Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 1st Year 2nd Semester Final Examination 2012
Subject: Inorganic Chemistry (Theory)
Course Code: ICM-102

Full Marks: 55 **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 is pH? What is the molar concentration of $[H^+]$ of a neutral solution? 01
   b) Describe the general definition of acids and bases. 02

2. a) Describe the Lewis concept of acids and bases. 03
   b) Why the aqueous solution of NaCl is neutral where as that of $AlCl_3$ is acidic? 03
   c) Which of the following is stronger acid and why? HF and HI. 02

3. a) What safety measures do you take in the laboratory? 03
   b) Deduce the Beer-Lambert law and discuss its applications. 03
   c) Write the theory of Spectrophotometry and colorimetry. 02

4. a) What is meant by a buffer solution? Discuss with a suitable example, the mechanism of buffer action. 04
   b) Calculate the pH of 0.1 M solution of (i) CH_3COOH and (ii) H_2SO_4 02
   c) How does a pH indicator function? Explain with suitable example. 02

5. a) Give some point of difference of oxidation number and valency. 03
   b) Complete and balance the equation 05

   $Na_2S_2O_3 + KMnO_4 +$ ---------- $\rightarrow MnO_2 + H_2SO_4 +$ ----------

Section: B

6. a) Identify and count the number of bond of $Ag(NH_3)_2Cl$. 02
   b) What is chemical bond? Mention the main types of chemical bond. 02

7. a) Define primary standard substance with suitable example. 02
   b) Differentiate between atomic emission and absorption spectroscopy. 03
   c) What is chromatography? Discuss the principle of thin layer chromatography. 03

8. a) Define with example of co-ordination covalent bond. 03
   b) Describe the properties of covalent compounds. 03
   c) Define Vander-waals force. 02

9. a) Describe the relation between the degree of dissociation and concentration. 05

b) Determine if the following solution are acidic, basic or neutral 03

(i) Na_2CO_3 and (ii) $CuSO_4$

10. a) Explain the sentence "Oxidation and reduction occur together" based on electronic concept. 04

b) Define with example of oxidation and reduction based on classical concept. 04

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 1st Year 2nd Semester Final Examination 2012
Subject: Human Biology
Course Code: HBL-102

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

Figures in the right margin indicate full marks.
(Answer **5 (FIVE)** questions from each section where question no. **1** and **7** are compulsory. Use separate answer script for each section. Split answer is not allowed)

Section: A

1.	a)	Cell is the basic unit of life. Explain.	3
	b)	Sketch out the structure of a human cell and write down the biological functions of nucleus.	4
2.	b)	Define Blood.	1
	b)	What are the constituents of blood?	1
	c)	Differentiate between plasma and serum.	2
	d)	Write down the functions of R.B.C and W.B.C.	3
3.	a)	What do you mean by blood coagulation?	2
	b)	Explain the mechanism of blood coagulation in human.	3
	c)	How the blood groups under 'ABO ' type are classified?	2
4.	a)	Give the comparison between artery and vein.	2
	b)	Write down the name of a vein which carries oxygenated blood.	1
	c)	What is blood pressure? Discuss the factors that regulate blood pressure.	1+3
5.	a)	Draw and label the structure of heart.	3
	b)	What are the functions of valves?	2
	c)	What is heart sound and what are the types of it?	2
6.	a)	What do you mean by respiration and inspiration?	2
	b)	What is normal respiration rate?	1
	c)	Sketch the diagram of exchange of gases from body tissue to lungs.	4

Section :B

7.	a)	Define tissue.	2
	b)	Write down the functions of connective tissue and nervous tissue.	4
	c)	What is the basic functional unit of nervous system?	1
8.	a)	What is hormone? Classify hormone according to chemical nature.	1+2
	b)	Briefly describe the hormonal regulation during pregnancy	4
9.	a)	What are the primary sex organs of male and female?	2
	b)	What is puberty?	1
	c)	Draw and label human spermatozoa.	2
	d)	Write down the functions of placenta.	2
10.	a)	Sketch out the alimentary tract.	4
	b)	Write down the functions of liver.	3
11.	a)	Describe the role of kidney to regulate the body fluid, electrolyte and water balance.	6
	b)	What is the basic functional unit of kidney?	1
12.		Write down short note on the following topics –	~~3×4~~
	a)	Functional organization of human body	3.5×2
	b)	Spermatogenesis and it's hormonal control	

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST First Year Second Semester Final Examination, 2012
Subject: Biochemistry (Theory)
Course Code: BCM-102 (T)

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

(Figures in the right margin indicate full marks. Answer three questions from each section. Questions 1 and 5 are compulsory. Use separate answer script for each section)

SECTION: A

1.	a.	Define biomolecules. Write down the major complex biomolecules of cells with bond, building block and major functions.	4
	b.	Write down the structure, functions and sources of two biochemically important disaccharides.	3
	c.	What is reducing sugar? Give an example of monosaccharide with structure. Show the anomeric carbon, asymmetric carbon and primary alcohol of this sugar.	3
	d.	What do you mean by isomerism?	1
2.	a.	What is enzyme? List the characteristic features of enzyme as catalyst.	3
	b.	Write down the differences between competitive and non-competitive inhibitions.	2
	c.	Briefly describe the different types of enzyme specificity with examples.	4
	d.	Write down short notes on: (i) Peptide bond; (ii) BUN and (iii) Zymogen	3
3	a.	What is rancidity? Mention the causes of rancidity of fat? Why vegetable oil is more stable than animal fat?	3
	b.	Define lipids. Classify lipids with suitable examples.	3
	c.	Write down the structure of the following compounds: (i) Triacylglycerol and (ii) Lecithin	2
	d.	Define: (i) Saponification; (ii) Acid value; (iii) Iodine value and (iv) RM value	4
4.	a.	What are nucleic acids? Differentiate between nucleosides and nucleotides.	4
	b.	Discuss the main points of difference between DNA and RNA.	4
	c.	Define replication. Show in figure how a daughter DNA is formed from a parental DNA.	4

SECTION: B

5.	a.	Discuss two evidences to show that an ES-complex is formed during the course of an enzyme catalysed reaction.	3
	b.	Explain the Koshland model for enzyme catalysed reaction.	4
	c.	What is meant by enzyme regulation? Discuss feedback inhibition with examples.	2
	d.	What is the significance of Km?	2
6.	a.	Define the following terms: (i) Amino acid; (ii) Peptide; (iii) Polypeptide and (iv) Protein	4
	b.	Write down the name and structure of amino acids having; (i) an indole ring; (ii) a disulfide bond; (iii) an imidazole ring and (iv) a branched chain	4
	c.	What is zwitter ion and isoelectric point? Write down the zwitter ion form of phenylalanine.	4
7.	a.	Define glycolysis. Give the reaction catalyzed by the following enzymes: (i) Hexokinase; (ii) Pyruvate dehydrogenase and (iii) α-ketoglutarate dehydrogenase	4
	b.	Why is stored glycogen known as fuel reserve?	2
	c.	What is HMP shunt? Write down the significance of this pathway.	3
	d.	Why primates and guinea pigs cannot synthesis ascorbic acid in the body?	2
	e.	Define the following terms: (i) Codon and (ii) Genetic code	1
8.		Write short notes on any three:	4×3=12
	a.	Mutarotation of sugar	
	b.	Catecholamines	
	c.	Lipoproteins	
	d.	Titration curve of any amino acid with its significance	

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 1st Year 2nd Semester Final Examination, 2012
Subject: Introductory Computer Science (Theory)
Course Code: ICS-102 (T)

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

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

SECTION: A

1.	a.	Calculate the difference: 1100101001 – 110110110	2
	b.	Add the following binary number 101111.11 and 11111.10	2
	c.	What do you mean by 1's complement and 2's complement method?	1
2.	a.	Classify computers with example.	2
	b.	What are the main components of modern computer?	3
	c.	What are the basic functions of operating system(OS)?	3
	d.	Windows or Unix which one you think the most popular operating system of the world - Why?	2
3.	a.	What do you mean by data, information and codes?	2
	b.	What is meant by computer generation? Describe the characteristics of the fifth generation computers?	4
	c.	Draw the diagram and truth table of two-input OR gate. What do you understand by Basic gate and Universal gate?	4
4.	a.	Write the differences between Data bus and Address bus.	2
	b.	Software brings the machine life - Explain.	4
	c.	What are the differences between serial and parallel interfaces?	2
	d.	"CPU is commonly termed as computer brain" - Why?	2
5.	a.	What is modem? Write down the functions of different types of modem.	4
	b.	How does the computer accept input from the keyboard? Explain with proper diagram.	6

SECTION: B

6.	a.	Convert to hexadecimal from $101101001011 10_{(2)}$	2.5
	c.	Convert $101.1101_{(2)}$ to its decimal equivalent.	2.5
7.	a.	Draw and label the working mechanism of a laser printer.	6
	b.	What is RAM? How does it differ from ROM?	2
	c.	How does a hard drive preserve data for a long period of time?	2
8.	a.	Write short notes on (any two) i) PROM, EPROM and EEPROM ii) Impact printer and non Impact printer iii) CISC and RISC	4
	b.	What is disk formatting?	2
	c.	List some optical storage devices. How data is read from a CD-ROM?	4
9.	a.	Compare DOS, WINDOWS and LINUX in a tabular form.	3
	b.	What is utility software? Write short notes on File Defragmentation.	5
	c.	State and salient features of a CRT, LCD and LED monitor.	2
10	a.	What is network topology? Discuss shortly three basic topologies (Bus, Ring and Star)	5
	b.	List four benefits of using a network. Differentiate between LANs and WANs.	5

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 1st Year 2nd Semester Final Examination 2012
Subject: Fundamentals of Food Engineering
Course Code: FFE-102

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

(Figures 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) Differentiate among Food Science, Food Engineering and Food Technology. 3.0
   b) Write the basic procedures applicable in to the food process engineering. 2.0

2. a) What are preparative operations in food industry? 2.0
   b) Write notes on: 5.0
      i. Magnetic cleaning
      ii. Electrostatic cleaning
      iii. Ultrasonic cleaning
      iv. Photometric sorting
      v. Grading parameters
   c) Differentiate between sorting and grading. What are the reasons for sorting of food materials before processing? 3.0

3. a) What are emulsifying agents? How do they function? 2.0
   b) What are heat processing operations? How is heat applied to food? 4.0
   c) What is size reduction and reduction ratio? Give a typical size reduction flow sheet. 3.0
   d) What is the effect of heat treatment on carbohydrate and protein 1.0

4. a) Classify food preservation methods on the basis of mode of action and write down the principles of food preservation. 4.0
   b) What do you mean by" Bio-reactor" and "Fermenter"? How can a bioreactor be operated? 3.0
   c) Differentiate among Drying, Dehydration, Distillation and Evaporation. 2.0
   d) Write down the uses of fluidized bed drier and spray drier. 1.0

5. a) Classify foods on the basis of perishability and acidity with examples 3.0
   b) What are the direct and indirect effects of radiation? Why irradiation process is called cold sterilization? 4.0
   c) How can you minimise the indirect effects of irradiation process? 1.0
   d) Write down the safety and wholesomeness of irradiated foods. 2.0

Section-B

6. a) What is fractionation? 2.0
   b) Name and explain the factors that determine the heat penetration capacity to sterilize a canned food. 3.0

7. a) Write down the principle of canning. 2.0
   b) Write down the various unit operations involved in canning of fruits and vegetables. Briefly mention the objectives of exhausting and processing steps of the canning process. 4.0
   c) What are the types of spoilage associated with canned food and mention their prevention. 4.0

8. a) What is liquid-liquid extraction and write down the principle of contact equilibrium process. 3.0
   b) A counter current extraction system is being utilized to extract oil from 1000lbm soybeans per hour. The system is to be designed to extract oil from soybeans with 18% oil and provide 40% oil in the extract solution leaving at 800lbm per hour. If the weight of extract solution in the solids leaving the system is equal to 50% of the weight of solids, compute the composition of the stream containing solids leaving the first stage and the composition of solvent entering stage 1. (Assume missing data if any) 7.0

9. a) Show material balance in contact equilibrium process by utilized separation column. 3.0
   b) What is solid-liquid extraction? Describe different types of extraction process. 3.0
   c) Differentiate between misbranding and adulteration. 2.0
   d) Describe about major parts of a retort. 2.0

10. a) Describe fabrication of tin can with figure. 2.0
    b) Write short notes on any four of the following- 2*4=8
       i. Newtonian fluid
       ii. Sterilization
       iii. F-value and Fo value
       iv. Boiler
       v. Z-value and D-value

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST 1st Year 2nd Semester Final Examination- 2012
Subject: Mathematics-II
Course Code: MTH-102

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

Figures in the right margin indicate full marks.
Answer **4 (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 a differential equation and its solution? Obtain the differential equation of the family of curves of $y = ae^{2x} + be^{-2x}$ .Hence write down the degree and order of the differential equation. 5

2. a) Find the general solution of (any two): $3 \times 2 = 6$

   i) $x^2 dy + y(x + y)dx = 0$

   ii) $(2x + y + 3)dy = (x + 2y + 3)dx$

   iii) $2(y - 4x^2)dx + xdy = 0$

2. b) During a chemical reaction ,substance A is converted into substance B at a rate that is proportional to the square of the amount of A. When t=0, 60 grams of A are present and after 1 hour, only 10 grams of A remain unconverted. How much of A is present after 3 hours? 4

3. a) Find the orthogonal trajectories of the family of circles passing through (0,2) and (0,-2) 4

   b) Solve the following differential equations(any two): $3 \times 2 = 6$

   i) $(D^2 + 1)y = \cos 2x \text{ where } D = \frac{d}{dx}$

   ii) $(D^3 - D^2 - 6D)y = 1 + x^2$

   iii) $(D^2 - 2D + 1)y = xe^x \sin x$

4. a) What do you know about the dot and cross product of two vectors? Find the angle between the vectors $\hat{i} + \hat{j} + \hat{k}$ and $\lambda^2\hat{i} - 2\lambda\hat{j} + \hat{k}$. For what value of λ will the vectors be perpendicular? 5

   b) Prove that the curl of the gradient of a scalar function and the divergence of the curl of a vector are zero. 5

5. a) Show that the Laplace's equation $\nabla^2\phi = 0$ satisfies the potential $\phi = \frac{1}{r}$ where $r^2 = x^2 + y^2 + z^2$. 5

b) Evaluate $\iint_s (y^2 z\vec{i} + y^3\vec{j} + xz\vec{k})\,dA$ here S is the boundary of the cube defined by $-1 \le x \le 1, -1 \le y \le 1 and 0 \le z \le 2$. 5

Section B

6. a) Discuss the geometrical interpretation of the trapezoidal rule. 3

b) What is the limitation of Lagrange interpolation? 2

7. a) The following data give the values of pressure and specific volume of super heated steam 5

V	2	4	6	8	10
P	105	42.07	25.30	16.70	13

Find the rate of change of pressure with respect to volume when V=2.

b) Using Newton-Raphson's iteration formula find a solution of $\cos x - x = 0$ 5
correct upto 4 decimal places.

8. a) Given that $f(x) = x + x^2$ for $-\pi \le x \le \pi$ 5+2=7

i)find the fourier expression of f(x) and

ii)deduce that $\frac{\pi^2}{6} = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + ...$

b) Write down the advantages of Fourier series. 3

9. a) Discuss a method for finding an approximate area under a given curve. 5

b) Applying trapezoidal and Simpson's 1/3 rule to find the value of the integral 5

$\int_0^1 \sqrt{1 - x^2}\,dx$ correct upto 4 decimal places.

10. a) Define divided differences. Show that divided differences are symmetric. 5

b) Using the following table find f(x) as a polynomial in 5

x	-1	0	3	6	7
f(x)	3	-6	39	822	1611

Also find the value for x=4.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
FST First Year Second Semester Final Examination, 2012
Subject: Physics-II (Theory)
Course Code: PHC-102 (T)

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

(Figures in the right margin indicate full marks. Answer **4(FOUR)** questions from each section. Questions **1** and **6** are compulsory. Use separate answer script for each section)

SECTION: A

1. a. State Lenz's law. 1
   b. Define coherent sources, curie temperature and magnetic susceptibility. 3
   c. Draw a RC circuit. 1

2. a. State Huygen's principle. 2
   b. For any two consecutive bright or dark fringes show that fringe width $X = \frac{\lambda D}{d}$. 7
   c. Define optical activity. 1

3. a. State, explain and prove Brewster's law. 5
   b. Distinguish between interference and diffraction. 3
   c. Define Plane of vibration and plane of polarization. 2

4. a. State and explain Kirchhoff's law. 4
   b. Establish the relationships of equivalent resistance of a series and parallel connection of resistors. 6

5. a. How can you distinguish para, ferro and diamagnetic substances? 4
   b. State Faraday's law. 2
   c. Deduce an expression for self inductance of a solenoid. 4

SECTION: B

6. a. Draw a symbol of pnp and npn transistor. 2
   b. Write down the special theory of relativity. 2
   c. Write down the formula for relativistic variation of mass. 1

7. a. Write down the three assumptions of Bohr atom model. 3
   b. What is the photoelectric effect? How this was explained by Einstein? 4
   c. Find out the threshold wavelength for a tungsten surface whose work function is $7.2 \times 10^{-19} J$ (where Planck's constant is $6.63 \times 10^{-34} Js$). 3

8. a. Deduce an expression for Decay law of radioactive elements and hence obtain an expression for half-life. 4 + 2 = 6
   b. Distinguish between inertial and non-inertial frame of references. 2
   c. What are the postulates of special theory of relativity? 2

9. a. Define majority carriers with figures. 2
   b. Discuss the working principle of pnp transistor. 4
   c. With circuit diagram describe how diode acts as a rectifier. 4

10 a. What are p-type and n-type semi-conductors? 2
   b. Write down the Lorentz transformation equations and the condition for which Lorentz transformations approach to Galilean. 3
   c. By direct applications of Lorentz transformation show that $x^2 + y^2 + z^2 - c^2t^2$ is invariant. 5