

(Figures in the right margin indicate full marks. Answer all the questions from each section. Split answer is discouraged.)

SECTION-A

1. Correct the following sentences if they are incorrect. If the sentence is correct, just copy it. 5
 - a) The Dhaka University is one of the biggest university of the Bangladesh.
 - b) Had I been a moneyed man, I would have travelled around the world.
 - c) Day by day students are getting used to use internet as a source of learning.
 - d) It is long since I had visited my little village.
 - e) My father likes to read newspaper every morning while my mother used to do exercise.

2. Change the following sentences as directed. 5
 - a) Everybody knows that man is mortal. (make it passive)
 - b) They invented the art of giving Christmas present (make it passive)
 - c) "Leave the place at once" said the teacher (change speech)
 - d) Once i asked a sweet Little girl, "What is your mother's name? (change speech)
 - e) Karim said to Abir, "Did you see the sky?" (change speech)

3. Most of the students waste their free time by either keeping bad company or watching TV while they can do various productive and creative activities in their leisure time. Now, write a letter to the editor of an English daily suggesting how students can utilize their free time. 7

SECTION-B

4. Complete the following sentence: 5
 - a) Since he committed a crime,
 - b), as if the boy knew everything.
 - c) Unless we reduce environmental pollution,
 - d) If you want to stay healthy,
 - e) With a view to prospering in life,

5. Write a paragraph on the following : 5

Internet as a source of learning Or Gender equality

6. Read the Passage bellow and answer the questions that follow: 8

Ant Intelligence

When we think of intelligent members of the animal kingdom, the creatures that spring immediately to mind are apes and monkeys. But in fact the social lives of some members of the insect kingdom are sufficiently complex to suggest more than a hint of intelligence. Among these, the world of the ant has come in for considerable scrutiny lately, and the idea that ants demonstrate sparks of cognition has certainly not been rejected by those involved in these investigations.

Ants store food, repel attackers and use chemical signals to contact one another in case of attack. Such chemical communication can be compared to the human use of visual and auditory channels (as in religious chants, advertising images and jingles, political slogans and martial music) to arouse and propagate moods and attitudes. The biologist Lewis Thomas wrote, 'Ants are so much like human beings as to be an embarrassment. They farm fungi, raise aphids* as livestock, launch armies to war, use chemical sprays to alarm and confuse enemies, capture slaves, engage in child labour, exchange information ceaselessly. They do everything but watch television.'

However, in ants there is no cultural transmission - everything must be encoded in the genes - whereas In humans the opposite is true. Only basic instincts are carried in the genes of a newborn baby, other skills being learned from others in the community as the child grows up. It may seem that this cultural continuity gives us a huge advantage over ants. They have never mastered fire nor progressed. Their fungus farming and aphid herding crafts are sophisticated when compared to the agricultural skills of humans five thousand-years ago but have been totally overtaken by modem human agribusiness.

Or have they? The farming methods of ants are at least sustainable. They do not ruin environments or use enormous amounts of energy. Moreover, recent evidence suggests that the crop farming of ants may be more sophisticated and adaptable than was thought.

Ants were farmers fifty million years before humans were. Ants can't digest the cellulose in leaves - but some fungi can. The ants therefore cultivate these fungi in their nests, bringing them leaves to feed on,

and then use them as a source of food. Farmer ants secrete antibiotics to control other fungi that might act as 'weeds', and spread waste to fertilize the crop.

It was once thought that the fungus that ants cultivate was a single type that they had propagated, essentially unchanged from the distant past. Not so. Ulrich Mueller of Maryland and his colleagues genetically screened 862 different types of fungi taken from ants' nests. These turned out to be highly diverse: it seems that ants are continually domesticating new species. Even more impressively, DNA analysis of the fungi suggests that the ants improve or modify the fungi by regularly swapping and sharing strains with neighboring ant colonies.

Whereas prehistoric man had no exposure to urban lifestyles - the forcing house of intelligence - the evidence suggests that ants have lived in urban settings for close on a hundred million years, developing and maintaining underground cities of specialized chambers and tunnels.

When we survey Mexico City, Tokyo, Los Angeles, we are amazed at what has been accomplished by humans. Yet Hoelldobler and Wilson's magnificent work for ant lovers, *The Ants*, describes a super colony of the ant *Formica yessensis* on the Ishikari Coast of Hokkaido. This 'megalopolis' was reported to be composed of 360 million workers and a million queens living in 4,500 interconnected nests across a territory of 2.7 square kilometers.

Such enduring and intricately meshed levels of technical achievement outstrip by far anything achieved by our distant ancestors. We hail as masterpieces the cave paintings in southern France and elsewhere, dating back some 20,000 years. Ant societies existed in something like their present form more than seventy million years ago. Beside this, prehistoric man looks technologically primitive. Is this then some kind of intelligence, albeit of a different kind?

* Aphids: small insects of a different species from ants

Research conducted at Oxford, Sussex and Zurich Universities has shown that when desert ants return from a foraging trip, they navigate by integrating bearings and distances, which they continuously update their heads. They combine the evidence of visual landmarks with a mental library of local directions, all within a framework which is consulted and updated. So ants can learn too.

And in a twelve-year programme of work, Ryabko and Reznikova have found evidence that ants can transmit very complex messages. Scouts who had located food in a maze returned to mobilize their foraging teams. They engaged in contact sessions, at the end of which the scout was removed in order to observe what her team might do. Often the foragers proceeded to the exact spot in the maze where the food had been. Elaborate precautions were taken to prevent the foraging team using odour clues. Discussion now centers on whether the route through the maze is communicated as a 'left- right sequence of turns or as a 'compass bearing and distance' message.

During the course of this exhaustive study, Reznikova has grown so attached to her laboratory ants that she feels she knows them as individuals - even without the paint spots used to mark them. It's no surprise that Edward Wilson, in his essay, 'In the company of ants', advises readers who ask what to do with the ants in their kitchen to: 'Watch where you step. Be careful of little lives.'

Do the following statements agree with the information given in Reading Passage?

In your answer sheet, write:

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- (i) Ants use the same channels of communication as humans do.
- (ii) Ants can build large cities more quickly than humans do.
- (iii) In one experiment, foraging teams were able to use their sense of smell to find food.
- (iv) The essay, 'In the company of ants' explores ant communication.

Complete the summary using the list of words, A-O, below.

Ants as farmers

Ants have sophisticated methods of farming, including herding livestock and growing crops, which are in many ways similar to those used in human agriculture. The ants cultivate a large number of different species of edible fungi which convert (v) into a form which they can digest. They use their own natural (vi) as weed-killers and also use unwanted materials as (vii) Genetic analysis shows they constantly upgrade these fungi by developing new species and by (viii)..... species with neighboring ant colonies.

- | | | | |
|-----------------|----------------|------------------|----------------|
| A. aphids | E. energy | I. growing | M. secretions |
| B. agricultural | F. fertilizers | J. interbreeding | N. sustainable |
| C. cellulose | G. food | K. natural | O. environment |
| D. exchanging | H. Fungi | L. other species | |

(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) Show that the work done per unit volume in straining a body is equal to $\frac{1}{2} \times \text{stress} \times \text{strain}$. 3
- b) State and explain Hooke's law. 2
2. a) Define modulus of rigidity. Derive an expression, $\eta = \frac{Y}{2(1 + \sigma)}$, where the symbols have their usual meanings and also show that $\frac{9}{Y} = \frac{3}{\eta} + \frac{1}{K}$ 7
- b) Two parallel and opposite forces each 400N are applied tangentially to the upper and lower faces of a cubical metal block 25 cm on a side. Find the angle of shear and the displacement of the upper surface relative to the lower surface. The shear modulus for the metal is 8 G Pa. 3
3. a) Explain the term 'viscosity' and hence define the coefficient of viscosity. 2
- b) Derive Poiseuille's equation $\eta = \frac{\pi p r^4}{8 l v}$, where the symbols have their usual meanings 6
- c) What is critical velocity? 2
4. a) What are the forms of energy involved when a liquid in motion? - Explain. 2
- b) What are the stream line and turbulent motions? 3
- c) State the Stokes law of viscosity. Water flows through a horizontal capillary tube of 1 mm internal diameter and length 70 cm under pressure of a column of water 30 cm in height. Find the rate of flow of water through the capillary tube. Viscosity of water is $10^{-3} \text{ N} - \text{s} / \text{m}^2$. 5
5. a) Show that the surface energy per unit area is numerically equal to the surface tension per unit length. 3
- b) Show that the excess of pressure across a curved liquid surface is $T(\frac{1}{R_1} + \frac{1}{R_2})$ 4
- c) A pilot tube is fixed on the wing of aeroplane to measure the speed of the aeroplane. The tube contains a liquid of density 800 kg/m^3 . The difference in level between the two limbs is 0.5 m. Density of air is 1.293 kg/m^3 . Calculate the speed of the aeroplane. 3

Section-B

6. a) State Kirchhoff's law of radiation. 2
- b) What do you mean by thermal conductivity? Write down its unit. 3
7. a) Define isothermal, adiabatic and isobaric processes. 3
- b) State and explain the first law of thermodynamics. 2
- c) Applying the first law of thermodynamics, establish the following relation for a reversible adiabatic process, $C_p - C_v = R$ 5
where the terms have their usual meanings.

8. a) What is meant by Carnot's cycle? Show that the efficiency of Carnot's engine using an ideal gas as the working substance is 6

$$\eta = 1 - \frac{T_2}{T_1}$$

where T_1 and T_2 are the temperatures of the source and sink respectively.

- b) A Carnot engine whose temperature of the source is 400K takes 200 calories of heat at this temperature and rejects 150 calories of heat in this sink. What is the temperature of the sink? Calculate the efficiency of the engine. 4

9. a) Show that 1-D differential equation of wave motion $\frac{d^2 y}{dt^2} = v^2 \frac{d^2 y}{dx^2}$, 5

where the symbols have their usual meanings.

- b) Define simple harmonic motion. Show that the total energy of the vibrating particle is constant at any instant. 5

10. a) Derive from elementary principles an expression for the velocity of sound in air (Newton's formula) with Laplace's correction. 4

- b) Discuss analytically the formation of beats and show that the number of beats per second is equal to the difference in frequency of the two notes. 6

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 1st Year 1st Semester Final Examination, 2017

Subject: Mathematics-I

Course Code: MTH-101(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 strongly discouraged.)

Section-A

1. a) Define Skew-symmetric matrix and Orthogonal matrix. Show that 3
- $$A = \frac{1}{3} \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{pmatrix}$$
- is an orthogonal matrix.
- b) 4
- Find the inverse of the matrix A, where $A = \begin{pmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{pmatrix}$
2. 7
- A diet is to include at least 150 miligrams of vitamin A and at least 160 miligrams of vitamin B. These requirements can be obtained from two types of food. Type X contains 12 miligrams of vitamin A and 24 miligrams of vitamin B per pound. Type Y contains 28 miligrams of vitamin A and 14 miligrams of vitamin B per pound. If type X food costs \$10 per pound and type Y food costs \$12 per pound, how many pounds of each type of food should be purchased to satisfy the requirements at the minimum costs?
3. a) Define Domain and Range of a function. Obtain the domain and range of the following 3
- functions.
- i) $f(x) = \frac{4x}{x^2 + 2x - 6}$
- ii) $g(x) = \frac{|x|}{2x}$
- b) 2
- Evaluate $\lim_{x \rightarrow 0} \frac{2 \cos^2 x}{1 + \sin x}$.
- c) 2
- Find $\frac{dy}{dx}$ when $y = x^x + \sin x \ln x$.
4. a) Calculate the critical point, inflection point and concavity of the function 3
- $$f(x) = x^3 - 3x^2 + 1.$$
- b) Define Taylor's series and Maclaurin's series. Expand the function $f(x) = x^3 - 10x^2 + 6$ 4
- about $x = 3$.
5. 7
- A closed top cylindrical container is to hold a volume of 1.875 litres. The material used for the top and bottom parts of the container costs twice as much per unit area as the material used for the cylindrical tube. Find the dimension of the most economical container.
6. a) State the chain rule for derivatives. At what rate is the volume of a box changing if its 4
- length is 8 ft and increasing at 3 ft/s, its width is 6 ft and increasing at 2 ft/s and height is 4 ft and increasing at 1 ft/s?
- b) Obtain the second order partial derivatives of $f(x, y) = x^2 y^3 + x^4 y$. 3

Section-B

7. a) State Walli's formula. 1
 b) Integrate the following(any two) 6
- i) $\int \frac{1}{x \cos^2(\log x)} dx$
- ii) $\int_0^{2a} \sqrt{2ax - x^2} dx$
- iii) $\int_0^{\frac{\pi}{2}} \log \tan x dx$
8. a) Define Beta and Gamma function. Show that $\Gamma(n+1) = n\Gamma(n) = n!$ 4
 b) Determine if the following integral is convergent or divergent. If it is convergent find its value. 3
- $\int_{-\infty}^{\infty} xe^{-x^2} dx.$
9. Give the geometrical interpretation of $\int_a^b f(x) dx$. Determine the area of the region 7
 bounded by $y = 2x^2 + 10$, $y = 4x + 16$, $x = -2$ and $x = 5$.
10. a) Evaluate the double integral I, where 2

$$I = \int_1^3 \int_0^2 x^2 y^3 dx dy$$
- b) Find the volume of the solid generated by the revolution of an ellipse round its major axis is $\frac{4\pi ab^3}{5}$ 5
11. a) Define direction cosine and direction ratios of a line. Show that 5

$$l = \pm \frac{a}{\sqrt{a^2 + b^2 + c^2}}, m = \pm \frac{b}{\sqrt{a^2 + b^2 + c^2}} \text{ and } n = \pm \frac{c}{\sqrt{a^2 + b^2 + c^2}}$$
 where l, m, n indicate the direction cosines and a, b, c indicate the direction ratios of a line.
- b) Find the direction cosines of the line passing through the points (-2, 4, -5) and (1, 2, 3). 2
12. Define the Shortest Distance (SD) between two lines. Show that the shortest distance 7
 between two lines
- $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4},$
- $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ is $\frac{1}{\sqrt{6}}$
- and that its equation is $11x + 2y - 7z + 6 = 7x + y - 5z + 7 = 0.$

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Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 1st Semester Final Examination, 2017
Subject: Introductory Human Nutrition
Course Code: IHN-101

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any five (5) questions from each section. Split answer is strongly discouraged.)

Section-A

1. a) Define the terms 'nutrient' and 'nutrition'. 2
b) Sketch and discuss the conceptual framework of malnutrition adopted by UNICEF. 5
2. a) Define malnutrition. 2
b) What do you mean by macronutrient and micronutrient? Why they are called so? 3
c) Why under-5 children are more vulnerable than adults for developing malnutrition? 2
3. a) How do micronutrient deficiencies affect the life cycle? 5
b) Mention the sources and recommended dietary allowance (RDA) of fat soluble vitamins, Ca, and iodine for a pregnant mother. 2
4. a) What is maternal protein energy malnutrition? 2
b) How does maternal micronutrient malnutrition jeopardize infant growth and development? 5
5. a) Write down nutritional needs of adolescent girl. 4
b) Discuss the different physiological changes occurred among adolescent boys and girls. 3
6. a) What is exclusive breast feeding? 2
b) Write down the advantages of breast feeding. 5

Section-B

7. a) What is colostrum? 2
b) "Colostrum is the first immunization of a baby"- explain this statement. 5
8. a) What do you mean by low birth weight? 2
b) Explain the long term consequences of low birth weight in different stages of life. 5
9. a) List the steps of successful breast feeding. 4
b) Indicate the feeding methods of infants. 3
10. a) Give the definition of preterm, term and post-term baby. 2
b) Write down the nutritional composition between breast milk and cow's milk. 5
11. a) What are the consequences of starting weaning too early or too lately among children under two years of age? 2
b) What is complementary feeding? Write down the principle of complementary feeding. 5
12. a) Narrate the fetal origins of disease hypothesis. 5
b) Mention the nutritional sources for LBW infants. 2

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 1st year 1st Semester Final Examination, 2017

Subject: Elementary Food Science

Course Code: EFS-101

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. Split answer is strongly discouraged.)

Section-A

1. a) What is food science? Mention the contribution of food science in our daily life. 2+3
2. a) What are the organic chemical groups that compose carbohydrates? How are carbohydrates classified according to the presence of those groups? 1+2
b) What are the main biological functions of carbohydrates? 3
c) Classify carbohydrate with example. 4
3. a) What are the elements of protein? What is the structure of a protein? 1+2
b) Classify protein based on their nutritional quality with examples. 3
c) Write the functions of protein. 4
4. a) Enlist the essential and non-essential amino acids. Why they are called so? 3+1
b) What is albumin? Where we can get it? Differentiate among albumin, glycoprotein and peptones. 3
c) Define enzyme and hormone with their functions. 3
5. a) Define fat with their chemical composition. 3
b) Differentiate between saturated and unsaturated fatty acids. Why saturated fatty acids are bad for health? 2+2
c) Write the benefits of poly-unsaturated fatty acids with their food sources. 3

Section-B

6. Why water is important for our body? What is metabolic water? How can we get it? 3+1+1
7. a) What is vitamin? Why is it important to human health? 2+3
b) Write the chemical name and common food sources of followings 1x5
i. Vitamin A iv. Vitamin E
ii. Vitamin C v. Vitamin B₂
iii. Vitamin B₉
8. a) What is mineral? Classify it with example. 2
b) Write the biological functions, food sources and daily requirements of the following 4x2
minerals:
i. Calcium ii. Sodium iii. Iron iv. Phosphorus
9. a) What are phytochemical? How phytochemicals help prevent diseases? 1+3
b) What do you mean by chronic energy deficiency? What are the causes of it? 1+2
c) Explain linear growth retardation. Write the phases of linear growth. 1+2
10. Write short notes on-
i. Categories of natural pigments 4
ii. Anti nutrients 3
iii. Food festival 3

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 1st Semester Final Examination, 2017
Subject: Inorganic Chemistry (Theory)
Course Code: ICM-101

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any four (04) questions from each section where question no. 1 and 6 are compulsory. Use separate answer scripts for each section. Split answers are strongly discouraged.)

Section-A

1. Explain Drude and Laurentz theory of metallic bond. 5
2. a) Write down the application of oxidation number. 2
b) Redox reaction occurs by together-Explain. 3
c) Balance the following reaction: 5
$$\text{K}_2\text{Cr}_2\text{O}_7 + \text{KI} + \text{H}_2\text{SO}_4 \longrightarrow \text{Cr}_2(\text{SO}_4)_3 + \text{I}_2 + \dots\dots\dots$$
3. a) Explain the electronic theory of chemical bond. 3
b) Find out the chemical bonds present in the following compound: 3
 NH_4Cl , KBF_4 and $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
c) Explain why ice floats in water? 2
d) What are Vander Waals forces? What are the sources of this bond? 2
4. a) What is Hydrogen bonding? 2
b) Explain inter and intra molecular Hydrogen bonding. 2
c) Write down the significance of Hydrogen bonds. 2
d) Explain variable electrovalency and variable covalency. 4
5. a) What do you mean by pH? Explain the temperature dependency of pH. 3
b) Derive Henderson-Heselbalch equation in case of acidic buffer solution. 4
c) Briefly describe the significance of pH. 3

Section-B

6. Explain why 5
a) The melting point of NaCl is greater than MgCl_2 .
b) Briefly describe electron affinity pattern of group VIIA elements.
7. a) Why metallic sodium does not occur in free in nature? 2
b) Explain the thermal stabilities of group of IA and group IIA metal carbonate. 4
c) What is the diagonal relationship of lithium and magnesium? 2
d) What are brine, soda ash, caustic soda and bleaching powder? 2
8. a) Show with examples that aluminium is amphoteric in nature. 3
b) CO_2 is gas at room temperature but SiO_2 is solid, why? 2
c) SiCl_4 can be hydrolysis but CCl_4 cannot be hydrolysis, why? 3
d) Which ions are more stable of the following ion pair: 2
(i) Pb^{2+} , Pb^{4+} and
(ii) Sn^{2+} , Sn^{4+}
9. a) Give an account of compounds of carbon. 3
b) Discuss the relationship between Hydrogen and alkali metals. 3
c) Briefly describe the production of Hydrogen by electrolysis process. 4
10. a) Write down some uses of magnesium and aluminium. 4
b) Describe the separation technique of individual inert gases from liquid air by fractional evaporation process. 6

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 1st year 1st Semester Final Examination, 2017

Subject: Human Biology

Course Code: HBL-101

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. Split answer is strongly discouraged.)

Section-A

1. a) Define controlling system. Illustrate the properties of control system with figure. 1+4
2. a) Define hormone and enzyme. 2
b) What are the sources of endocrine hormone? Briefly describe their major functions. 6
c) What are the major enzymes secreted from the stomach? 2
3. a) List the component of cell. Write the composition and functions of cell membrane. 1+4
b) Enumerate the physiological importance of mitochondria and golgi body. 2.5x2
4. a) What are the parts of alimentary tract? 2
b) Write down the major functions of stomach. 3
c) Classify tissues of human body. Briefly discuss the connective and muscle tissues. 1+4
5. a) What are the main difference between plasma and serum? 2
b) Define prothombin time and clot time. What are the factors involve in blood clotting? 2+1
c) Why totals body weight of women is lower than the men? Explain the renal body fluid feedback mechanism of regulation of water balance in human body. 1+4

Section-B

6. a) Define fick's law of gas diffusion. What are the steps involve in respiration? 2+3
7. a) Why the pituitary gland called the master gland? Enlist the hormones that are secreted from pituitary gland with their functions. 2+3
b) Construct the mode of actions of hormone. 5
8. a) List the parts of human kidney. 2
b) Define nephron, micturition and glomerular filtration rate. 3
c) Give a brief outline of urine formation, concentration and acidification. 5
9. a) Level the organs of respiratory system with their functions. 5
b) Suppose a person losses so much blood due to an accident. His blood pressure drops from 120 mmHg to 100 mmHg. In the absence of regulatory mechanism the blood pressure would have possibly dropped to 60 mmHg. Calculate his regulation factor and gain. 5
10. Write short notes on
i. Immunity 2.5
ii. Blood group 2.5
iii. Regulation of heart pumping 5