Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st Year 2nd Semester Final Examination, 2014
Subject: Introductory Computer Science
Course Code: ICS-102(T)

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

(Figures in the right margin indicate full marks. Answer **any 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. Write short notes on :   2.5+2.5=5
   a) Volatile and Non-volatile memory
   b) Impact printer and Non-impact printer

2. a) Differentiate between flat-file databases and relational databases.   3
   b) Describe Client-Server database. Write two reasons why need data normalization.   7

3. a) Write the truth table and logic gate of EXOR gate and NAND gate.   2
   b) Distinguish between hardware and software.   3
   c) Convert $39.B816_{16}$ and 101010.10_2 to its decimal equivalent.   2
   d) Using 5-bits for representing numbers perform 12-14 subtraction by 2's   1.5
      complement method.
   e) Write the relation among data, information and codes.   1.5

4. a) Define application software and system software.   2
   b) Write the characteristics with example   3
      i)   Mainframe computer
      ii)   Super computer
   c) Explain how data is stored on the surface of magnetic and optical disks.   5

5. a) What is computer networking? Name different types of computer networks and   5
      briefly explain their characteristics.
   b) Explain the terms: network topology, links and network protocols.   3
   c) Mention some common uses of computer networks.   2

Section-B

6. a) Describe the memory hierarchy with a diagram.   2
   b) Simplify the following expression using k-map: 3
   $$MN\bar{R}\bar{S} + \bar{M}NS + \bar{N}\bar{R}S + \bar{M}N\bar{S} + (\overline{M+N})$$

7. a) Describe the functions of a microprocessor with the help of a flowchart.   5
   b) Draw the block diagram of an ALU and its relation to control and memory units. 5
      Compare between primary and secondary memory.

8. a) Define operating system. Discuss the basic functions of operating system.   4
   b) How the operating system communicates with CPU?   4
   c) Distinguish between data bus and address bus.   2
9. a) What is programming language? Write the advantages of high level programming 4
      languages.
   b) Distinguish between machine language, assembly language and high level   4
      language.
   b) Distinguish between compiler and Interpreter.   2

10. a) "Software brings the machine life"-Explain.   3
    b) How can you avoid RSIs (Repetitive Stress Injuries) while working with you   3
       keyboard and mouse?
    c) Draw a simplified block organization of a PC showing the system bus, adapter 4
       ports, main memory, microprocessors and other items.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st Year 2nd Semester Final Examination, 2014
Subject: Inorganic Chemistry (Theory)
Course Code: ICM-102

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

(Figures in the right margin indicate full marks. Answer **Four (04)** questions from each section where questions **1 and 6** are compulsory. Use separate answer script for each section. Split answer is discouraged).

Section-A

1.   a) What type of bonding do you expect between atoms of the same element?   1
    b) "Solid NaCl does not conduct electricity whereas molten NaCl does"- Explain the reason.   2
    c) Calculate the oxidation number of Cr in $Na_2Cr_2O_7$ and Mn in MnO_4^- 2

2.   a) Distinguish between ionic and covalent compounds.   4
    b) Why are metals good conductors of heats and electricity?   3
    c) Mention the types of chemical bonding appear in the following compounds- $MgCl_2$, CH_4, H_2O_2 3

3.   a) "Redox reaction occurs by together"- Explain by electronic concept.   4
    b) Balance the following reaction: 4
       $K_2Cr_2O_7 + KI + H_2SO_4 \rightarrow Cr_2(SO_4)_3 + I_2$
    c) Write down the significance of oxidation number   2

4.   a) What is indicator?   2
    b) Discuss the mechanism of colour change by indicator in acid–base reactions.   5
    c) Give some uses of buffer solution.   3

5.   a) Give the formulae of methyl orange and methyl red.   2
    b) Explain atomic hydrogen and nascent hydrogen.   3
    c) Describe the manufacturing process of hydrogen using electrolysis process.   5

Section-B

6. Derive Henderson-Hasselbalch equation for basic buffer solution.   5

7.   a) Write down some uses of He and Ar.   4
    b) Give a brief account of isolation of inert gases from liquid air by fractional distillation process.   6

8.   a) What are the sources of Magnesium?   2
    b) How Na_2O_2 is produced commercially? Explain.   3
    c) Give a brief account of the production of NaOH by Nelson cell   5

9.   a) Classify the compounds of carbon.   2
    b) Give some uses of phosphoric acid.   2
    c) Write down the comparison between chamber and contact sulfuric acid.   3
    d) Describe cascade process of concentrating sulfuric acid.   3

10. Explain the following (any four)   10
    i. H_2O is liquid while H_2S is gas at room temperature.
    ii.   Rare gases are chemically inert.
    iii.   Sodium is stored (kept) in kerosene.
    iv.   The inside surface of a glass bottle containing NaOH becomes dull.
    v. CO_2 is a gas while SiO_2 is a solid of high melting point.

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(Figures in the right margin indicate full marks. Answer any **03 (three)** 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.   Define asymmetric carbon? How many asymmetric carbon atoms present in open chain structure of glucose? Discuss the importance of carbohydrate in food science?   1+1+2=4
    b.   How are carbohydrate classified? What is osazone? Why glucose, fructose and mannose form the same osazone?   2+3=5
    c.   "Life is composed of lifeless chemical molecules"- explain this statement.   2

2. a.   Define protein? Classify protein on the basis of shape and size, and their functional properties?   5
    b.   What is peptide bond? Give three evidences that peptide bond present in protein?   3
    c.   What are the forces responsible for structure of protein? Briefly describe the secondary structure of protein?   4

3. a.   What are essential fatty acids? Mention their function.   1+3=4
    b.   Discuss the following, that are used for the characterization of fats and oils: 2+2=4
             i) Iodine number   ii) Acid number
    c.   Explain-"Why HDL is more beneficial than LDL for human health?"   2
    d.   Briefly discuss the biological role of lipid.   2

4. a.   Define the following: i) Coenzyme   ii) Isoenzyme   iii) Active site   iv)Enzyme inhibition   2
    b.   Discuss the nomenclature of enzyme? Write down the difference between Lock and key model, and ~~Fischer template model?~~ Induce fit model?   2+2=4
    c.   Discuss the effect of substrate concentration and temperature on the activity of enzymatic reaction?   4
    d.   What do you mean by specificity of enzyme? Give examples of different types of enzyme specificity?   2

Section-B

5. a.   Calculate the number of moles of ATP produce in the complete oxidation of one mole of valeric acid?   4
    b.   What do you mean by anaplerotic reaction? Give two examples of it.   3
    c.   Indicate the entry point of glycogen into the main stream of glycolysis? Write down the payoff phase of glycolysis?   4

6. a.   Define metabolism? Distinguish between catabolism and anabolism? Enumerate the major pathway of carbohydrate metabolism.   4
    b.   What is the common end product of carbohydrate, protein and fat metabolism? Describe the energy yielding steps of citric acid cycle.   4
    c.   Define biogenic amine? Give the reaction of urea cycle that occurs in cytoplasm?   4

7. a.   Write down the role of carnitine in lipid metabolism?   3
    b.   Why glycogen store as a fuel reserve in your body? Write down the significance of HMP pathway?   4
    c.   Write down the irreversible steps of glycolysis? Calculate the total number of ATP in aerobic glycolysis?   3+2=5

8.   Write down the short notes on (any three):   4×3=12
             a. Cori cycle   b. DNA replication
             c. Protein denaturation   d. Glycogenolysis

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st Year 2nd Semester Final Examination, 2014
Subject: Mathematics-II
Course Code: MTH-102(T)

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

(Figures in the right margin indicate full marks. Answer **any Five (5)** questions from each section. Use separate answer script for each section. Split answer is discouraged.)

Section-A

1. a) What do you mean by a differential equation and its solution?   2
   b) Let y(t) be the unknown. Identify the order and linearity of the following equations: 5
   - i) $(y + t)y' + y = 1$
   - ii) $3y' + (t + 4)y = t^2 + y''$
   - iii) $y''' = \cos(2ty)$
   - iv) $y^{(4)} + \sqrt{t}y''' + \cos t = e^y$

2. a) Classify the differential equation and give example of each class.   3
   b) Verify that $y(t) = 10 - ce^{-t}$ with c a constant is a solution to $y' + y = 10$ 4

3. c) Consider the equation   4

   $$(2x + y) + (x + 2y)y' = 0$$

   - i)   is it exact?
   - ii)   If yes, find the solution with the initial condition y(1)=1

   b) Solve the following differential equation: 3
   $$\frac{dy}{dx} + y \sec x = \tan x$$

4. a) Water at temperature 100^0 C cools in 10 minutes to 88^0 C in a room temperature 25^0 C. Find the temperature of water after 20 minutes.   4
   b) Solve the following higher order differential equations(any one)   3
   - i) $(D^2 - 5D + 6)y = e^x \cos 2x$
   - ii) $(D^3 + 1)y = 3 + e^{-x} + 5e^{2x}$

5. a) Define gradient, divergence and curl.   2
   b) Find the volume of parallelopiped if $\bar{A} = -3\hat{\imath} + 7\hat{\jmath} + 5\hat{k}, \bar{B} = -3\hat{\imath} + 7\hat{\jmath} - 3\hat{k}$ and $\bar{C} = 7\hat{\imath} - 5\hat{\jmath} - 3\hat{k}$ are the three co-terminous edges of the parallelopiped.   3
   c) If $\varphi = 2xz^4 - x^2y$ find $\nabla\varphi$ and $|\nabla\varphi|$ at the point (2,-2,-1).   2

6. a) If a force $F = 2x^2y\hat{\imath} + 3xy\hat{\jmath}$ displaces a particle in the xy plane from (0,0) to (1,4) along a curve $y = 4x^2$, Find the workdone.   3
   b) Prove that $\varphi = \frac{1}{r}$ is a solution of $\nabla^2\varphi = 0$ 4

Section B

7. a) Explain the following terms with figure   5
   - i)   Periodic function
   - ii)   Even function
   - iii)   Odd function
   b) Write down the Fourier coefficients of a Fourier series.   2

8. a) Consider the function
$$f(x) = \begin{cases} -\pi & ; -\pi < x < 0 \\ x & ; 0 < x < \pi \end{cases}$$

     i)   Sketch f(x)

     ii)   Find its Fourier series.

9. a) Derive Newton-Raphson method for solving the equation f(x) using geometrical method.   3

     b) Show that $x^5 - 5x + 1 = 0$ a has a root in the interval [0,1]. Apply Newton-Raphson method to obtain an estimate of this root. Give your answer to 3 decimal places.   4

10. a) Define interpolation.   2

     b) Calculate the finite differences for the following data: 5

x	1	2	3	4	5	6
g(x)	3.2	12.8	28.4	50.2	77.9	111.6

Use Newton's forward difference formula to estimate the value of g(1.5)

11. a) Show that divided differences are symmetric in their arguments.   3

     b) The following table is given   4

x	0	1	2	3	4
f(x)	3	6	11	18	27

What is the form of the function f(x)?

12. a) Discuss the geometrical significance of the trapezoidal rule.   2

     b) Evaluate $\int_1^2 \frac{e^{-x}}{x}$ with h=0.2 using suitable numerical integration formula. Also compute the error bound.   5

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Section-A

1 a) Define Food, Food Engineering and Food Science. Write down the probable functioning scope of food technology.   5

2. a) Differentiate between sorting and grading.   1
    b) How consecutive type screens sort food products?-explain.   4
    c) With figure describe two types of dry cleaning methods.   5

3. a) Write what you know about kinetics of reactions occurring in processed foods.   5
    b) Prove that ,$Z=(19.15/Ea).T_A^2$ 5

4. a) Define D value, F values, F_o value and Z value.   4
    b) Narrate the principle of canning with proper definition of canning.   3
    c) Compute the first–order rate constant where following data were obtained from a thermal resistance experiment conducted on a spore suspension at 112^0 C-   3
    Time(min)------------------No. of survivors

Time(min)	No. of survivors
0	10^6
4	1.1×10^5
8	1.2×10^4
12	1.2×10^3

5. a) Write short notes on following terms: (i) Thermodynamic potential, (ii) Entropy.   5
    b) Describe the properties of raw materials for food processing.   5

Section -B

6. Give short notes on :(i) Pasteurization & Sterilization, (ii) Homogenization & Blanching.   5

7. a) What types of spoilage can be occurred in a can? –Describe briefly.   4
    b) Give a flow chart of canning of pine-apple with major functions of each unit operation.   6

8. a) Illustrate a generalized food processing plant.   3
    b) A food product is being packaged in a 6 mill polythene film. Since the product is sensitive to oxidation, the rate of oxygen diffusion through the film is being calculated. Due to the reaction of the product with O_2, the O_2 partial pressure within the package will be maintained at 0.03 atm. Calculate the mass flux where diffusivity of O_2 through polythene at 25^0 C is obtained 0.17 cm^2/sec and partial pressure of O_2 is 0.21 atm.   4
    c) Highlight the principles and methods of food preservation.   3

9. a) Define mixing with classification.   2
    b) What do you know about emulsion? How emulsifying agents work during emulsion process?   5
    c) Describe a size reduction machine where attrition force is applied.   3

10. a) Give a list of nature of forces that are used in size reduction operation.   2
    b) Develop a usuable form of Kick,s law and Rittinger,s law.   4
    c) If 12 hp is required to reduce a quantity of material from 0.25 inch to 0.08 inch. How much energy would be required if reduction were 0.04 inch. Use both Kick,s & Rittinger,s law.   4

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Section-A

1. a) State Faradays law and Lenz's law for electromagnetic induction and hence show 3 that electromagnetic induction is a consequence of principle of conservation of energy.
    b) What do you mean by the term "Coherent sources"? State Kirchhoff's law on 2 distribution of current.

2. a) For any two consecutive bright or dark fringes, show that fringe width $\aleph = \frac{\lambda D}{d}$, 4 where the symbols have their usual meanings.
    b) A parallel beam of light of wavelength $6 \times 10^{-5} cm$ is incident on a thin glass 3 plate of refractive index 1.5 such that the angle of incident into the plate is 60^0. Calculate the smallest thickness which will appear dark by reflection.
    c) In an experiment with Fresnel's biprism, fringes for light of wavelength 5890 A° 3 are observed 0.2 mm apart at a distance of 100 cm from the prism. The prism is made of glass of refractive index 1.5 and it is at a distance of 20 cm from the illuminated slit. Calculate the obtuse angle of the biprism.

3. a) What is drift speed? Derive an expression for the drift speed of electron in a 4 conductor.
    b) Calculate the electric field strength at a point along the perpendicular bisector of 4 the line joining of an electric dipole.
    c) "Electric force between two particles is stronger than gravitational force between 2 those two particles"-Explain.

4. a) Derive Lorentz transformation equations. Show that Galilean transformation is a 7 special case of Lorentz transformation.
    b) A spacecraft is moving relative to the earth. An observer on the earth finds that 3 according to his clock, 3601 sec elapse between 1 PM and 2 PM on the spacecraft's clock. What is the spacecraft's speed relative to the earth?

5. a) What do you understand by a semi-conductor? Discuss some important properties 2 of semi-conductors.
    b) What do you mean by the concept "Hole current" for semi-conductors? Give the 4 mechanism of hole current flow in a semi-conductor.
    c) What is a pn junction? Explain the formation of potential barrier in a pn junction. 4

Section-B

6. a) Establish a relationship between radioactive half-life and decay constant. 2
    b) Write down the assumptions of Bohr model. 2
    c) What do you mean by wave-particle duality? 1

7. a) Define inertial and non-inertial frames. 2
    b) Explain the phenomenon of length contraction. 3
    c) Discuss, on the basis of theory of relativity, the equivalence of mass and energy 5 deriving the relation E= mc² where the symbols have their usual meanings.

8.   a) Show that, for two reflected rays to form Newton's Rings, the apparent path 4 difference between them is $x = 2\mu d\cos r$. where the symbols have their usual meanings.

      b) Green light of wavelength 5100 A^0 from a narrow slit is incident on a double slit. 3 If the overall separation of 10 fringes on a screen 200 cm away is 2 cm, find the slit separation.

      c) In a Newton's rings experiment, the diameter of the 15th ring was found to be 0.590 3 cm and that of the 5th ring was 0.336 cm. If the radius of the Plano-convex lens is 100 cm, calculate the wavelength of light used.

9.   a) Draw the circuit diagram of RC circuit. Obtain an expression for charging and 4 discharging through the capacitor of RC circuit.

      b) Derive an expression for magnetic field intensity of a solenoid wound in a close- 4 packed helix and carrying current i.

      c) What is photoelectric effect? Explain how this has been explained by Einstein. 2

10. a) Draw the energy band diagram for intrinsic and extrinsic semiconductors. 2

      b) Draw and explain the V-I characteristics of a pn junction. 4

      c) Draw the symbol of npn and pnp transistor and specify the leads. Explain the 4 operation of an npn transistor as an amplifier.