International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Mid term Exam, Spring 2023

Course Code: **CSE 4743** Course Title: **Computer Security**

Time: 1 hour and 30 minutes Full Marks: 30

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	**Understand** the concepts of computer security and various symmetric and asymmetric cryptographic methods.
CO2	**Apply** cryptographic techniques e.g. digital signature, PGP, S/MIME etc.
CO3	**Evaluate** ip security architecture & transport layer security.
CO4	**Apply** firewall design principles to detect various intrusion systems for achieving maximum system security.

Bloom's Levels of the Questions						
Letter Symbols	**R**	**U**	**App**	**An**	**E**	**C**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the questions from the followings]

1.	a)	Explain Confidentiality, Integrity and Availability with suitable example.	**CO1**	**U**	**5**
		Or,			
1	a)	Explain Access Control, Selective Field Data Integrity and Non-repudiation	**CO1**	**U**	**5**
1.	b)	Describe some security mechanism that are included in ITU X.800 recommendation	**CO1**	**U**	**5**
2.	a)	Explain the components of a Symmetric cipher model?	**CO1**	**U**	**5**
2.	b)	Analyze the differences between cryptanalysis of Transposition cipher and Caesar cipher.	**CO2**	**An**	**5**
		Or,			
2	b)	i. Given the initial permutation "86574231" find the inverse initial permutation, show with a bit string example. ii. Given a 64 bit key, how would you derive the round key in DES for the 3rd round?	**CO2**	**An**	**5**

Part B

[Answer the questions from the followings]

3.	a)	Why do we need both End to end and Link encryption? Explain with example.	**CO1**	**E**	**4**
3.	b)	Find the GCD of (450,120) with Euclidean algorithm.	**CO2**	**App**	**2**
3.	c)	Is Z_5 a Galois field? If yes, why is it? Show the additive inverse and multiplicative inverse for modulo 5 arithmetic.	**CO2**	**E**	**4**

International Islamic University Chittagong
Center for General Education (CGED)

Midterm Examination: Spring 2023
Course Code: URIH-4701

Time: 1 hours and 30 minutes.

Program: Undergraduate
Course Title: A Survey of Islamic History & Culture
Full Marks: 30

Instructions:
i. All Questions are Compulsory.
ii. Figures in the right margin indicate full marks.
iii. Course Learning Outcome (CLO) and Bloom's levels are mentioned in additional columns.

Bloom's Levels of the Questions.						
Letter of Symbol	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

	Text of the Questions	Marks	Bloom's Level	CLO
1	Elucidate the concept of *khilafah* in Islam. What are the qualities and responsibilities of a *khalifah*?	10	U	CLO1
2	Investigate the causes of *Riddah* (Apostasy) War and point out the significant contributions of *Khalifah Abu Bakr* (R) as the savior of Islam. Or Review the expansion of Islamic territories during the reign of *Khalifah* Umar (R).	10	An	CLO3
3	Analyze the administrative developments and reforms during the time of four pious *Khalifah*. How is modern administration indebted to the developments.	10	An	CLO3

International Islamic University Chittagong
Department of Computer Science and Engineering
Mid Term Examination Spring 2023
Course Code: CSE-4741 Course Title: Computer Graphics

Total Marks: 30 **Time: 1:30 hours**

Answer all questions. Figures in the right margin indicate full marks.

		Mark	CO	DL
a)	"Computer graphics is consist of imaging, modeling, rendering and animation" – Explain statement with proper examples.	3	CO2	C2
b)	If we use 2-bytes pixel values in a 32-bit lookup table representation, how many bytes does the lookup table occupy? How many entries does the lookup table have? How many bytes does the image occupy?	2	CO4	C3
c)	Describe RGB and CMY color model. Why an additional black pigment is used in printer?	3	CO1	C1
d)	Write the pros and cons of raster display and vector display.	2	CO1	C1
a)	Solve the following equations for Bresenham's circle algorithm.	4	CO3	C3

$$d_{i+1} = \begin{cases} d_i + 4x_i + 6 & \text{if } d_i < 0 \\ d_i + 4(x_i - y_i) + 10 & \text{if } d_i \geq 0 \end{cases}$$

OR

Solve the following equations for Midpoint circle algorithm.

$$p_{i+1} = \begin{cases} p_i + 2x_{i+1} + 1 & \text{if } p_i < 0 \\ p_i + 2(x_{i+1} - y_{i+1}) + 1 & \text{if } p_i \geq 0 \end{cases}$$

b)	"Displaying smoothly drawn curves on a pixilated display can produce horribly jagged edges". What are the aliasing effects? How can we solve these problems?	3	CO2	C2
c)	Distinguish Flood fill and Boundary fill algorithm.	3	CO1	C1

OR

Describe different Character representation techniques.

a)	i) Find the matrix that represents the rotation of an object by 30° about the origin. ii) What are the new coordinates of the point A(4, -6) after the rotation about B(2, 5)?	4	CO4	C4
b)	"Instance transformation is the combination of many transformations" - Explain with necessary figures/examples.	2	CO2	C2
c)	Find the new coordinates of the triangle P(-1,2), Q(2,4), R(0,0) about Q(2,4) (i) it has been expanded twice its size and (ii) reduced to half its size.	4	CO4	C4

OR

Find the transformation matrix M_L of mirror reflection of a point about a line L (y = b).

Bismillahir Rahmanir Rahim

International Islamic University Chittagong

Department of Computer Science & Engineering

Mid Term Examination Spring 2023

CSE 4745 Numerical Methods

Total Marks: ***30*** Time: ***90*** Minutes

[Answer ***all*** the ***three*** questions. Figures in the right-hand margin indicate full marks.]

1.a)	Write short notes on: i) Inherent errors ii) Roundoff errors iii) Truncation errors	3	CO1
b)	Describe the *banker's rounding rule* with examples. Use *banker's rounding rule* to round off the following numbers to four significant figures - **i) 405.5578 ii) 0.2342500 iii) 0.000098354 iv) 199.9999** *OR* How to count significant digits of a number? Use *banker's rounding rule* to round off the following numbers to four significant figures - **i) 405.6578 ii) 0.2341500 iii) 0.000098356 iv) 199.9399**	4	CO1
c)	What do you mean by *absolute error* and *relative error*. Write down the approximate representation of **2/3** correct to *four significant figures* and then compute the absolute error and relative error.	3	CO1
2.a)	How does the *secant method* overcome the limitations of *Newton's method* for finding the roots of nonlinear equations?	2	CO1
b)	Find the root of $\mathbf{f(x) = 5x^3 + 11x - 17}$, correct to *two decimal places*, by using the *bisection method*. *OR* Find the root of the equation $\mathbf{f(x) = x^3 - 6x + 4}$, correct to two decimal places, by using the *Newton Raphson method*. [*Newton-Raphson formula:* $X_{n+1} = x_n - f(x_n) / f'(x_n)$]	5	CO2
c)	What is *synthetic division*? Find the *quotient polynomial* q(x) such that p(x) = (x - 2) q(x) where the polynomial $\mathbf{p(x) = x^3 - 6x^2 + 11x - 30 = 0}$ has a root at $\mathbf{x = 5}$.	3	CO2
3.a)	What do you mean by *interpolation*? When *Newton's forward* and *Newton's backward* formulas will be used in interpolation and why?	2	CO3
b)	Derive the *Newton's forward interpolation formula*. *OR* Derive the *Newton's divided difference formula*	3 5	CO3 CO4
c)	The following table gives the sales of a software firm for the six years. **Year** 2008 2010 2012 2016 2020 2022 **Sales** 40 43 48 52 58 63 (in millions) Estimate the sales for the year **2011** [if the *last digit* of your ID is **odd**] / **2018** [if the *last digit* of your ID is **even**] using a *suitable interpolation formula*.		

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Mid term Exam, Spring 2023

Course Code: **CSE 3633** Course Title: **Computer Networks**

Time: 1 hour and 30 minutes Full Marks: 30

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

1.	a)	What is computer network and why it is useful? Write the different types of networks with example?	**CO1**	**Un**	**5**
1.	b)	Compare and contrast between TCP/IP reference model and ATM reference model.	**CO1**	**Un**	**5**
2.	a)	What is MAC sublayer? Why do computers need both MAC Addresses and IP Addresses? Differentiate between CSMA/CA and CSMA/CD.	**CO3**	**An**	**5**
2.	b)	Analyze the performance of slotted aloha over pure Aloha.	**CO3**	**An**	**5**
		OR			
	b)	Define hidden terminal problem and exposed terminal problem. Write the solution to solve the problems.	**CO3**	**An**	**5**
3.	a)	What is connection-oriented and connectionless service? Write the difference between datagram network and virtual-circuit network.	**CO2**	**Un**	**5**
3.	b)	192.168.5.85 /27 is an IP address of a host in a network. Find the following: I. Subnet mask II. Network Address III. Broadcast address IV. First usable address V. Last usable address	**CO2**	**An**	**5**
		OR			
	b)	List the differences between IPv4 and IPv6.	**CO2**	**Un**	**5**

International Islamic University Chittagong

Department of Computer Science and Engineering
B. Sc. in CSE
Mid Exam, Spring 2023

Course Code: **CSE 4747** Course Title: **Mathematical analysis for Computer Science**

Time: 1 hours 30 minutes **Full Marks**: 30

(The figures in the right-hand margin indicate full marks

[Answer the questions from the followings]

1. a) The following recurrence represents the number of ways to climb n stairs where f(n) denotes the number of ways to climb n stairs. **07**

   f(0)=1
   f(1)=1
   f(n)= f(n-1)+f(n-2)

   Now solve this recurrence relation .

   b) Solve the following recurrence relation which represents the time complexity of a divide and conquer algorithm. **03**
   T(n)= 2T(n/4)+T(n/3) +n , where T(0)=1

2. a) The maximum overhang in the book staking problem is given by the following recurrence : **05**

$$B_1 = \frac{1}{2}$$

$$B_{n+1} = B_n + \frac{1}{2(n+1)}$$

   Now convert this recurrence into sum problem and then find a solution of the sum.

   b) In how many different ways is it possible to answer the problems in an examination if: **03**

   1. the first problem has four yes or false or not given questions.
   2. the second problem requires choosing one of four alternatives, and
   3. the answer to the third problem is an prime number between 1 and 50.

   c) Find the recurrence relation of the lines in the plane problem. **02**

3. a) Write A Generating Function for the Fibonacci series. **02**

   Or

Derive the generating function for the following sequence using derivative and right shift rule.

0,1,4,9,16,25,……

b) Find the coefficient of the following generating function using Taylor's series. **03**

$$F(x) = \frac{1}{x-1}$$

Or

Consider the following product

$$\frac{n}{e^n}\frac{n-1}{e^{n-1}}\frac{n-2}{e^{n-2}}\cdots\frac{3}{e^3}\frac{2}{e^2}\frac{1}{e^1}$$

Find the best approximation of the closed form for the above product.

b) Mr. X never goes outside without a collection of pets. In particular **05**

1. he brings even number of rabbits
2. he brings singing birds in a multiple of 5
3. he brings at most 1 cats.
4. There can me at most four dogs

Let P_n denote the number of different collections of n pets that he can accompany. Solve this counting problem using generating function.

Or

T-Pain is planning an epic boat trip and he needs to decide what to bring with him.

1. He must bring some burgers, but they only come in packs of 6.
2. He and his two friends can't decide whether they want to dress formally or casually. He'll either bring 0 pairs of flip flops or 3 pairs.
3. He doesn't have very much room in his suitcase for towels, so he can bring at most 2.
4. In order for the boat trip to be truly epic, he has to bring at least 1 nautical-themed pashmina afghan.

Let g_n be the number of different ways for T-Pain to bring n items. Solve this problem using GF.