
Per< 85 and Per>=70	Grade=B
Per<70 and Per>=55	Grade=C
Per<55 and Per>=40	Grade=D
Per<40	Grade=E

Here "Per" is Percentage;

3. (a) How much memory require for a float type data? 01
   (b) Write a C program that converts the given temperature in Fahren heit to celsius using the following formula $C=\frac{F-32}{1.8}$. 04
   (c) Distinguish between compiler and assembler. 02
   (d) Describe the two different ways to utilize the increment (++) and decrement (--) operators. 03

4. (a) Write a program to find whether a year is "leap year" or not using function. 05
   (b) What do you mean by library function? Write a program to convert lower case character to upper case character using library function. 04
   (c) Determine the following is valid or invalid string constant? State reason. "Name" 01

5. (a) Define recursive function and explain with an example. 03
   (b) How to calculate "Permutation" and "Combinations" using functions in C programming. 05
   (c) int i=8, j=5, K;
   Find the value of K from the expression K=(j>0)? j:0 01
   (d) Determine the following is valid or invalid integer constant? State reason. 01

0900

Section B

6.	(a)	Distinguish between "getchar" and "seanf" function.	02
	(b)	What do you mean by looping? Write a program using "switch" statement that will take a number from keyboard and cheek whether it is EVEN or ODD.	03
7.	(a)	Describe "else-if" ladder with example	02
	(b)	What is the purpose of the do-while statement? How does it differ from the while statement.	03
	(c)	Why "break" and "continue" statement are used?	02
	(d)	What is function? State advantages to the use of user –defined functions.	03
8.	(a)	What is the primary advantage to using a data file?	01
	(b)	Write a program how to find the maximum and minimum numbers in an array.	04
	(c)	What will be the advantages of using pointer? Explain the use of pointer with an example.	03
	(d)	What are the differences between "call by value" and "call by reference"? Give example.	02
9.	(a)	What is structure? How does a structure differ from array?	03
	(b)	How to declare a file and explain the types of mode available in file.	05
	(c)	Differentiate between "algorithm" and "flowchart".	02
10.	(a)	How to "Open" and "Close" a file. Explain with an example.	03
	(b)	What are the major differences between "Identifiers" and "Variables"?	03
	(c)	Write a C program that read three integer numbers from user and prints the largest of them.	04