International Islamic University Chittagong
Morality Development Program
Semester Final Examination, Spring-2022
3rd Semester *(for Muslim Students only; other than Shari'ah faculty)*
Course code: MDP-2303

Course Title: *Tajweedul Qur'an*-III (Arts of correct recitation of the Qur'an)

Full Marks: 50 **Time: 2 Hours**

Answer any five of the following questions: 10×5=50

1. Write the meaning of the following Suar (any two):
   a) *Surah At-Tin (سورة التين);*
   b) *Surah Ash-Sharh (سورة الشرح);*
   c) *Surah Ad-Duha (سورة الضحى).*

2. What is Waqf(الوقف)? Write down it's classification with example.

3. Explain the rule of Tafkheem (Velarization) and Tarqeek (Attenuation) in the Letter Laam (ل) of the name of the Majesty (الله), and Ra' (ر) in Arabic Alphabet.

4. Define the Velarization and Attenuation (التفخيم والترقيق) with it's catagory.

5. Explain the procedure of performing the Salatul Janazah (Funeral Prayer) serially.

6. Explain briefly five main types of Voluntary Prayers mentioning their importance in Islamic *Shari`ah.*

7. Suppose, you decided to perform two Rakat of Salatul Eid-al-Adha, how do you perform them? Explain.

International Islamic University Chittagong

Center for General Education (CGED)

Final Examination, Spring–2022

Course Title: Sciences of *Qur'an* and *Hadith* **Course Code: URED-2302**

(URED-2101 for Law Faculty)

Full Marks: 50 **Time: 2:30 Hours**

Answer any **five (5)** of the following
(All questions are of equal value):

1. Analyze the definitions and characteristics of *Makkai* and *Madani* revelations.

2. "*Asbabun Nuzul* is the best way to know the messages of Holy *Qur'an* properly"- assess this statement mentioning various types of *Asbabun Nuzul*.

3. "The concept of Abrogation (*An-Naskh*) removes the misconceptions and contradictions in the Holy *Qur'an*"- explain this statement summarizing various classifications and benefits of Abrogation in the Holy *Qur'an*.

4. Explain various miraculous aspects of the Holy *Qur'an* proving it as the best miracle of Prophet Muhammad (*SAAS*).

5. Discuss the compilation of *Qur`an* showing the differences between the two compilations of *Abu bakr* ® and *Uthman* ®

6. *Hadith* is the fundamental source of Islamic *Shariah*. Explain its importance.

7. Explain the following important terms with example **(any four)**:
   (a) *Sanad* (سند)
   (b) *Matan* (متن)
   (c) *Al-Hadith Al-Qudsi* (الحديث القد سي)
   (d) *Six Books of Hadith* (الكتب الستة)
   (e) *Al-Hadith Al-Sahih* (الحديث الصحيح)
   (f)*Al-Hadith Al-Maudu`* (الحديث الموضوع)

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International Islamic University Chittagong

Department of Computer Science & Engineering

B.Sc. in CSE Final Examination, Spring 2022

Course Title: Mathematics-III Course Code: MATH-2307 (New)
Course Title: Mathematics-IV Course Code: MATH-2401 (Old)

Time: 2 Hours 30 Minutes **Full Marks: 50**

(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 fundamentals of Matrix , Linear system of equations & Vector analysis
CO2	**Implement** the fundamental knowledge of Matrix, linear system of equations, vector functions, vector field, scalar field, gradient, divergence, curl, differentiation and integration of vector valued functions, partial derivatives in different problems
CO3	**Solve** line integrals, surface area, surface integrals, volume integrals, and the work done in different problems
CO4	**Apply** Green's theorem, Stoke's theorem, Gauss' theorem in solving mathematical problems

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 following questions

1. a) Examine the eigen decomposition for the matrix $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ **CO1 An 10**

Or

1. a) (a) If $\vec{A} = A_x\vec{i} + A_y\vec{j} + A_z\vec{k}$ and $\vec{B} = B_x\vec{i} + B_y\vec{j} + B_z\vec{k}$ find $\vec{A} \times \vec{B}$. **CO1 An 5**

1. b) Find a unit vector perpendicular to the vector $\vec{a} = 3\vec{i} + \vec{j}$ and $\vec{b} = -\vec{i} + 2\vec{j} + 2\vec{k}$. **CO1 An 5**

2. a) A particle moves through 3-space in such a way that its velocity is $\vec{\mathbf{v}}(\mathbf{t}) = \hat{\mathbf{i}} + \mathbf{t}\,\hat{\mathbf{j}} + \mathbf{t}^2\,\hat{\mathbf{k}}$. Find the co-ordinates of the particle at time $\mathbf{t = 1}$ given that the particle is at the point $\mathbf{(-1,2,4)}$ at time $\mathbf{t = 0}$ **CO2 App 5**

2. b) Show that $\vec{A} = \vec{i} + 2\vec{j} - 3\vec{k}$, $\vec{B} = 2\vec{i} - \vec{j} + 2\vec{k}$ and $\vec{C} = 3\vec{i} + \vec{j} - \vec{k}$ are coplanar. **CO2 App 5**

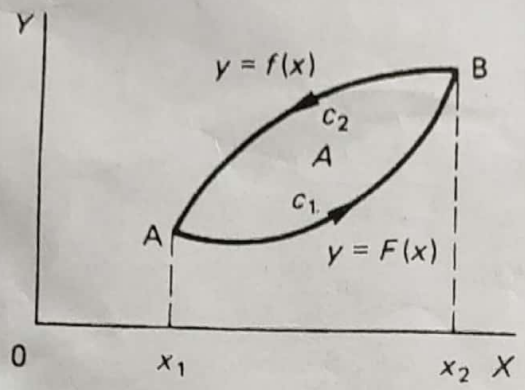
Part B

Answer the following questions

3. a) Find the directional derivative of the function $\phi = x^2y + y^2z + z^2x$ at the point of (1, -1, 2) in the direction of the vector $\vec{A} = 4\hat{i} + 2\hat{j} - 5\hat{k}$. CO2 U 4

b) Find the angle between the surfaces $x^2 + y^2 + z^2 = 2$ and $z = x^2 + y^2 - 1$ at the point (2,-1, 2) CO2 U 4

c) CO3 U 2



What is the value of A?

4. a) Evaluate the line intregal $\int \bar{F}.d\bar{r}$ where the force field is given by $\bar{F}(x,y) = 3xy\vec{i} - 5z\vec{j} + 10x\vec{k}$ along the curve $x = t^2 + 1, y = 2t^2, z = t^3$ from t=1 to t=2. CO3 App 5

b) Evaluate $\int_c xy\,dx$ from B(1,0) to C(0,1) along the curve C that is the portion of $x^2 + y^2 = 1$ in the first quadrant. CO3 App 5

5. a) Verify the Divergence theorem for $\vec{F} = (2xy + z)\hat{i} + y^2\hat{j} - (x + 3y)\hat{k}$ taken over the region bounded by the planes, $2x + 2y + z = 6, x = 0, y = 0, z = 0$ CO4 App 10

Or

5. a) Find the work done by the force $F(x,y) = x^3y\vec{i} + (x - y)\vec{j}$ on a particle that moves along the parabola $y = x^2$ from (-2,4) to (1,1). CO4 App 5

b) Evaluate $\int_c xy\,dx + (2x - y)dy$ round the region bounded on the curve $y = x^2$ and $x = y^2$ by using Green's theorm. CO4 App 5

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Final Exam, Spring 2022

Course Code: **STAT 2311** Course Title: Probability and Statistics

Time: 2 hours 30 minutes **Full Marks: 50**

The figures in the right-hand margin indicate full marks

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) What is correlation and correlation coefficient? How to interpret a correlation coefficient? Explain various types of correlation with the help of scatter diagrams. CO2 An 4

Or,

1 a) What is linear regression? State some uses of regression in engineering statistics. Distinguish between correlation coefficient and regression coefficient. CO2 An 4

1 b) The following table gives information on ages and cholesterol levels for a random sample of six men. CO2 E 6

Age	48	59	43	63	52	41
Cholesterol level	184	205	193	154	213	135

(i) Compute correlation coefficient between age and cholesterol level.

(ii) Find the regression of cholesterol level on age.

(iii) Predict the Cholesterol level of 65 years-old man.

2 a) Explain the followings with example: (i) Random experiment; (ii) Sample space; (iii) Conditional Probability and (iv) Independent event. CO3 U 4

2 b) A computer center has 120 computers which are collected from three companies A, B, and C. The selected computers from these companies are 50, 40 and 30 respectively. The probabilities of trouble which is faced in these computers daily are 0.20, 0.25, and 0.35 respectively. One day during work a computer is found defective. What is the probability that it was collected from company B? CO3 E 6

Or,

2 b) Suppose that $P(A|B)=0.2$, $P(A|B')=0.3$ and $P(B)=0.8$. Are A and B independent? Determine the followings: (i) $P(A)$, (ii) $P(A\cup B)'$, (iii) $P(A'B)$ CO3 E 6

Part B

[Answer the questions from the followings]

3.	a)	What does the expected value of a random variable measure? Could the expected value be negative? State four important properties of variance of a random variable.	CO3	An	4
3.	b)	Suppose that in a certain region of a country the daily rainfall (in inches) is a continuous random variable X with probability density function f(x) given by $f(x)=\frac{3}{12}\left(6x-3x^2\right),\ 0<x<2$ Find the probability that at a given day in this region the rainfall is (i) not more than 1.5 inches. (ii) between 0.5 and 1.5 inches. Also calculate mean and variance of the daily rainfall (in inches).	CO3	E	6
		Or,			
3.	b)	A continuous random variable X has the following probability density function: $f(x)=\frac{1}{24}\left(x^2+1\right);\ 1<x<4$ Compute (i) the value of E(X) (ii) SD(X) (iii) $P(x<2.5)$ and (iv) $P(x>2.3)$	CO3	E	6
4.	a)	What are the parameters of a binomial distribution? Why are they so called? Define normal probability distribution with its importance.	CO3	U	4
		Or,			
4.	a)	What are the inherent assumptions of binomial distribution? Under what conditions will binomial distribution tend to Poisson distribution? Write some practical situations suitable for Poisson distribution.	CO3	U	4
4.	b)	The number of Website visitors per hour follows Poisson distribution with parameter $m=3$. Find the probability that (i) No people visit the website in a particular hour (ii) Exactly one visitor visit the website (iii) At most 2 visitor visit the website	CO3	E	6
5.	a)	Discuss the different steps of formulation of a test of hypothesis. Write some applications of χ^2 -test?	CO4	U	4
5.	b)	The following contingency table shows the classification of 200 peoples according to the gender and reference of color:	CO4	C	6

Colour	Gender	
	Male	Female
Green	40	60
White	35	25
Yellow	25	15

Test whether there is any relationship between gender and preference of color at $\alpha=0.01$

At 1% level of significance tabulated value of Chi-square @ 2 df = 9.21

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Final Examination, Spring 2022

Course Code: CSE 2321 **Course Title: Data Structures**

Time: 2 Hours 30 Minutes Total Marks: 50

[Answer *all* the following questions. Figures in the right hand margin indicate full marks. Use a Separate answer script for Group-A and Group-B.]

CLO DL

Group A

1. a) Let N be an integer and suppose **G(N)** is recursively defined by CLO1 C2 3

$$G(N) = \begin{cases} 3 * N & if\ N < 5 \\ 2 * G(N-5) + X & otherwise \end{cases}$$

i) Find the base criteria of G.
ii) Find G(2), G(8) and G(24).
[Here X is the last digit of your ID. For example, if ID is C191085, X will be 5].

b) Consider the following *circular queue* where Queue is allocated six memory cells: CLO1 C2 2
FRONT=2, REAR=5 QUEUE: _, _, U, C, S, _
Illustrate the Queue, including **FRONT** and **REAR**, as the following sequences take place:
i) **E** is added
ii) Two items are deleted
iii) **U, V, A** are added
iv) Three items are deleted

c) Write a procedure to insert an element into a circular queue and delete an element from a circular queue. CLO3 C4 5

Or

Tower of Hanoi consists of three pegs or towers with n disks placed one over the other. The objective of the puzzle is to move the stack to another peg following these simple rules. Only one disk can be moved at a time. No disk can be placed on top of the smaller disk. CLO3 C4 5
How many moves does it take to solve the Tower of Hanoi for 5 disks?

2. a) What is linked list? What are the advantages and disadvantages of linked list over the linear array. CLO2 C2 2

b) What is two way linked list? Form a two way linked list from the following one way list. CLO1 C2 3

	1	2	3	4	5	6	7	8	9	10	11	12
INFO:			41	129		9	123	78	194	231	62	145
LINK:	2	5	11	12	0	3	4	7	10	0	8	9
START : 6 AVAIL : 1												

c) Complete a procedure to store an array into a two ways link list. CLO3 C4 5

Or

Let LIST be a linked list in memory. Each node of the list has a single character value. Write an algorithm to print all 'A' character in the LIST. CLO3 C4 5

Group B

3. a) Illustrate the hash function. CLO3 C2 2
b) Research the following algorithms to compare their complexity: CLO2 C3 4
i) Linear Search Algorithm
ii) Bubble Sort Algorithm
iii) Binary Search Algorithm
iv) Insertion Sort Algorithm
v) Selection Sort Algorithm

c) Suppose the following characters are stored in an array A: CLO3 C2 4
B, A, N, G, L, A, D, E, S, H
Apply ***selection sort*** algorithm to sort the array A and show each pass separately.

Or

Suppose the following characters are stored in an array A: CLO3 C2 4
D, A, T, A, S, T, R, U, C, T, U, R, E, S
Apply ***insertion sort*** algorithm to sort the array A and show each pass separately.

4. a) Analyze the differences between Binary tree and Complete binary tree with figure. CLO1 C2 5
Construct an *expression tree* **T** for the following arithmetic expression:
(A + B * C) + ((D / E - F) * G)
Traverse the tree T in **preorder, postorder** and **inorder**.

b) Explain which data structure is most efficient to find the *top 10 largest items* out of *1 million items* stored in file? Why? CLO4 C4 1
i) Min heap ii) Max heap iii) BST iv) Sorted array

c) What is a *binary search tree*? Suppose the following eight numbers are inserted in order into an empty binary search tree. CLO1 C2 4
49, 42, 19, 62, 37, 79, 44, 8
i) Draw the tree T.
ii) Find the inorder traversal of T.

Or

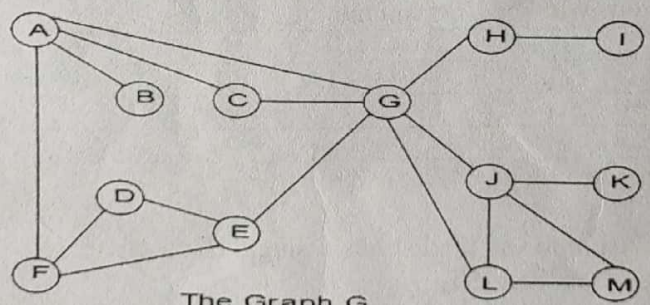
What do you mean by *max heap*? Build a max heap from the following list of numbers (Show each step): CLO1 C2 4
33, 29, 49, 21, 57, 62, 73, 54

5. a) Define *graph*? Draw a picture of the directed graph specified below: CLO1 C2 3
G = (V, E)
V(G) = {1, 2, 3, 4, 5, 6}
E(G) = {(1,2), (2, 3), (3, 4), (5,1), (5, 6), (2, 6), (1, 6), (4, 6), (2, 4)}
Obtain the following for the above graph:
i) Find the *adjacency matrix* A of the graph G.
ii) Find the *adjacency list* of the graph G.

b) For a set of vertexes V with n elements, how many possible edges there? CLO2 C2 2

c) Give a comparison between *breadth first search* and *depth first search*. CLO1 C4 1

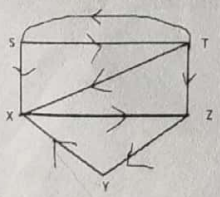
d) Traverse the graph G shown below in **breadth first order**, **depth first order** and construct the **breadth first** and **depth first spanning trees**. Start from node **C** [if last digit of your ID is *odd*] / **J** [if last digit of your ID is *even*]. CLO1 C2 4



The Graph G

Or

Analyze the following graph G to CO3 C4 4
i. Evaluate the adjacency matrix A of Graph G.
ii. Evaluate the path matrix P of Graph G.



International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Semester Final Examination, Spring 2022

Course Code: **CSE 2323** Course Title: **Digital Logic Design**

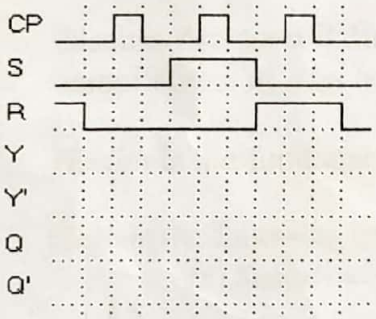
Time: 2 hours 30 minutes Full Marks: 50

The figures in the right-hand margin indicate full marks

Part A

[Answer the questions from the followings]

1.	a)	Design a look-ahead carry generator for a 3-bit full-adder.	**CO2**	**A**	5
		Or,			
1.	a)	Design a asynchronous ripple down counter.	**CO2**	**A**	5
1.	b)	Design a J-K flip-flop and show its characteristic equation, characteristic table, and logic diagram.	**CO1**	**U**	5
2.	a)	Enter the expected timing diagram for the signals Y, Y', Q, and Q' for a master slave S-R flip flop.	**CO2**	**U**	5



2.	b)	Design a 5X32 decoder with four 3x8 decoder and a 2x4 decoder. Use a block diagram.	**CO3**	**A**	5
		Or,			
2.	b)	Design a circuit that compares two 3 bit numbers, A and B, to check, if they are equal. The circuit has one output x, so that x=1 if A=B, and x=0 if A≠ B. Show the output by providing data into the circuit.	**CO3**	**A**	5

Part B

[Answer the questions from the followings]

3.	a)	Design a sequential circuit with JK flip-flops to satisfy the following state equations: A(t+1)=A′B′CD+A′B′C+ACD+AC′D′ B(t+1)=A′C+CD′+A′BC′ C(t+1)=B D(t+1)=D′	**CO2**	**A**	**5**
3.	b)	Design a 2 bits synchronous counter by JK Flip Flop.	**CO2**	**A**	**5**
4.	a)	Design a counter using SR flip-flops with the repeated following binary sequence: 0, 1, 3,2, 6,4,5,7.	**CO2**	**A**	**5**
4.	b)	Design Johnson's counter	**CO3**	**N**	**5**
5.	a)	Define ROM.	**CO1**	**U**	**2**
5.	b)	Implement the functions $F(w,x,y,z)=\sum(0,1,3,4,8,9,15)$ with ROM.	**CO2**	**A**	**8**
		Or,			
5.	a)	Define register. Define the functions of universal shift registrar.	**CO1**	**U**	**3**
5.	b)	A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers. How many selection inputs are there in each multiplexer? What size of multiplexers are needed? How many multiplexers are there in the bus?	**CO2**	**E**	**7**

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Final Exam, Spring 2022

Course Code: **CSE 2340** Course Title: **Software Development 1**

Time: 2 hours 30 minutes Full Marks: 50

Part A

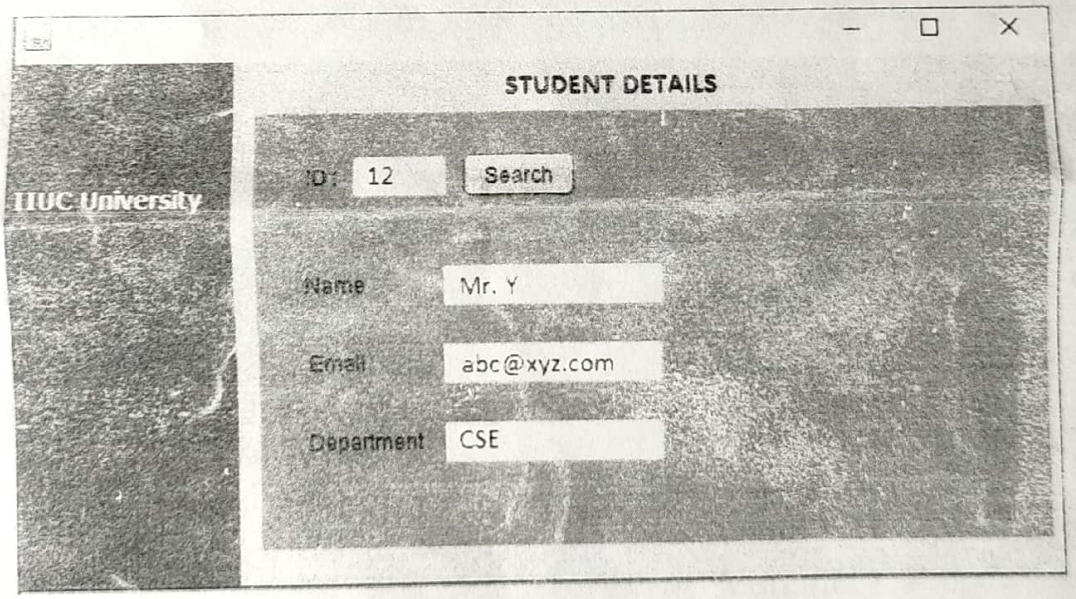
[Answer the questions from the followings]

1 a) Download the "**SD1FinalExam**" project by "git clone" command from this link https://github.com/HiddenHopes/SD1FinalExam . 2

1. b) Connect to MySQL Database server and import the **.sql** file from following directory "SD1FinalExam/NecessaryFiles" and write an SQL query to insert your details with **ID**, **Name**, **Email** and **Department**. 8

2. a) Go inside the project directory and open **Git Bash**. **Checkout** to **master** branch and create a new branch with your **ID** with **Git** command. 2

2. b) Open the project with **NetBeans IDE** and make a Frame like below screen. On **Search** button click, fetch the Student's details by **ID** from **STUDENT** Table. 8



3. a) Open **Git Bash** and **Commit** all the new changes with a commit message. 4

3. b) **Push** the code to the remote server (Github). 6

Part B

[Viva]

4. Viva on Software Development (Java, Java OOP, MySQL, GIT) 20