

**International Islamic University Chittagong**  
**Center for General Education (CGED)**  
**Midterm Examination, Spring - 2022**

Course Code: URIH – 4701

Course Title: A Survey of Islamic History and Culture

Full Marks: 30

Time: 1.5 Hours

Answer any three of the following questions.  
[All questions are of equal value]

1. Explain the basic features and the development of *Khilafah* in Islamic history. How do you compare the concept of *Khilafah* with the theory of 'good governance' in modern state?
  2. Investigate the causes of *Riddah* War and point out the significant contributions of *Khalifah Abu Bakr (R)* as the savior of Islam.
  3. Assess the contributions of *Khalifah Othman*, and *Ali (R)* to the development of *Khilafah* and World Civilization.
  4. Analyze the development of *Shura* during the rightly-guided four pious *Khalifah* in Islam. Compare the concept of *Shura* with the parliamentary system of a democratic country.
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**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**

**B.Sc. In CSE, Mid Term Exam, Spring 2022**

**Course Code: CSE-4741 Course Title: Computer Graphics**

**Total Marks: 30**

**Time: 1.5 hours**

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

		Marks	CO	DL
1	a) "One of the main fields of application of computer graphics is the entertainment industry" – Explain with examples.	2	CLO1	C2
	b) Suppose you use direct coding method of RGB values with 3 bits per primary color, how many possible colors do we have for each pixel? If these 3 bits pixel values use in lookup table, how many entries does the lookup table have?	3	CLO2	C3
	c) Write the working principles of CRT monitor. Or Write down the pros and cons of two image representation techniques.	3	CLO1	C2
	d) Distinguish between object space and image space with example.	2	CLO1	C1
2	a) Write the steps that are required to scan convert a circle using <i>Midpoint</i> circle algorithm. Evaluate the equation $p1=1-r$ from midpoint circle algorithm.	3	CLO3	C3
	b) Indicate which raster location would be chosen by <i>Bresenham's</i> algorithm when scan converting a line from pixel coordinate (9, 18) to pixel coordinate (14, 22). Or, Indicate which raster location would be chosen by <i>DDA</i> algorithm when scan – converting a line from pixel coordinate (0, 0) to pixel coordinate (4, 5).	4	CLO3	C4
	c) "Displaying smoothly drawn curves on a pixelated display can produce horribly jagged edges". What are the aliasing effects? How can we solve these problems?	2	CLO2	C2
	d) Write down the difference between flood fill and boundary fill algorithm.	1	CLO1	C2
3	a) i) Find the new coordinate of a triangle A(0,0), B(2, 2), C(6, 3) after applying rotation by $45^\circ$ about the origin. ii) Also find the new coordinates of that triangle after applying rotation by $30^\circ$ about P(-2, -2).	5	CLO4	C4
	b) Prove that, Inverse geometric transformation is the coordinate transformation with example. Or Find the steps to mirror reflect of an object about a line L.	2	CLO2	C2
	c) Find the new coordinates of the triangle P(2,5), Q(6,3), R(1,1) after (i) it has been expanded thrice its size about Q. (ii) reduced to half its size about Q.	3	CLO4	C4



Bismillahir Rahmanir Rahim  
**International Islamic University Chittagong**  
 Department of Computer Science & Engineering  
**Mid Term Examination Spring 2022**  
**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) What do you mean by *numerical computing*? State the four characteristics of numerical computing. 2 CO1
- b) Write short notes on: 3 CO1  
 i) Conversion errors ii) Roundoff errors iii) Truncation errors
- c) Describe the *banker's rounding rule* with examples. Use *banker's rounding rule* to round off the following numbers to four significant figures - 3 CO1  
 i) **38.46735** ii) **0.700156** iii) **0.0022213** iv) **19.245101**  
 OR  
 What do you mean by *significant digits*? How to count significant digits of a number? Use *banker's rounding rule* to round off the following numbers to four significant figures -  
 i) **38.46435** ii) **0.700356** iii) **0.0022218** iv) **19.275101**
- d) What do you mean by *absolute error* and *relative error*? If  $X = 0.430958$  is rounded off to four significant figures compute the absolute error and relative error in X. 2 CO2
- 2.a) Evaluate the polynomial  $f(x) = x^4 - 2x^3 + 5x^2 - 7x + 10$  using Horner's rule at  $x = V$ . [V means the *last digit* of your ID number. Example: for C171017,  $x = 7$ ] 1.5 CO2
- b) Derive the *Newton - Raphson formula* Write the advantages and disadvantages of Newton - Raphson method 2.5 CO1
- c) Find the root of the equation  $x^3 - 9x + 1 = 0$ , correct to two decimal places, by using the *bisection method*. 4 CO2  
 OR  
 Find the root of the equation  $x^3 - 6x + 4 = 0$ , correct to two decimal places, by using the *secant method*.
- d) What is *synthetic division*? Find the *quotient polynomial*  $q(x)$  such that  $p(x) = (x - 2) q(x)$  where the polynomial  $p(x) = x^3 - 6x^2 + 11x - 6 = 0$  has a root at  $x = 2$ . 2 CO2
- 3.a) What do you mean by *interpolation*? 1 CO3
- b) Show that  $\delta = E^{1/2} - E^{-1/2}$  and  $\mu = \frac{1}{2}(E^{1/2} + E^{-1/2})$ . 2 CO4
- c) Derive the *Newton's forward interpolation formula*. 3 CO3  
 OR  
 Derive the *Newton's divided difference formula*
- d) The following table gives the sales of a software firm for the five years. (4) CO4
- | Year  | 2008 | 2010 | 2012 | 2016 | 2020 |
|-------|------|------|------|------|------|
| Sales | 40   | 43   | 48   | 52   | 58   |
- (in millions)
- Estimate the sales for the year 2009 [if the *last digit* of your ID is *even*] / **2018** [if the *last digit* of your ID is *odd*] using a *suitable interpolation formula*

# International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE, Mid Term Exam, Spring 2022

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

Course Outcomes (COs) of the Questions	
CO1	Understand the architectures of different types of computer complex networks and protocols.
CO2	Analyze the architectures of different types of computer complex networks and protocols.
CO3	Analyze the performance of protocols and networks.
CO4	Demonstrate a familiarity with major network and security algorithms and protocols.

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

1. a) Make a list of activities that you do every day in which computer networks are used. How would your life be altered if these networks were suddenly switched off? List the negative impacts of computer network. CLO2 An 5
- b) When a file is transferred between two computers, two acknowledgement strategies are possible. In the first one, the file is chopped up into packets, which are individually acknowledged by the receiver, but the file transfer as a whole is not acknowledged. In the second one, the packets are not acknowledged individually, but the entire file is acknowledged when it arrives. Discuss these two approaches. CLO3 E 5
2. a) Compare the characteristics and performance of Pure and Slotted Aloha. CLO1 U 5
- b) Explain Nonpersistent and different variations of persistent CSMA. CLO4 An 5
- OR
- b) Analyze the major characteristics of a collision free protocol. CLO4 An 5
3. a) Both virtual circuits and datagrams have their supporters and their detractors. Make a comparison of datagram and virtual-circuit subnets with highlighting advantages and disadvantages of each system. CLO1 U 5
- b) An organization is using class c address 192.168.5.0. Perform the subnetting for 4. different departments. How many hosts can connect in each department? Write the beginning and ending ranges of IP addresses and broadcast address for all 4 departments. CLO2 An 5
- OR
- b) In the given IP address FDEC::BBFF:0:FFFF/60 how many bits can you use for host address? Expand the given address FDEC:0:BBFF::FFFF CLO2 An 5



**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**  
*B. Sc. in CSE Midterm Examination, Autumn 2022*

**Course Code: CSE 4747**

**Course Title: Mathematical Analysis for Computer Science**

**Total marks: 30**

**Time: 1 hour 30 minutes**

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

- |   |   | CO  | DL         |
|---|---|-----|------------|
| <b>1.</b>   |   |     |            |
| a) Find the solution of the following non-homogeneous recurrence equation $a_n = 2a_{n-1} - a_{n-2} + 2^n$ with $a_0 = 1$ and $a_1 = 2$ .   | 4 | CO1 | C2, C3     |
| b) Argue in favor of the recurrence relations that Josephus number $J(n)$ satisfies.  | 3 | CO1 | C2, C4     |
| d) Estimate how many slices of pizza can a person obtain by making $N$ straight cuts with a knife. Justify your recurrent solution.   | 3 | CO1 | C3         |
| <b>2.</b>   |   |     |            |
| a) Design a recurrent problem focusing on the following series as a closed form or solution. You need to specify the problem formulation and demonstrate the complete derivation of the solution. | 4 | CO1 | C2, C3, C4 |

$$1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{1}{6}n(n+1)(2n+1)$$

Or,

A Bank offer loans on the following terms: He loans a client  $m$  taka in the morning. This puts the client  $m$  dollars in the debt to bank. Each evening bank first charges a service fee which increase the client debt by  $f$  taka and then bank charges interest, which multiplies the debt by a factor of  $p$ . For example, Bank might charge a "modest" ten cent service fee and 1% interest rate per day, then  $f$  would be 0.1 and  $p$  would be 1.01. Now figure out the followings:

- i. What is the client's debt at the end of the second day?
- ii. Write a formula for the client's debt after  $k$  days and find an equivalent closed form?

- b) Find a closed form for the following expression:

3 C01 C3

$$\sum_{i=0}^n \sum_{j=1}^m (2m)^i$$

Or,

Find the closed form of the following equation

$$\sum_{i=2}^n \sum_{j=2}^n \frac{2i + 2j - 4}{(1-i)(1-j)}$$

- c) Solve the following expression:

3 C01 C3

$$\sum_{i=1}^n \sum_{j=1}^i \sum_{k=0}^j x^2 = x^2 + 1$$

$$\sum_{k=0}^j \frac{1}{(n-1)}$$

$$\begin{aligned} x^2 - x^2 + 1 &= 1 \\ (x^2 - 1) &= x^2 \\ (x-1)(x+1) &= x^2 \\ x^2 - x + 1 &= x^2 \end{aligned}$$

3.

- a) Assume that you are one of the selection committee members of the Bangladesh Cricket Board (BCB) and you need to select a team of  $n$  players for today's T20 match against Afghanistan. Now, use generating function to determine in how many ways can you form a team with  $n$  players considering the following constraints.

4 C02 C2, C3, C4, C5

- ❖ The number of wicketkeepers is at most one.
- ❖ There can be at most three pacers.
- ❖ There can be at most two spinners.
- ❖ The number of all-rounders must be a multiple of 3.
- ❖ The number of middle-order batsmen must be a multiple of 4.
- ❖ The number of opening batsmen must be even.

$$\begin{aligned} x + 1 + x \\ 1 + x + x^2 + x^3 \\ 1 + x + x^2 \end{aligned}$$

According to your solution, determine the number of ways when the number of players is eleven,

- b) Write down a faster alternative of the following code segment i.e. optimize it:

1 C02 C3

```
int N=100;
float sum = 0;
for (int i = 1; i <= N; i++)
    sum += i;
```

- c) In how many different ways you can place two black bishops and one black rock on a chessboard so that no two pieces any rows?

2 C02 C2

- d) You would like to buy a bouquet of flowers. You find an online shop that will make bouquets of lilies, roses, and tulips, subject to the following constraints:

3    C02    C2,  
C3,  
C4,  
C5

- ❖ there must be at most 2 lilies,
- ❖ there must be an even number of tulips,
- ❖ there can be any number of roses.

Now, use generating function to determine in how many ways can the online shop form a bouquet with  $n$  flowers.

Or,

There are 4 prizes you have distribute to the winner. There are 5 participants when

- i) Any participant will not get more than one prize?
- ii) A participant may get any number of prizes?
- iii) Any participant will not get all the prizes?

# International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Midterm Examination, Spring 2022

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

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

1. a) What is risk management? How can an organization manage the risks? CO1 U 5  
b) Describe a network security model for your IT infrastructure and explain the roles of different entities in the model. CO3 An 5
2. a) Explain the CIA triad with necessary examples. What is its significance? CO1 U 5  
b) Write down the steps of Cryptanalysis of Transposition cipher with example. CO2 An 5

OR

For a Shift cipher (Caesar cipher), find the cipher text for plaintext letter x with a shift value of  $k=3$ . Show modular operations in detail both for encryption and decryption

3. a) Why do we need both End to end and Link encryption? CO1 U 5

OR

Describe briefly the logical and physical access control methods

- b) Find the GCD of (450,120). How to find whether two numbers are co prime? CO2 App 5