

International Islamic University Chittagong
Morality Development Program

Midterm Examination, Spring-2024
3rd Semester (other than Shari'ah faculty)

Course Title: Tajweedul Qur'an-III Course code: MDP-2303

Full Marks: 30

Time: 1.50 Hours

Answer all questions; all questions are of equal value:

1. Write the meaning of the following Surahs: (Any two) 5x2 =10
 - a) Surah Al-Qari'ah (سورة القارعة);
 - b) Surah Az-Ziljal (سورة الزلزال).
 - c) Surah Al-Qadr (سورة القدر);
2. What does *Lahn* mean literally and terminologically? Explain types of *Lahn* with examples. 6+4=10
3. (a) Explain following terms of *Sifat* and mention opposite types of them: (i) *Al-Jahr* (ii) *Al-Shiddah* (iii) *Al-Isli'la* (iv) *Al-Intibak* (v) *Al-Ijlak*. 5x2 =10

Or,

- (b) Define *Sifaatul Huruf* (Characteristics of letters). How many types of *Siffaatul Huruf* are there in *Tajweed* primarily and totally? Explain.

3+7=10

International Islamic University Chittagong (IIUC)
Department of Computer Science and Engineering (CSE)
B. Sc. in CSE, Mid Term Examination, Spring-2024
Course Code: MATH-2307, Course Title: Mathematics-III

Time: 1:30 hours

Marks: 30

[Answer all questions; Read the instruction below before answering the questions; Figures in right hand margin indicate full marks]

1. a) If the matrix $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, find the value of x and hence present the matrix A 3 CLO1 C2

Or

- Prove that $A = \begin{bmatrix} 2 & 2-3i & 3+5i \\ 2+3i & 3 & i \\ 3-5i & -i & 5 \end{bmatrix}$ is Hermitian 3 CLO1 C2

- b) Check whether it is singular matrix $\begin{bmatrix} 1 & 2 & d \\ 2 & 4 & e \\ 3 & 5 & f \end{bmatrix}$; Where d, e and f are the digits of your own ID number 2 CLO1 C2

- c) Give an example of a Tri-diagonal matrix 1 CLO1 C2
- d) Give one example of an Augmented Matrix 1 CLO1 C2
- e) What is the relation between Eigen vector, Eigen value and given matrix 1 CLO1 C2

- f) Find the area of the parallelogram constructed by the vectors $\vec{u} = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ and $\vec{v} = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$ Or 2 CLO1 C2

- Test whether $\lambda_1 = f$ and $\lambda_2 = e$ are Eigen values for $A = \begin{bmatrix} 5 & 3 \\ 2 & 3 \end{bmatrix}$; Where e and f are the digits of your own ID number 2 CLO2 C2

2. a) Determine which of the following vectors are Eigen vectors for $A = \begin{pmatrix} 2 & f \\ -1 & -5 \end{pmatrix}$ showing your analysis procedure graphically 5 CLO2 C2

- (a) $\begin{pmatrix} a \\ e \end{pmatrix}$ (b) $\begin{pmatrix} b \\ f \end{pmatrix}$; Where a, b, e and f are the digits of your own ID number

b) Determine whether the following vectors in \mathbb{R}^3 are linearly dependent 5 CLO2 C2

or linearly independent $x_1 = \begin{bmatrix} 2 \\ 2 \\ 0 \end{bmatrix}, x_2 = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 4 \\ 2 \\ -2 \end{bmatrix}$

Or

Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$ and hence 5 CLO2 C2
find A^{-1} .

3.

Diagonalize the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

10 CLO2 C2

$$|A| = 8 + 3$$

Instruction:

If your ID no is C171023 then you can assign your digit as follows

C	1	7	1	0	2	3
	↓	↓	↓	↓	↓	↓
	a	b	c	d	e	f

To solve the above problem, you need to use your own ID number where needed

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. Engineering in CSE

Mid term Examination, Spring- 2024

Course Code: CHEM-2301

Course Title: Chemistry

Time: 1 hour 30 minutes

Full Marks: 30

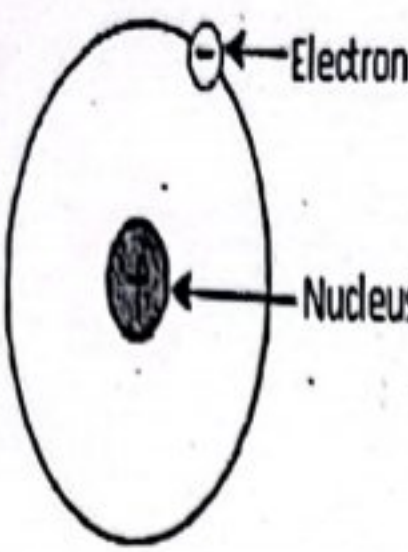
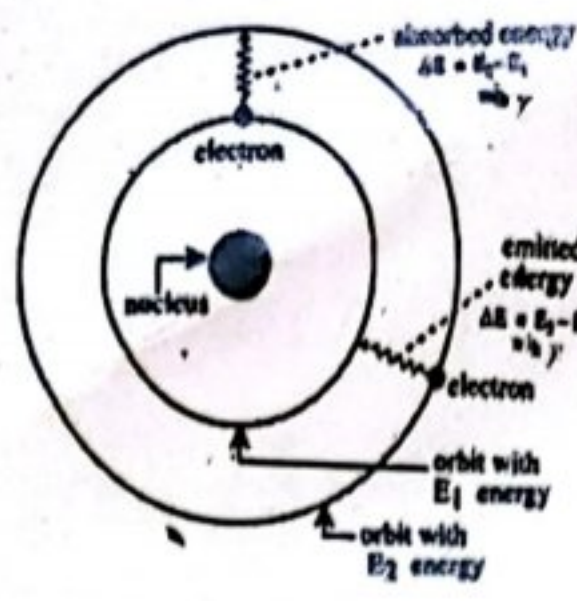
- (i) Answer all the questions. The figures in the right-hand margin indicate full marks.
(ii) Course Learning Outcomes (COs) and Bloom's Levels are mentioned in additional Columns.

Bloom's Levels of the Questions

Letter Symbols	R	Un	Ap	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Fill in the gaps of the following table and find out the isotopes, isobars and isotones from it and also write their chemical formulae. Also Comment on their physical and chemical properties

1) a)	Name	Atomic number (Z)	Mass number(A)	Proton number (p)	Neutron number(n)	CLO2	An	5
	A	6			6			
	B		64		36			
	C		30	14				
	D		13		7			
	E			29	35			
	F	16			16			
1) b)	Suppose an electron is in N shell. Find out the four quantum number values for it.					CLO3	Ap	2

1)	c)	<p>Follow the figures and answer the following question</p> <div><div><p>Model -A</p></div><div><p>Model-B</p></div></div> <p>Which model is much acceptable and why mentioning the two limitations for each model.</p>	CLO2	An	3																								
2)	a)	<p>Which of the following sets of quantum numbers are allowable or not allowable and why?</p> <table><tr><td>i. $n=1$</td><td>$l=1$</td><td>$m=0$</td><td>$s=+1/2$</td></tr><tr><td>ii. $n=2$</td><td>$l=0$</td><td>$m=+1$</td><td>$s=-1/2$</td></tr><tr><td>iii. $n=3$</td><td>$l=2$</td><td>$m=0$</td><td>$s=+1/2$</td></tr><tr><td>iv. $n=4$</td><td>$l=2$</td><td>$m=+2$</td><td>$s=-1/2$</td></tr><tr><td>v. $n=2$</td><td>$l=2$</td><td>$m=+1$</td><td>$s=-1/2$</td></tr><tr><td>vi. $n=4$</td><td>$l=2$</td><td>$m=+4$</td><td>$s=-1/2$</td></tr></table>	i. $n=1$	$l=1$	$m=0$	$s=+1/2$	ii. $n=2$	$l=0$	$m=+1$	$s=-1/2$	iii. $n=3$	$l=2$	$m=0$	$s=+1/2$	iv. $n=4$	$l=2$	$m=+2$	$s=-1/2$	v. $n=2$	$l=2$	$m=+1$	$s=-1/2$	vi. $n=4$	$l=2$	$m=+4$	$s=-1/2$	CLO2	Ap	4
i. $n=1$	$l=1$	$m=0$	$s=+1/2$																										
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iii. $n=3$	$l=2$	$m=0$	$s=+1/2$																										
iv. $n=4$	$l=2$	$m=+2$	$s=-1/2$																										
v. $n=2$	$l=2$	$m=+1$	$s=-1/2$																										
vi. $n=4$	$l=2$	$m=+4$	$s=-1/2$																										
2)	b)	<p>Why 3f is not possible? Arrange the following orbitals according to order of higher energy- 7p, 6s, 3d, 4d, 5f, 4s, 6d</p>	CLO2	An	4																								
2)	c)	<p>Discuss the electronic Configuration of Cr_{24} and Cu_{29}.</p>	CLO2	Un	2																								
		<p style="text-align: center;">OR</p>																											
2)	a)	<p>Why and how atoms combine together?</p>	CLO1	R/Un	3																								
2)	b)	<p>Discuss the ionic and covalent bond with suitable examples and necessary diagrams.</p>	CLO2	An	5																								
2)	c)	<p>Suggest an example in Which major three types of chemical bonds are present.</p>	CLO2	E	2																								
3)	a)	<p>State Modern periodic Law. Discuss the s, p, d and f block elements with two examples.</p>	CLO1	R/Un	1+3																								
3)	b)	<p>Write the electronic configuration and mention the position of the following elements in the periodic table: (i) $\text{Fe}_{(26)}$, (ii) $\text{Br}_{(35)}$ (iii) $\text{K}_{(19)}$ and (iv) $\text{Al}_{(13)}$</p>	CLO3	An	4																								
3)	c)	<p>Write down the key feature of Mendeleev's periodic table.</p>	CLO1	R/Un	2																								

Bismillahir Rahmanir Rahim
International Islamic University Chittagong
Department of Computer Science & Engineering
Mid Term Examination, Spring 2024
CSE 2321 Data Structures
Total marks: 30 Time: 90 minutes

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

1. a) A professor keeps a class list containing the following data for each student: 2. CO1 C2
Name, ID Number, Section, Total Marks, Final Grade
i) State the *entities, attributes* and *entity set* of the list.
ii) Which attribute can serve as the *primary key* for the list?
- b) Draw a flowchart for binary search algorithm 3 CO1 C2
Or
Draw a flowchart to determine whether a given number *N* is *prime* or not.
- c) What do you mean by *space complexity*? What is the *space complexity* of the following 2 CO2 C2
functions? Explain.
i)

```
void swap()  
{  
    int a, b, temp;  
    temp = a;  
    a = b;  
    b = temp;  
}
```


ii)

```
int sum(int a[], int n)  
{  
    int i, sum = 0;  
    for(i = 0; i < n; i += 2)  
        sum += a[i];  
    return sum;  
}
```
- d) For the following pattern *P* and text *T*, find the number *C* of comparisons to find the **INDEX** 3. CO3 C3
of *P* in *T* using the *pattern matching algorithm* you studied. You have to show each step.
P = ccd, *T* = cbcddcdcdcdccccddd
2. a) Write an algorithm to *insert* an element *ITEM* to the *Kth* position of a linear array *LA*. What 2.5 CO1 C2
is the time complexity of your algorithm?
- b) Consider an array *B*(1:8, -5:5, -10:5). 2.5 CO3 C3
i) Find the *length* of each dimension and the *number of elements* in *B*.
ii) Suppose *Base (B)* = 150 and *w* = 4 words per memory cell for *B*.
Find the effective indices *E₁*, *E₂*, *E₃* and the address of the element *B* [2, -3, 2] assuming *B*
is stored in *row-major order*.
- c) Given a string **STRUCTURES**, find the number of *comparisons* (*C*) and number of 3.5 CO3 C3
interchanges (*D*) needed to *sort* the string *alphabetically* by using *bubble sort* algorithm.
Show each steps.
Or
Modify the *bubble sort* algorithm so that it will stop early if it detects that the list is already
sorted. Write the modified *bubble sort* algorithm.
- d) Write down the *worst case* & *average case* complexity for the following algorithm: 1.5 CO1 C1
i) Binary search ii) Linear search iii) Bubble Sort

3. a) What is *stack*? Write a procedure to **PUSH** an item onto a stack and **POP** an item from the stack. 2.5 CO1 C2

b) Suppose the following stack of integers is in memory where **STACK** is allocated $N = 8$ memory cells: 1 CO1 C2

TOP = 4 **STACK:** 11, 22 33, 44, __, __, __, __

Describe the **STACK** and **TOP** as the following operations take place –

- i) POP (STACK, ITEM) iii) PUSH (STACK, 99)
ii) PUSH (STACK, 77) iv) POP (STACK, ITEM)

c) Consider the following postfix expression, 2.5 CO3 C2

P: 3, 2, +, 2, ^, 7, 4, -, 2, *, +, 5, -

Evaluate P, using the algorithm you have studied.

d) Consider the following *infix* expression Q: 4 CO3 C2

Q: $((A + B) / D) ^ ((E - F) * G)$

Translate Q into its equivalent *postfix* expression P using the algorithm you studied.

Or

Write an algorithm that receives a bracket sequence and tells whether the sequence is correct or incorrect.

For example, "()", "()[]{ }", "({ })[]" are correct sequences while, "({ })[])", "{]" are not.

[You can safely assume that the required data structure and its operational algorithms are available to you to solve this problem. You don't need to re-implement them.]

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Spring- 2024

Course Code: STAT 2311 Course Title: Probability and Statistics

Total marks: 30, Time: 1 hours 30 minutes

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

CO DL

- 1.
- a) Define statistics and explain its importance in the field of computer science and engineering. 5 CO1 C2
- b) What is a quantitative variable? Determine whether these variables are discrete or continuous or qualitative? 5 CO1 C5
- (i) Time it takes for students to finish their assignment (ii) Number of books in the library (iii) Price of laptop (iv) Number of visitors to hit a website (v) Thesis titles.

- 2.
- a) Define weighted average. Can you compare the weighted average with other types of averages? Write some real-world applications where weighted average is commonly used? 5 CO1 C2
- b) In a study, students were surveyed regarding their weekly coding practice time, which was categorized as follows: 5 CO1 C4

Hours Spent (per week)	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	5	8	9	20	12	6

- (i) Calculate the mean and median weekly coding practice time (ii) What percentage of students spends more than 20 hours per week on coding practice? (iii) Draw an ogive curve and hence locate median.

Or

- a) Distinguish between: (i) Primary data and secondary data.
(ii) Discrete variable and continuous variable.
- b) Suppose the heights in inches of the students in your section are as follows: 66, 77, 68, 63, 72, 60, 66, 70, 71 and your height in inches. What would be the mean, median and mode of this data? Can you compute the variance, standard deviation, and coefficient of variation for this dataset? Which measure would best represent this data?

- 3.
- a) What is meant by dispersion? What are its important measures? Discuss mean deviation and the coefficient of variation. 5 CO1 C2
- b) The runs scored by two batsmen in their last 6 ODI cricket matches are given below: 5 CO1 C4

Batsman- X	65	25	78	Sum of last two digits of your ID	51	34
Batsman-Y	40	35	18	28	25	41

- (i) Which batsman has a higher average run?
(ii) Which batsman is more consistent?

International Islamic University Chittagong

Center for General Education (CGED)

Midterm Examination, Spring-2024

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

(For Law faculty: URED-2101)

Full Marks: 30

Time: 1 hour & 30 minutes

Answer all questions. The right side columns contain marks, CLOs, and

Bloom's taxonomy domain for each question.

#	Questions	Marks	CLOs	Bloom's taxonomy domain
1	<p>a) Define Al-Qur'an literally and terminologically. Explain some names of the holy Qur'an. Prove that the holy Qur'an is the speech of Allah (SWT).</p> <p style="text-align: center;">Or,</p> <p>b) <i>"The holy Qur'an is the purest source of Islamic Shari'ah"</i>- justify this statement summarizing some extraordinary characteristics of the holy Qur'an and proving the superiority of this Book over other Devine Books.</p>	10	2	Remember & Create
2	"The holy Qur'an was revealed in various stages"- explain these stages investigating some proper reasons for revealing the holy Qur'an in many stages.	10	2	Create
3	Verify some opinions of Muslim scholars regarding the number of <i>Ayat</i> and <i>Suar</i> of the holy Qur'an demonstrating some important classifications of <i>Suar</i> of the holy Qur'an elaborately.	10	2	Apply & Understand

International Islamic University Chittagong

Department of Computer Science & Engineering

Program: B.Sc. in CSE; Semester: 3rd

Mid Term Examination, Spring-2024

Course Code: CSE-2323

Course Title: Digital Logic Design

Time: 1 Hour 30 minutes

Total Marks: 30

Answer the following Three (3) questions. Parts of the same questions must be answered serially. Each question carries 10 marks.

Question : 1	<p>a) Convert Boolean expression in standard form $F=y'+xz'+xyz$. Minimize the following 5 variable SOP function using K map : $F(A,B,C,D,E)=\sum m(0,5,6,8,9,10,11,16,20,24,25,26,27)$.</p> <p>b) Design a circuit that has a 3-bit binary input B_2, B_1, B_0 (where B_2 is MSB and B_0 is LSB) and a single output (Z) specified as follows: $Z = 0$, non prime number $Z = 1$, prime numbers 2, 3, 5, 7</p>	<p>2+5=7</p> <p>3</p>
Question : 2	<p>a) Simplify the expression using Consensus Theorem $F = (A + B).(A' + C).(B + C)$</p> <p>b) Design a circuit that the Dual-Function Gate can perform two different logical operations on the data inputs, A and B, depending on the select input X.</p> <ul style="list-style-type: none">• $X=0$ NAND• $X=1$ NOR <p>c) Function $F = \sum(1,2,3,4,5,7)$ Minimize and implement with NAND. Is 7421 a self-complementing code or not? Justify.</p> <p>If we have 4 input NAND gate then how many 2 input NAND gates are required to implement it?</p>	<p>2</p> <p>3</p> <p>2+1+2=5</p>

