

**Department of Leather Engineering**  
**Khulna University of Engineering & Technology**  
**B. Sc. Engineering 1<sup>st</sup> Year 2<sup>nd</sup> Term Examination-2022**  
**CSE 1219**  
**Computer Fundamentals and Programming**

Time: 3.0 Hours  
210

Full Marks:

- 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) | List out the characteristics of a computer.   | 07 |
| 1(b) | Draw the logical architectural diagram of computer system and describe every part of it.  | 12 |
| 1(c) | List out the different types of printers available. What technology does the laser printer use to print a document?                                     | 10 |
| 1(d) | What are peripheral devices? What are the uses of PCI bus in a computer system?   | 06 |
| 2(a) | Explain the access mechanism of magnetic disk pack.   | 07 |
| 2(b) | Write short notes on: (i) Cache memory (ii) Optical storage device and (iii) Disk array   | 12 |
| 2(c) | What are the elements that the performances of a processor depend on?   | 06 |
| 2(d) | What is an operating system? What are the different functions of operating system?  | 10 |
| 3(a) | Write an algorithm to calculate the GPA of a student in KUET. Also draw the flowchart.  | 15 |
| 3(b) | Design a combinational circuit of a full adder with NOR gate only.  | 12 |
| 3(c) | Implement the Boolean expression of the following equations-<br>(i) $A.B + C. (A+B.D)$ (ii) $\overline{A.B} + C.D + \overline{E.F}$                     | 08 |
| 4(a) | Suppose a computer uses EBCDIC as its internal representation of characters. In which order will this computer sort the strings 23, ca, a1, A1, 1a, 1b? | 04 |
| 4(b) | Write a binary coding for the word "DYING" in ASCII-8. How many bytes are required for this representation?   | 12 |
| 4(c) | Subtract $(36)_{10}$ from $(82)_{10}$ using complementary method.   | 09 |
| 4(d) | Divide $(35)_8$ by $(17)_8$   | 10 |

**SECTION-B**

- |      |  |    |
|------|--|----|
| 5(a) | Discuss about 4 basic data types. How could you extend the range of values they represent? | 15 |
| 5(b) | Write a program using while loop that will reverse the digits of a number.                 | 15 |

- 5(c) Write the output of the following 05
- ```

Int main () {
    Int x= 101, y= 201;
    Printf ("% d", x++);
    Printf ("% d", x+(y++));}

```
- 6(a) "An array is one type of pointer"- justify the statement with proper example. 06
- 6(b) Write a program that will take a list of numbers as input and search a data among them. 15
- 6(c) Explain the differences between postfix and prefix of increment operator with example. 10
- 6(d) Draw the flowchart of if else or if else. 04
- 7(a) A function can be categorized depending on argument and return type- Explain this term with proper example. 10
- 7(b) Explain the basic file operations in C with appropriate examples. 10
- 7(c) Describe what task perform of the following functions- 10  
 (i) fseek () (ii) rewind () (iii) foet () and (iv) putw ()
- 7(d) Write a C program to copy the content of one file to another. 05
- 8(a) What are the techniques of passing structure variable as argument? Write the basic difference between struct and union with examples. 10
- 8(b) Create a C program to delete duplicate elements from array. 15
- 8(c) What are the limitations of using scanf function for reading string? Write the necessary of a to i () function. 10

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**B. Sc. Engineering 1<sup>st</sup> Year 2<sup>nd</sup> Term Examination-2022**  
**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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**SECTION-A**

- 1(a) Define order and degree of a differential equation (D.E.) with examples. Form a D.E. from the relation  $xy = Ae^{2x} + Be^{-2x} + x^3$ . 11
- 1(b) Find a particular solution of the differential equation  $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 8y = 3 + 2x$  when  $y(0) = 3$  and  $y'(0) = 5$ . 13
- 1(c) Identify and solve the following  $(2x - 4y + 3)dx + (2y - x - 2)dy = 0$ . 11
- 2 Identify and solve the following D.Es.
- (a)  $(x^2 + y^2 + 2x)dx + 2ydy = 0$ . 11
- (b)  $x\frac{dy}{dx} - y = 2\sqrt{y^2 - x^2}$ . 12
- 2(c) Solve  $\{\cos x \tan y + \cos(x + y)\}dx + \{\sin x \sec^2 y + \cos(x + y)\}dy = 0$ . 12
- 3 Solve the following differential equations:
- (a)  $(x^2D^2 + xD + 1)y = \sin(\log x^2)$ . 12
- (b)  $D^2y + 4Dy + 3y = 3 - 2e^{-x} + 4x^2$ . 13
- (c)  $D^2y - 5Dy + 4y = 5e^x \cos 2x$ . 10
- 4(a) Form a partial differential equation by eliminating arbitrary function from the relation  $z = 2xy + f(y^2 + x^2)$ . 10
- 4(b) Solve  $\frac{\delta u}{\delta t} = 3\frac{\delta u}{\delta x}$ ,  $u(x, 0) = 8e^{-2x}$  by the method of separation of variables. 15
- 4(c) Solve  $(x + 1)^2 y'' - 4(x + 1)y' + 6y = x$ . 10

**SECTION-B**

- 5(a) When the general equation of second degree represents (i) a parabola (ii) an ellipse (iii) a hyperbola 06
- 5(b) Reduce the equation  $4x^2 - 4xy + y^2 - 8x - y + 6 = 0$  to the standard form and identify the conic. Also, find its focus. 20

- 5(c) If possible, remove the first degree terms of the equation  $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$ . 09
- 6(a) Find the cylindrical polar and spherical polar coordinates for the points (8, -4, 1). 10
- 6(b) Find the equation to the right circular cone of radius 2 whose axis passes through (1, 2, 3) and has direction cosines proportional to (2, -3, 6). 12
- 6(c) Find the equation of the planes through (0, 4, -3), (6, -4, 3) and which cuts off from the axes intercepts whose sum is zero. 13
- 7(a) Find the equation of plane through (2, 3, -4) and (1, -1, 3) and perpendicular to the xz-plane. 11
- 7(b) Check that the four points (-6, 3, 2), (3, -2, 4), (5, 7, 3) and (-13, 17, -1) are coplanar or not. If coplanar, then find the equation of the plane containing them. 12
- 7(c) Find the equation of the right circular cone whose axis is equally inclined to the coordinate axes, vertex is the point (1, 0, 1) and the cone passes through the point (1, 1, 1). 12
- 8(a) Find the distance of the point (1, -2, 3) from the plane  $x - y + z = 5$  measured parallel to the line  $\frac{x}{2} = \frac{y}{3} = \frac{z-1}{-6}$ . 12
- 8(b) Reduce the equation of the straight line  $x - 2y + 3z + 1 = 0 = 2x + y - 4z - 8$  in symmetrical form. 10
- 8(c) Find the length and the equation of the shortest distance between the lines  $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$  and  $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ . 13

**Department of Leather Engineering**  
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 Ph 1219  
 Physics

Time: 3.0 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) What is meant by damped vibrations and forced vibrations? 05
- 1(b) Obtain an expression for the displacement in the case of a damped oscillatory motion. 15
- 1(c) Deduce the frequency and quality factor for a circuit with  $L = 4 \text{ mH}$ ,  $C = 7 \text{ } \mu\text{F}$  and  $R = 0.2 \text{ } \Omega$  10
- 1(d) Explain briefly the three damping process. 05
- 2(a) Define isothermal, adiabatic, isochoric and iso baric processes and show them graphically. 10
- 2(b) Draw a schematic diagram of Carnot's cycle. Show that the work done in a Carnot's cycle operation is  $W = R(T_1 - T_2) \ln \frac{V_2}{V_1}$ ; where the symbols have their usual meanings. 15
- 2(c) Calculate the mean free path of a gas molecule, given that the molecular diameter is  $2 \times 10^{-8} \text{ cm}$  and the number of the molecules per cc is  $3 \times 10^{19}$ . 10
- 3(a) State the postulates of Bohr atom model. 03
- 3(b) Derive expressions for the radius and electron energy in the  $n^{\text{th}}$  orbit. 12
- 3(c) What is Compton effect? Deriving appropriate expression for the wavelength change, discuss the conclusion drawn based on this effect. 13
- 3(d) Calculate the longest and shortest wavelength in the Balmer series. 07
- 4(a) What is meant by unit cell? Show that 68% of the body centered cubic structure is occupied by atoms. 15
- 4(b) In case of simple cubic crystals, show that,  $d_{110} : d_{111} : d_{100} = \frac{1}{\sqrt{2}} : \frac{1}{\sqrt{3}} : 1$  10
- 4(c) Draw the following planes and directions in cubic crystal: (i) (110) (ii) (112) (iii) 011 (iv) (222) and (v) (120). 10

**SECTION-B**

- 5(a) State Hook's law. Draw and explain the stress-strain curve. 10
- 5(b) Prove that strain energy per unit volume is,  $\frac{1}{2} \times \text{Young's modulus} \times (\text{longitudinal strain})^2$  15
- 5(c) The modulus of rigidity and Poisson's ratio of the materials of a wire are  $2.87 \times 10^{10} \text{ Nm}^{-2}$  and 0.39 respectively. Find the value of Young's modulus of the material of the wire. 10

- 6(a) What are coherent sources? Explain the formation of Newton's rings using coherent source and show how you would use Newton's rings to determine the wavelength of light. 15
- 6(b) What is polarization of light? Explain Brewster's law and Malus law. 10
- 6(c) A diffraction grating which has 4000 lines to a cm is used at normal incidence. Calculate the dispersive power of the grating in the third spectrum in the wavelength region  $5000\text{\AA}$ . 10
- 7(a) What is population inversion? Why two level LASER is not possible? 10
- 7(b) Explain spontaneous and stimulated emission. 08
- 7(c) Show that relative population can be written as  $\frac{N_2}{N_1} = e^{-(E_2 - E_1)/kT}$ ; where the symbols have their usual meanings. 07
- 7(d) A LASER beam of wavelength  $6000\text{\AA}$  on the earth is focused by a lens of diameter 2.45 m on the crater of the moon. The distance of the moon is  $4 \times 10^8$  m. How big in the spot on the moon? Neglect the effect of the earth's atmosphere. 10
- 8(a) Write down the properties of nuclear force. 10
- 8(b) Show that, for a successive radioactive disintegration, the amount of daughter substance at instant  $t$  is given by:  $N_2 = \frac{\lambda_1 N_1^0}{\lambda_2 - \lambda_1} [e^{-\lambda_1 t} - e^{-\lambda_2 t}]$ ; where the symbols have their usual meanings. 15
- 8(c) How much energy can be obtained from the fission of 1 mole of  $U^{235}$ ? And what will be the energy and power that can be obtained from the fission of 1 kg of  $U^{235}$ ? 10

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**Ch 1219**  
**Organic Chemistry**

Time: 3.0 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 are the evidences of resonance? Find out the stable structure(s) of  $\text{NO}_3^-$ . 12
- 1(b) Draw the orbital picture of Propadiene. 06
- 1(c) Compare the boiling point and solubility of methanol and ethanol. 08
- 1(d) Which of the following compounds would you predict associated liquids? Draw the structures to show the hydrogen bonding you would expect with structure of the followings:  $\text{CH}_3\text{F}$ ,  $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$ ,  $\text{CH}_3\text{NH}_2$ ,  $\text{CH}_3\text{COCH}_3$  and  $\text{CH}_3\text{OH}$ . 09
- 2(a) What is optical isomer? Draw all the possible isomers of  $\text{C}_4\text{H}_{10}\text{O}$ . 08
- 2(b) Illustrate sequence rule for assigning R and S configuration to an optically active compound. 09
- 2(c) What are the conditions of geometrical isomers? "The geometrical isomers of butenedioic acid have different chemical properties". Explain the term. 12
- 2(d) Define the following terms: (i) Enantiomer, (ii) Anomer and (iii) Chiral center. 06
- 3(a) An  $\text{SN}^1$  reaction proceeds with racemization plus some net inversion, explain with suitable example. 09
- 3(b) What are protic and aprotic solvents? Give examples. 07
- 3(c) Describe the nitration of benzene with mechanism. 09
- 3(d) "When 1-butene is treated with  $\text{HBr}$ , 2-bromo butane is the major product, but when treated in presence of peroxide 1-bromo butane is the major product" Explain the facts. 10
- 4(a) Which compound is more susceptible towards nucleophilic addition reaction, (i) Propanal, (ii) Propanone and (iii) Methanal, explain the reason. 10
- 4(b)  $\text{CHCl}_3$  is polar but  $\text{CCl}_4$  is non polar, why? 07
- 4(c)  $\text{SN}^2$  reactions compete with  $\text{E}2$  reaction in respect of nature of nucleophiles, size and nature of substrate- explain with examples. 10
- 4(d) Why benzene does not give the characteristics reaction of double bond whereas benzene has three double bonds? 08

**SECTION-B**

- 5(a) (+)-Glucose is an aldohexose, explain this statement with proper reaction scheme. 11

- 5(b) Identify each of the following glucose derivatives: 12
- i.  $A + 4\text{HIO}_4 \rightarrow 3\text{HCOOH} + \text{HCHO} + \text{OHC-COOH}$ .
  - ii.  $B + 5\text{HIO}_4 \rightarrow 4\text{HCOOH} + 2\text{HCHO}$ .
  - iii.  $C + 3\text{HIO}_4 \rightarrow 2\text{HCOOH} + 2\text{OHC-COOH}$ .
- 5(c) How to determine the ring size of (+)- Glucose. Explain in detail using methylation of glucose. 12
- 6(a) What is meant by invert sugar? Write down the properties and chemical structure of (+)- Glucose. 11
- 6(b) Derive the structure of water-insoluble fraction of starch with end group analysis. 13
- 6(c) Write down the reaction scheme of cellulose xanthate from cellulose. Why acetate rayon has better quality than cellulose nitrate? 11
- 7(a) Compare the basicity of amine in aqueous media. 10
- 7(b) Write the reaction mechanism of primary amine preparation through Hofmann rearrangement. 13
- 7(c) How to identify primary, secondary and tertiary amine by Hinsberg test? 12
- 8(a) Show the reaction scheme of synthesis of azo compounds. What conditions should be applied in the aromatic ring? 13
- 8(b) Write the chemical structure of the following compounds: (i) m-cresol, (ii) Catechol, (iii) Resorcinol, (iv) 2-naphthol and (v) Hydroquinone. 10
- 8(c) Write down the industrial source of phenol using cumene as starting materials. 12



**Department of Leather Engineering**  
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 Hum 1219 \

English

Time: 3.0 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. (Study as verb)
  - ii. Subj. + Linking Verb + Adj. complement. (seem as verb)
  - iii. Since + Subj. + Verb + Adv. of Manner, subj. + Verb + Object. (Study and like as verb)
  - iv. Till + Subj. + verb + Adv. of Manner, Subj. + Verb + Obj. (Behave and Co-operate as Verb)
  - v. Subj. + Relative pronoun + Verb + Adv. of place + verb + Adj. complement. (Work and is as verb)
  - vi. Subj. + Verb + not only + Adj. complement + but also + Adj. complement. (is as verb)
  - vii. Subj. + Verb + Adv. of Manner, so + verb + Adv. of place. (study and progress as verb)
- 1(b) Change the following words as asked in brackets and use the changed words in sentence. 12
- Stability (into adj), Fragrency (into adj.), potent (into noun), Barbarization (into verb), mystification (into verb), cage (into verb)
- 1(c) Make words with the following prefixes and suffixes and use them in sentences: 09
- Fore \_\_\_\_, de \_\_\_\_, pre \_\_\_\_, sub \_\_\_\_, \_\_ful, \_\_ship.
- 2(a) Transform the following sentences as asked in the brackets. 14
- i. We call Rana what his father named. (Simple)
  - ii. Reza, who studies hard, is a doctor. (Simple)
  - iii. As Mamun is lazy, he can't succeed in life. (Simple)
  - iv. Shova works hard to cut a good figure in exam. (Complex)
  - v. Kamal reads not only a novel but also a poem. (Simple)
  - vi. Nomen completed the duty as the authority suggested him. (Simple)
  - vii. Abir is as disciplined as other students. (Comparative)
- 2(b) Make use of the following words in sentence as asked in brackets. 12
- Back (as verb), Before (as conjunction), Better (as verb), Book (as verb), call (as adj), Advance (as adj.).
- 2(c) Write two antonyms for each of the following word and make sentence with the antonyms. 09
- Comfort, Hard, Bright.
- 3(a) Make Wh question with each of the underlined word/words of the following sentences. 14
- i. Habib met Reza yesterday.
  - ii. Nasim walks fast to catch the bus.
  - iii. The book is interesting enough.
  - iv. Halim is five feet and six inches tall.
  - v. Bob has been living in this village for five years.
  - vi. The river is two hundred miles long.
  - vii. Kalam's pen has gone lost.
- 3(b) Complete the following sentences with clauses as asked in brackets. 12
- i. \_\_\_\_\_ is touching. (Noun clause)
  - ii. It is nice \_\_\_\_\_. (Noun clause)
  - iii. \_\_\_\_\_, we can feel comfortable. (Adv. clause of condition)
  - iv. We are so lazy \_\_\_\_\_. (Adv. clause of cause and effect).
  - v. \_\_\_\_\_, he can't progress in life. (Adv. clause of concession)
  - vi. Rakib, \_\_\_\_\_, is honest always. (Adj. clause)
- 3(c) Make sentence with the following modals as asked in brackets. 09
- i. Can. (To express allowance to somebody else)
  - ii. Can. (To express a polite request)

- iii. Should. (To express propriety)
- iv. Must + have + past participle of verb (To express a logical deduction)
- v. Had better. (To express a duty at present)
- vi. Would rather. (To express a preference)

- 4(a) Correct the following sentences. 14
- i. Always speak truth.
  - ii. He can't read Gitanzoli by Rabindranath Tagore.
  - iii. Since you come in time, we will feel happy.
  - iv. Mamun lives in the boarding.
  - v. Look up the word in the dictionary book.
  - vi. Quote the poem from heart.
  - vii. The poor men are not always happy.
- 4(b) Express the following notions and functions in sentence. 12
- i. Happiness, ii. Honesty, iii. Tension, iv. Endeavor, v. Confusion vi. Dislike
- 4(c) Make sentence with the following idioms and phrases. 09
- Beat around the bush, Good things come to those who wait, Run around in circles, Eat like a horse, chip off the old block, Fair and squire.

### SECTION-B

- 5(a) Read the passage and answer the questions: 20
- A man in the surging crowd heard the cry and stooping with great difficulty, lifted the child up in his arms. "How did you get here, child? Whose baby are you?" the man asked as he steered clear of the mass. The child wept more bitterly than ever now and only cried, "I want my mother, I want my father!" The man tried to soothe him by taking him to round about. "Will you have a ride on the horse?" the man gently asked. The child's throat tore into a thousand shrill sobs and he only shouted "I want my mother, I want my father!" The man headed towards the place where the snake-charmer played on the flute to the swaying cobra. "Listen to that music, child!" But the child shut his ear with his fingers and shouted "I want my mother, I want my father!" The man took him near the balloons, thinking the bright colors of the balloons would distract the child's attention and quieten him. "Would you like a rainbow colored balloon?" he persuasively asked. The child turned his eyes from the flying balloons and just sobbed, "I want my mother, I want my father!" The man still trying to make the child happy, bore him to the gate where the flower-seller sat, "Look! Can you smell those nice flowers, child! Would you like a garland to put round your neck?" the child turned his nose away from the basket and reiterated his sob, "I want my mother, I want my father!" Thinking to humor his disconsolate charge by a gift of sweets, the man took him to the counter of the sweet shop. "What sweets would you like, child?" he asked. The child turned his face from the sweet shop and only sobbed, "I want my mother, I want my father!"
- i. Describe the man.
  - ii. Why did the lost child lose interest in the things that every child wants in a fair?
  - iii. The man should have looked for the child's parents or informed the police instead of quietening the child. What do you think?
  - iv. What do you think happens in the end? Does the child find his parents?
- 5(b) Make a précis of the above passage with a title. 15
- 6(a) Write a contrast paragraph on life with parents vs. life on campus. 15
- 6(b) Amplify the idea: 'Fear not for the future, weep not for the past.' 20
- 7(a) Lotto Leather products Ltd. is looking for a production officer to work in their company. Prepare your CV and apply for the post. 20
- 7(b) Suppose you are the CEO of a company. Write a memo to thank your marketing department for their devotion throughout the year. 15
- 8 Write a free composition on any one of the following: 35
- i. A tragic character from a book or a movie.
  - ii. Press and the good governance of a country.