

Department of Leather Engineering
Khulna University of Engineering & Technology
B.Sc. Engineering 1st Year 2nd Term Examination, 2019
Ph 1219
Physics

Time: 3 Hours.

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if any missing.

SECTION-A

- 1(a) What is forced vibration? Derive an expression for average maximum power absorption due to forced vibration. 15
- 1(b) Derive the expressions for logarithmic decrement and displacement resonance. 10
- 1(c) A particle of mass 2 gm is free to vibrate under the action of an elastic force of 128 dyne/cm and a damping force of 8 dyne-sec/cm. A periodically varying outside force of maximum value 275 dynes is applied to the particle. Find the frequency for displacement resonance and velocity resonance. 10
- 2(a) Discuss adiabatic and isothermal transformation. 06
- 2(b) Discuss kinetic interpretation of temperature. 08
- 2(c) Distinguish between elastic and plastic materials. Explain the terms elastic limit and breaking stress. 12
- 2(d) A quantity of air at 40°C and 76 cm of mercury is suddenly expanded to twice its volume under adiabatic conditions. What will then be its temperature? If its temperature is allowed to rise again 20°C, what will be its pressure? ($\gamma=1.40$). 09
- 3(a) Discuss Carnot cycle. Derive an expression for efficiency in terms of temperature of the source and the sink. 13
- 3(b) Define entropy. What is its physical significance? Show that the entropy increases in an irreversible process. 12
- 3(c) Find the change in entropy when 1 gm of ice at 0°C is gradually changed to 1 gm of dry steam at 100°C at 1 atmospheric pressure. Assume latent heat of fusion of ice at 0°C = 80 Cals/gm; specific heat of water between 0°C and 100°C = 1, and latent heat of steam at 100°C = 540 cal/gm. 10
- 4(a) Explain the terms: (i) Spontaneous emission (ii) Absorption emission and (iii) Stimulated emission. 12
- 4(b) Derive the rate equation of two level laser system and hence show that a two-level laser system is not suitable for optical pumping. 14
- 4(c) A steel wire of diameter 1mm supports load which is sufficient to keep the wire taut at 20°C. Calculate the additional load that will be required to restore the length of the wire to its initial value when the temperature falls to 0°C. 09

SECTION-B

- 5(a) What is interference? Show that the distance between two consecutive dark or bright fringes are equal and its value is $\beta = \frac{\lambda D}{d}$. 13
- 5(b) What do you mean by diffraction and resolving power of a grating? Show that $\frac{\lambda}{d\lambda} = nN$. Where the symbols have their usual meanings. 12
- 5(c) A biprism is placed 5 cm from a slit illuminated by sodium light ($\lambda = 5890 \text{ \AA}$). The width of the fringes obtained on a screen 75 cm from the biprism is 9.424×10^{-2} cm. What is the distance between the two coherent sources? 10
- 6(a) What do you mean by photoelectric current? Explain the laws of photoelectric effect. 12
- 6(b) What is Compton effect? Derive an expression for change in wavelength when a photo is colloid with a free electron. 15
- 6(c) Calculate the De-Broglie wavelength of an electron whose speed is 9×10^7 m/sec. 08
- 7(a) What is X-ray? Discuss the properties of X-rays. 08
- 7(b) Show that electron cannot stay in the nucleus but it can stay in an atom. 10
- 7(c) Explain orbital magnetic moment of an electron. 07
- 7(d) Draw the planes with the following indices in a cubic unit cell: (2 0 0), (1 0 0), (0 1 2), (2 0 1) and (1 0 1). 10
- 8(a) What is chain reaction? Explain construction and working principle of a nuclear reactor. 13
- 8(b) What do you mean by packing fraction and nuclear binding energy? Draw a binding energy curve. What information is obtained from such a curve? 12
- 8(c) The half-life of 1 gm sample of ${}_{38}^{90}\text{Sr}$ against beta decay is 28 years calculate the decay constant, rate of radioactive disintegration and mean life. 10

Department of Leather Engineering
Khulna University of Engineering & Technology
 B. Sc. Engineering 1st Year 2nd Term Examination-2019
Organic Chemistry
 Ch 1219

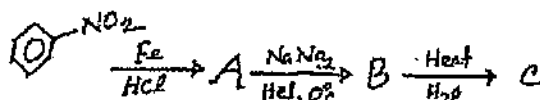
Time: 3 Hours.

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
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SECTION-A

- 1(a) Write down the common synthesis route of cresol and 2-naphthol. 10
 1(b) Identify A, B and C. 06

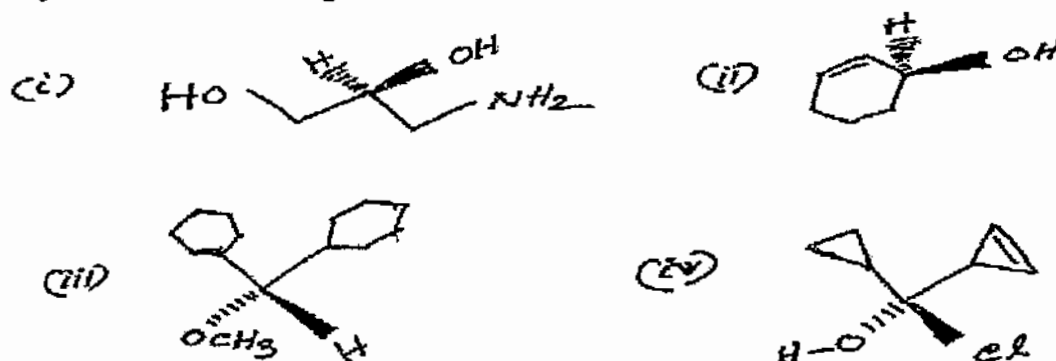


- 1(c) Write a short notes on: 12
 i. Kolb's reaction ii. Gattermann reaction and iii. Reimer Tiemann reaction.
 1(d) How do you explain high melting and boiling points of phenol? 07
 2(a) How can you differentiate 1°, 2°, and 3° amine from each other's? 10
 2(b) How will you synthesis: 09
 i. Benzene ii. Iodobenzene and iii. Benzoic acid from benzenediazonium salt?
 2(c) Explain why aniline is less basic then methyl amine. 08
 2(d) What is coupling reaction? Explain with the help of an example. 08
 3(a) How are carbohydrates classified? 08
 3(b) What is mutarotation? Explain the mutarotation of glucose. 11
 3(c) How will you distinguish between glucose and sucrose? 06
 3(d) Write Kiliani Fischer Synthesis for ascending the series of aldoses. 10
 4(a) Why glucose and fructose give the same osazone? 08
 4(b) Discuss the structure and uses of cellulose. 09
 4(c) What are reducing and non-reducing sugars? Give one example of each. 08
 4(d) How will you prove that glucose has a ring structure? 10

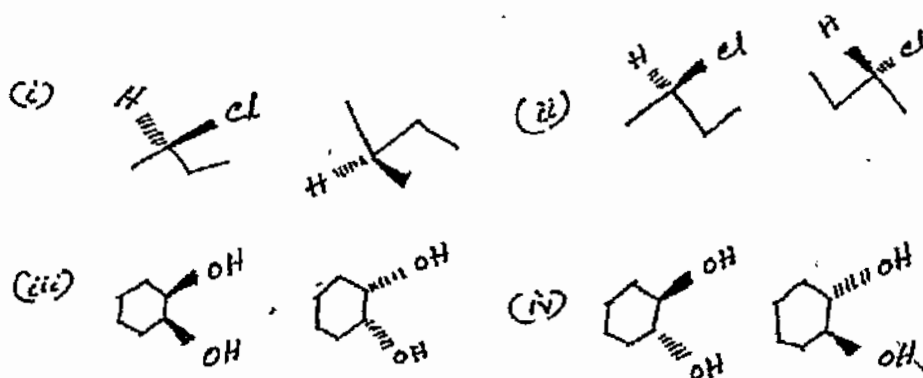
SECTION-B

- 5(a) What is quantum number? State the relation between quantum mechanics and atomic orbitals. 10
 5(b) What is bond order? What information will you get from bond order? 09
 5(c) Draw the shape of possible orbitals with n=3 and l= 2. 10
 5(d) Draw the orbital structure of ethylene. 06

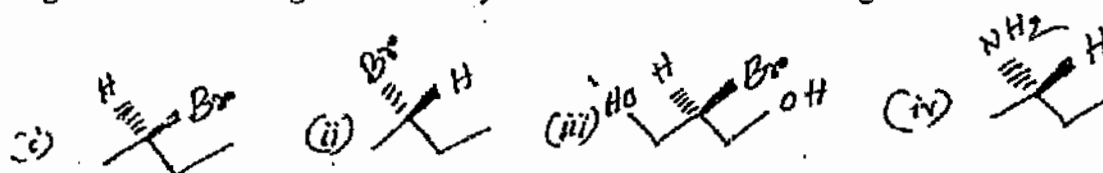
- 6(a) Indicate the type of hybridization of each carbon atom in the following structures: 10
 i. $\text{H}_3\text{C}-\text{CH}_3$ ii. $\text{H}_3\text{C}-\text{C}\equiv\text{C}-\text{CH}_3$ iii. $\text{H}_2\text{C}=\text{C}=\text{CH}_2$ iv. $\text{CH}_3-\text{C}\equiv\text{N}$ v. $\text{CH}_3-\text{O}-\text{CH}_3$
- 6(b) How would you account for the fact that while CH_4 and CCl_4 have no dipole moment, CHCl_3 has dipole moment? 08
- 6(c) Draw the geometrical isomers of the following compounds (if any): 06
 i. 1, 2- dimethylcyclopropane ii. 3- hexene and iii. 2- bromo -1- chloropropene.
- 6(d) Give the general mechanism of nucleophilic addition reactions of carbonyl compounds. 11
- 7(a) Arrange the stability of carbonium ion from the following- 06
 CH_3^+ , $(\text{CH}_3)_2\text{CH}^+$, CH_3CH_2^+ , $(\text{CH}_3)_3\text{C}^+$
- 7(b) Explain the mechanism of E_1 and E_2 reaction with suitable common reaction. 10
- 7(c) Write down the comparison between SN^2 and SN^1 -reactions. 09
- 7(d) Discuss the mechanism of chlorination of methane. 10
- 8(a) What is absolute configuration? Write down the differences between enantiomers and diastereomers. 11
- 8(b) Identify each of the following molecules as chiral or achiral. 08



- 8(c) Mark the relationships between the following structures as either "same", "enantiomers" or "diastereomers" 08



- 8(d) Designate the R/S configuration for any chiral centre in the following. 08



Department of Leather Engineering
Khulna University of Engineering & Technology
 B.Sc. Engineering 1st Year 2nd Term Examination-2019
Math 1219
Mathematics II

Time: 3 Hours.

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
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 iii) Assume reasonable data if any missing.

SECTION-A

- 1(a) Define order and degree of a differential equation. Find the differential equation of $y = A + B \log x + C (\log x)^2 + 3x^2$, where A, B, and C are arbitrary constants. 13
- 1(b) Define trajectory. Find the orthogonal trajectories of the family of coaxial circles $x^2 + y^2 + 2gx + c = 0$, where g is an arbitrary constant and c is a fixed constant. 13
- 1(c) Solve $\frac{dy}{dx} = \sin(x - y) + \cos(x - y)$. 09
- 2 Answer any three of the followings: 35
- (a) Solve the differential equation $\frac{dy}{dx} = \frac{x + 2y - 3}{2x + y - 3}$.
- (b) Solve $\frac{dy}{dx} + \frac{y}{2x} = \frac{x}{y^3}$.
- (c) Solve $(2xy^4e^y + 2xy^3 + y)dx + (x^2y^4e^y - x^2y^2 - 3x)dy = 0$.
- (d) Solve $(x^2y - 2xy^2)dx - (x^3 - 3x^2y)dy = 0$.
- 3 Answer any three of the followings: 35
- (a) Solve $(D^2 - 4D + 4)y = 3x^2e^{2x}\sin 2x$
- (b) Solve $(D^2 + 4D + 5)y = e^{-2x}\sec x$
- (c) Solve $x^2D^2y - 3xDy + 5y = x^2\sin(\log x)$
- (d) Solve $(D^2 - 3D + 2)y = x + \sin 3x + e^{2x}$, where $D = \frac{d}{dx}$ is the differential operation.
- 4(a) Solve $\{(3x + 2)^2D^2 + 3(3x + 2)D - 36\}y = 3x^2 + 4x + 1$ 12
- 4(b) Solve the one-dimensional heat equation $\frac{\partial u}{\partial t} = h^2 \frac{\partial^2 u}{\partial x^2}$, subject to the boundary conditions $u(0, t) = u(l, t) = 0$, $t \geq 0$, l being the length of bar and $u(x, 0) = F(x)$, $0 < x < l$. 23

SECTION-B

- 5(a) Remove the first degree terms in $3x^2 + 4y^2 - 12x + 4y + 13 = 0$. 10
- 5(b) Transform the equation $11x^2 + 24xy + 4y^2 - 20x - 40y - 5 = 0$ to rectangular axes through the point $(2, -1)$ and inclined at an angle $\tan^{-1}(4/3)$. 10
- 5(c) Transfer $7x^2 + 12xy - 2y^2 - 2x + 4y - 7 = 0$ to its standard form and hence find the equation of axes. 15
- 6(a) Find the coordinate of $(-3, 4, -5)$ in cylindrical and spherical polar coordinates. 10
- 6(b) Find the shortest distance between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$, $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$. Find also equation and the points in which it meets the given lines. 15
- 6(c) Define direction cosines and direction ratios. Find the value of the sum of the squares of the direction cosines of a line. 10
- 7(a) Find the equation of the plane which bisects the acute angle between the planes $x + 2y - 2z + 5 = 0$ and $2x - 3y + 6z - 3 = 0$. 12
- 7(b) Find the equation of the plane through the line $\frac{x-2}{3} = \frac{y-3}{5} = \frac{z}{7}$ and passing through the points $(1, -2, 3)$. 13
- 7(c) Find the equation of the plane through the points $(1, -2, 2)$, $(-3, 1, -2)$ and perpendicular to the plane $2x + y - z + 6 = 0$. 10
- 8(a) Find the equations of the line perpendicular to both the line $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z+2}{3}$, $\frac{x+2}{2} = \frac{y-5}{-1} = \frac{z+3}{2}$ and passing through their intersection. 17
- 8(b) Find the equation of the right circular cone with vertex $(1, -2, -1)$, semi-vertical angle 60° and the line $\frac{x-1}{3} = \frac{y+2}{-4} = \frac{z+1}{5}$ as its axis. 11
- 8(c) Test whether the points $(-2, 3, 7)$, $(1, 4, 3)$ and $(2, 5, 7)$ are collinear or not. 07

Department of Leather Engineering
Khulna University of Engineering & Technology
B. Sc. Engineering Ist Year Ist Term Examination-2019
Leather Manufacturing Technology I

LE 1101

Time: 3 Hours

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
 ii) Figures in the right margin indicate full marks.
 iii) Assume reasonable data if any missing.

SECTION-A

- | | | |
|------|---|----|
| 1(a) | Concisely discuss the consequential development of leather tanning. | 08 |
| 1(b) | Define: (i) Hide (ii) Kip and (iii) Leather | 06 |
| 1(c) | Sketch a hide or skin with proper identification. | 07 |
| 1(d) | Discuss in brief the sources of hides and skins. | 08 |
| 1(e) | If you are tannery owner how will you collect hide and skin during Eid-Ul-Azha? Explain. | 06 |
| 2(a) | Define histology and sectioning. Briefly discuss the sample preparation method for the histological study of raw hide/skin. | 12 |
| 2(b) | Sketch the cross-sectional view of hides and skins with appropriate indication. | 10 |
| 2(c) | Write down the major layer of hide/skin. Briefly discuss the cutis layer. | 07 |
| 2(d) | Write down the chemical structure of: (i) Glycine (ii) Cysteine and (iii) Hydroxyproline | 06 |
| (a) | Define collagen. Classify protein with their approximate percentage. | 07 |
| (b) | Explain the factors influence the quality of hide/skin. | 12 |
| (c) | Write short notes on: (i) Thermostat layer and (ii) OSP | 08 |
| (d) | Write down the grain pattern characteristics of buffalo and goat leather. | 08 |
| 4(a) | Define stunning, flaying, and slaughtering. | 06 |
| 4(b) | Define flayer. Describe the systematic method of flaying a small animal. | 07 |
| 4(c) | Identify the aiming points for stunning of cattle goat and pig with a figure. | 09 |
| 4(d) | Distinguish between ripping knife and flaying knife with a figure. | 05 |
| 4(e) | Classify flaying. Briefly discuss the machine flaying. | 08 |

SECTION-B

- | | | |
|------|--|----|
| 5(a) | Define surface tension. Describe the mechanism of wetting. | 11 |
| 5(b) | Explain the actions that you will take in the soaking process if the preserved hide/skin has endured severe moisture loss in preservation. | 05 |
| 5(c) | Define the following terms: (i) ILB value (ii) Baume Meter. | 04 |
| 5(d) | Write a short note on "Quick test" for defect identification. | 05 |
| 5(e) | Assume you are given a wet-salted cow hide during the summer season. Appearance: dirty, odor: offensive, preservation period: two weeks. Now formulate a recipe of soaking of the supplied material. | 10 |
| 6(a) | Write down the principles of grading. | 06 |
| 6(b) | Define: (i) Cuts (ii) Scores (iii) Corduroy | 03 |
| 6(c) | Briefly describe the cause, effect or quality and remedy of the following defects: (i) Red heat (ii) Grub damage (iii) Brand marks (iv) Dermatitis and (v) Hair slip. | 20 |
| 6(d) | Removal of hyaluronic acid is an objective of soaking - Explain. | 06 |
| 7(a) | Define leather defects. Write some precautionary steps to prevent post-mortem defects. | 09 |
| 7(b) | Write down some pros and cons of air drying in case of hides/skins. | 06 |
| 7(c) | Give a short definition or equilibrium moisture content. Suppose you are given a fresh goat "cased" skin. Now, write down the wet-salting preservation process for the skin. | 07 |
| 7(d) | Briefly explain the conventional preservation method of raw hide/skin with their disadvantages. | 06 |
| 7(e) | Give some reasons for carrying out short term preservation. "Wet-salted method is discouraged by the environmentalists despite the advantages" - write a short note on it. | 07 |
| 8(a) | Describe the selection guidelines according to UNIDO. | 08 |
| 8(b) | Briefly explain the following grading criteria: (i) Animal type (ii) Preservation type (iii) Percent composition according to qualitative classes. | 12 |
| 8(c) | Suppose you have been given a freshly slaughtered goat skin which is to be preserved within a few hours. State briefly a reasonable preservation method to carry out the supplied goat skin. | 07 |
| 8(d) | Define the preservation of hide/skin. State the names of bacteria that are responsible for putrefaction of hide/skin. | 08 |

Department of Leather Engineering
Khulna University of Engineering & Technology
B. Sc. Engineering: 1st Year 2nd Term Examination-2019
English
Hum 1219

Time: 3 Hours.

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if any missing.

SECTION-A

- 1(a) Make sentence with the following structures using the words given in brackets. 14
- i) Subj. + Intransitive verb + Adv. of manner. (Walk as verb)
 - ii) Subj. + Transitive verb + Object. (Offer as verb)
 - iii) That + Subj. + Verb + Adv. of manner + Verb + Adj. complement. (Study and is as verb)
 - iv) Subj. + Relative pronoun + Verb + Adv. of place + Verb + Adj. complement. (Study and is as verb)
 - v) Subj. + Verb + Adv. of manner + that + Subj. + Verb + Adv. of place. (Walk and Reach as verb)
 - vi) Subj. + not only + Verb + but also + Verb + Object. (Cultivate and Plant as verb)
 - vii) Subj. + Verb + Adv. of manner, so + Verb + Adv. of place. (Labor and Develop as verb)
- 1(b) Change the following words as asked in brackets and make sentence with the changed forms. 12
Accurate (into noun), Mist (into adj.), Generosity (into adj.), Charm (into adj.), Awkward (into noun) and Friend (into verb)
- 1(c) Write a synonym and antonym of the following words and use the new words in sentence. 09
Ability, Mystery, Explore.
- 2(a) Make Wh question with each of the underlined word/words in the following sentences. 14
- i) Azad meet us.
 - ii) He went to market to buy papers.
 - iii) Lipu is hard working.
 - iv) He has been working for 3 hours.
 - v) The pond is 10 ft deep.
 - vi) Sima works hardly for passing in exam.
 - vii) He has read a good number of books.
- 2(b) Make use of the following words in sentence asked in brackets. 12
Chair (as verb), Cloud (as verb), Pen (as verb), Tea (as adj), Date (as verb), Pin (as verb).
- 2(c) Make new words with each of the following prefixes and suffixes and use the new words in sentence. 09
Ante----, By----, Matri----, ----ness, ----ing, ----ee.
- 3(a) Transform the following sentences as asked in brackets. 14
- i) What you read teaches us a lot of lesson. (Simple)
 - ii) You have done a great thing for us. (Complex)
 - iii) Besides studying hard he helps his parents. (Compound)
 - iv) Mim is the most talented of all in the class. (Comparative)
 - v) We should not waste our time. (Imperative)
 - vi) You can't do well in life because of your laziness. (Complex)
 - vii) Having forgotten him, I went outside yesterday. (Compound)
- 3(b) Make use of the following modals in sentence as asked in brackets. 12
- i) Can. (To express offer to someone else)
 - ii) Should. (To express propriety for someone else)
 - iii) May. (To express uncertainty about an event)
 - iv) Should + have + past participle. (To express propriety about an unimplemented event of the past)
 - v) Must + have + past participle. (To express a logical deduction)
 - vi) Need. (To express a propriety about an action)
- 3(c) Make sentence with the following phrases and idioms. 09
An apple of discord, Nick of time, Call to mind, See eye to eye, Fast life, Gala day

- 4(a) Correct the following sentences . 14
- i) Chairman is coming in the meeting.
 - ii) The sunshine can dry soon our clothes in winter.
 - iii) Which say you is right.
 - iv) The watch is beyond repairs.
 - v) Liza likes vegetable.
 - vi) Sazu lives in a boarding.
 - vii) When he is ill, he can't attend at the meeting.
- 4(b) Express the following notions / functions in the sentences. 12
- i) Honesty, ii) Courage, iii) Determination, iv) Love, v) Sympathy and vi) Fear.
- 4(c) Define present participle, gerund and transitive verb with two examples for each of the definitions. 09

SECTION-B

- 5(a) Read the following passage carefully and answer the questions: 20
- I am new to the city. I do not know anyone. But an old woman lives next door. Her name is Val. She gives me a big box of vegetables.
- She grows them in a garden by the sidewalk. There are carrots, tomatoes, beans and peas. They are the best vegetables I ever ate. Val lives alone too. But she seems happy in her garden. She loves plants. Sometimes, I can hear her talking to them. May be that is why they grow so big. One day, I stop seeing Val in the garden. I see people take many boxes from her home. Weeds grow in her garden. The plants look sad. Val must have passed on. So I pull the weed and water the garden. I even talk to the plants. Then a family moves next door. They are new to the city. They do not know anyone. And I give them a big box of vegetables from Val's garden.
- i) Name a vegetable that Val did not grow in her garden.
 - ii) Why was the new family lucky?
 - iii) What happened after the writer stopped seeing Val?
 - iv) What did you learn from the above story?
- 5(b) Make a précis of the above passage. 15
- 6(a) Write a paragraph on reading as a pleasure and a means of knowledge gathering. 15
- 6(b) Amplify the idea contained in the following statement: 20
- “ Health is Wealth”
- 7(a) Suppose there is a post of lecturer vacant in your department, prepare of your CV and apply for the post. 20
- 7(b) Suppose you are the Head of Leather Engineering department. Write a memo to arrange a seminar on tannery pollutant and their effects on living entities. 15
- 8 Write a free composition on one of the followings: 35
- i) Time management.
 - ii) A book fair and the culture of peoples for knowledge.

Department of Leather Engineering
Khulna University of Engineering & Technology
B.Sc. Engineering 1st Year 2nd Term Examination-2019
CSE 1219

Computer Fundamentals and Programming

Time: 3 Hours.

Full Marks: 210

- N.B. i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if any missing.

SECTION – A

- 1(a) What is a supercomputer? Differentiate between microcomputer, mainframes and supercomputer. 10
1(b) Briefly describe about 1st and 2nd generation computer. 10
1(c) "Information means processed data"- Explain this term. 05
1(d) Draw and explain the Von Neumann Architecture. 10
- 2(a) Explain machine cycle and breakdown the steps of machine cycle. 10
2(b) Find the equivalent hexadecimal of the following number: i. $(582.28)_8$ ii. $(100010110)_2$ 10
2(c) Perform 1's complement subtraction with detail steps with the following data: $1100 - 1010$ 10
2(d) What are the elements that the performance of a processor depends? 05
- 3(a) How input is received from keyboard? Describe with appropriate figure. 10
3(b) Briefly describe the working principle of optical mouse. 10
3(c) How does Kernel work? Explain how operating system finds data. 10
3(d) Write the differences between LED and LCD monitor. 05
- 4(a) Compare and contrast: 15
i. Memory and Storage device ii. Internet and Intranet iii. Flowchart and Pseudocode
iv. DOS and Linux and v. Interpreter and Compiler
- 4(b) Explain the process of storing and retrieving data through memory and CPU. 10
4(c) Write a short note on OSI model of networking. 10

SECTION-B

- 5(a) What is structured programming? Why C is called structured programming language. 05
5(b) What is library function? Draw the process of computing and running C program. 10
5(c) What is C Token? Briefly discuss about C Tokens. 10
5(d) Write a program that reads a character from keyboard and then prints the character in reverse case. 10
- 6(a) What is array? Why array is used in a program? How can we declare and initialize two-dimensional array? 10
6(b) Write a program to determine whether a number is prime or not. 15
6(c) What is switch statement? Draw the flowchart of else if ladder. 10
- 7(a) Discuss about continue and break statement with examples. Why the use of goto statement is generally discouraged? 10
7(b) Write a program that read a string from the keyboard and convert all the characters in it reverse way. 15
7(c) Design an interchange function that will exchange their values by call by value method. 10
- 8(a) What is recursion function? What are the limitations of using recursion function? 10
8(b) What is limitation of using scanf () in case of string input? How it can be solved- Explain with example. 10
8(c) Write a program which will copy one string to another without using library function. 15