International Islamic University Chittagong
Center for General Education (CGED)
Midterm Examination Autumn Semester- 2023
Course Code: GEBL-2401
Course Title: Bangla Language and Literature
Full Marks: 30 Time: 1.5 Hours

ক-বিভাগ
ভাষা ও নির্মিতি: ২০
(প্রতিটি প্রশ্নের মান সমান।)

প্রশ্ন নং	বর্ণনা	মান	CLO	Cognitive learning
০১.	বাংলা ভাষার উদ্ভব ও বিকাশের গতি প্রকৃতি সম্বন্ধে একটি নিবন্ধ উপস্থাপন কর।	১০	CLO1	Create
	অথবা "যৌতুক একটি সামাজিক অভিশাপ"-শীর্ষক একটি বক্তব্য রচনা কর।	১০	CLO1	Create
০২.	ক. স্বরধ্বনি কাকে বলে? বাংলা মৌলিক স্বরধ্বনিগুলো উল্লেখ কর।	৫	CLO1	Understand
	খ. স্বরযন্ত্রের অবস্থা অনুযায়ী বাংলা ব্যঞ্জনধ্বনির শ্রেণিবিভাগ দেখাও।	৫	CLO1	Apply

খ-বিভাগ
সাহিত্য: ১০

প্রশ্ন নং	বর্ণনা	মান	CLO	Cognitive learning
০১.	"পুঁইমাচা" গল্পে প্রতিফলিত সমকালীন সমাজব্যবস্থার স্বরূপ নির্ণয় কর।	১০	CLO2 CLO3	Analyze

International Islamic University Chittagong
Department of Computer Science and Engineering
B. Sc. Engineering in CSE
Midterm Exam, Autumn 2023

Course Code: **ACC 2401** Course Title: **Financial and Managerial Accounting**
Time: 1 hour 30 minutes Full Marks: 30

Answer all the questions. The figures in the right-hand margin indicate full marks.

Course Outcomes (COs), Program Outcomes (POs) and Bloom's Levels (BL) of the Questions			
CO	**CO Statements**	**PO**	**BL**
CO1	**Explain** the basic concept of financial accounting, cost accounting and management accounting.	PO11	C2
CO2	**Analyze** the basic concept of Cost Accounting and preparation of Cost Sheet.	PO11	C4
CO3	**Apply** the tools from accounting and cost accounting this would facilitate the decision making i.e. Budgeting, Make or Buy decision.	PO11	C3
CO4	**Compare** the different business situations and suggest to best solution with analytical abilities.	PO11	C5

Bloom's Levels (BL) of the Questions						
Letter Symbols	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

1)	a)	"Owners' Equity is internal claim in a business" Place your explanation about this statement with details elaboration of Accounting Equation.	CO1	Un	4
1)	b)	"A company has limited liability", Explain this statement with the types of business organization.	CO1	Un	6
2)		Mrs. Alisha opens a business firm that names ALISHA ENTERPISE on Jan 01, 2023. He will be the sole owner of the business. During the month January 2023 the following transactions take place: a. Mrs. Alisha invested \$2,00,000 in a business bank account and a Flat valued \$30,00,000 . b. Mrs. Alisha pays \$20,000 for a standard house to be used as an office. c. Mrs. Alisha sale some office supplies \$(Last Four digit of your student ID) on account. 1229 d. Mrs. Alisha locates apartments for clients and receives cash of \$2,000. e. Mrs. Alisha pays \$3,000 of personal funds for a vacation of her family. f. Consulted on the interior design of an office and billed the client for services rendered, \$5,000. g. Paid advertising bill \$500. h. Collected cash from a customer on account, \$2,000. i. Withdraw cash of \$10,000 for personal use. **Required:** i. Analyze the effects of the above transactions on the accounting equation. ii. Prepare the Financial Statements.	CO4	E	10

3)		Mr. John opens a business firm that names JOHN ENTERPISE on Jan 01, 2015. He will be the sole owner of the business. During this month the following transactions take place: a. Mr. John invested $1,00,000 in his business bank account. b. Mr. John paid $20,000 for a house to be used as an office. c. Mr. John purchased office supplies $1,000 on account. e. Mr. John paid $3,000 of personal funds for a vacation of his family. f. Mr. John Consulted on the interior design of an office and billed the client for services rendered, $5,000. g. Paid office rent $300. h. Collected cash from a customer on account, $2,000. **Required:** i. Journalize the above transactions. ii. Post the transaction into the ledger. iii. Prepare the trial Balance.	CO3	An	10
		OR			
3)		a. Mr. Ahmed invested $50,000 cash and furniture valued at $30000 in the business. b. Paid $50,000 cash for Land. c. Purchased $400 of Office Supplies on account. d. Received $5,000 cash from clients for accounting service revenue earned. e. Performed accounting service for a client on account, $3,000. f. Paid cash expenses: rent, $1,200; Employee salary, $800; utilities, $200. g. Paid $200 on the account payable created in transaction-3. h. Remodeled his personal residence funding personally. i. Received $1,500 on the account receivable created in transaction-5. j. Sold land for $22,000. Cash received 15000 and remaining amount will be collected in the next month. k. Withdraw $2,000 cash for personal living expenses. l. Salary expense due but not paid $2500. ***Required:*** i. Prepare Journal Entries from above transactions. ii. Prepare a ledger account for cash only.	CO3	E	10

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Autumn 2023

Course Code: CSE 2421 Course Title: Computer Algorithms

Total marks: 30 *Time: 90 minutes*

[Answer all the questions; in some questions, there might be options; Figures in the right hand margin indicate full marks.]

1.

1.a) Find the time complexity of the following function? 4

```
Fib (n)
  if (n = 0 or n = 1)     return 1
  return Fib(n-1) + Fib(n-2)
```

How will it be changed if the function is written as follows?

```
Fib_tail(n, a=0, b=1)
      if (n == 0)     return a
      if (n == 1)     return b
      return Fib_tail(n-1, b, a+b)
```

Here, a=0, b=1 are default arguments.

1.b) Find the time complexity of the following function. 3

```
void Tweety (int n)
{
  for (int i = 1; i <= n; i++)
    for (int j = 1; j <= i*i; j++)
      k = k + 1;
}
```

How the time complexity will be changed if **i*i** is replaced with **i**?

1.c) Find the asymptotic bound of the following recurrence by using *master method:* 3

$$T(n) = 4T(n/k) + n^2$$

where ***(i)*** $k = 4$ *and* ***(ii)*** $k = 2$.

2.a) *Show that the lower bound of any comparison based sort in* $\Omega(n \lg n)$. 4

OR

Show that a heap can be constructed from an array in $O(n)$ time.

2.b) Show the operation of the Radix-sort on the following array. 3

$$A = \langle 673, 424, 527, 639, 247, 826, 974, 428, 356, 652, 713 \rangle$$

2.c) Show the steps of sorting the following list of numbers using Quicksort. Show steps of each partition operation. 3

$$A = \langle 15, 9, 5, 2, 3, 6 \rangle$$

OR

Show how you can sort the numbers of the following min-heap A. Illustrate each step.

$$A = \langle 1, 2, 3, 6, 8, 11, 13, 15, 17, 21, 23 \rangle.$$

3.a) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 3, 7, 9, 5, 8 \rangle$. 4

3.b) What is optimal substructure? Show that the longest common subsequence problem has this property. 3

OR

What is overlapping subproblems? Show that the matrix-chain-multiplication problem has this property.

3.c) How many ways you can parenthesize a chain of 7 matrices? Show the steps of calculation. Also, find how many distinct subproblems you will encounter if you want to parenthesize a chain of 7 matrices optimally for multiplication. 3

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Mid-term Examination, Autumn 2023

Course Code: **CSE 2423** Course Title: **Database Management System**

*Total marks: **30*** *Time: **1** hour **30** minutes*

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

			CO	DL
1.				
a)	Describe different types of DBMS users.	2	CO1	R
b)	Imagine you're developing a healthcare management system for a hospital. Different users like doctors, nurses, and administrative staff need varying levels of access to patient records. How can provide users with an ***abstract view of the data*** in the database system? Explain with example. **Or,** What is **data model**? Briefly describe 2 different types of data model with examples.	3	CO1	U
c)	Consider a hotel reservation system for a chain of hotels. The system can handle room availability, guest reservations, and payment processing. **Issue-1:** A guest successfully reserves a room but experiences a system failure prior to receiving a confirmation and before the room availability is properly updated. **Issue-2:** Imagine two guests trying to book the same room at the same time. **Issue-3:** A malicious user attempts to alter reservation records or manipulate *room availability data.* *How do the above issues* **relate to the problems faced by file systems** while *storing information?* Explain with example how these can be resolved using database.	5	CO2	Ap
2.				
a)	Suppose you are running a startup company entitled as ***"LIKHO"*** for a blog writing platform allowing users to post blogs, and to comment on other users' blogs. Design the **E-R diagram** for your company's data. Consider all the necessary mapping cardinalities, attributes and participation constraints. Your database should store information about users, bloggers, and blogs, and encode the following information: • Every user has a user ID and a name. • Every blog has a blog ID, a text content and one author, who is a blogger. • Every blogger is a user. • Every blogger also has a rating attribute. • Users may comment on blogs. • Every comment has an optional rating.	5	CO1	Ap

Or,

Construct an **E-R diagram** for a Grocery shop with a set of customers and a set of products. Customer is of two types such as retail and wholesale. Associate with each customer a log of the various products and providing each customer with the voucher, showing Total Amount being purchased. Consider the necessary mapping cardinalities, participation constraints and attributes.

b) Suppose you are designing an ER diagram for a Library Management System. The system manages different types of library items, including Books and DVDs. **3 CO1 Ap**

1) Now design **a specialization and generalization hierarchy**. Justify your placement of attributes at each level of the hierarchy.
2) Is your placement total or partial?

c) Write down the problems of using **Cartesian Product**. How could it be resolved? Explain with example. **2 CO2 U**

3.

a) What is **Relational Algebra**? Write the difference between **inner join and outer join.** **2 CO1 R**

Or,

State the names of **basic operators of Relational Algebra** with symbols and meaning.

b) ***Customer*** (customer_id, customer_name, address, city, state, phone_number) **8 CO1 Ap**
Store (store_id, store_name, store_address, store_phone)
Food (food_id, store_id, food_name, food_image, food_category, food_price)
Order (order_id, customer_id, store_id, food_id, shipment_address, payment_method, quantity, total_price, order_date)

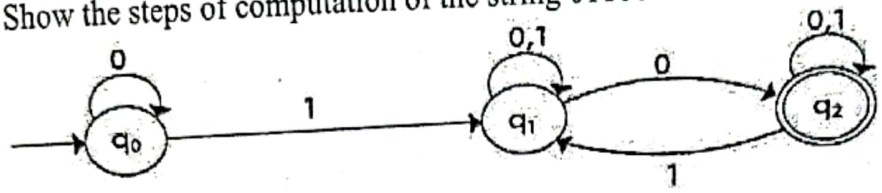
Consider the relational database of an online food app, where the primary keys are underlined. Write **queries in relational algebra** to answer the following questions -

1. Find the names of customers who has ordered between 1000 Tk and 2000 Tk.
2. Find the food items with their prices from a specific store. (store_name = "Well Food")
3. Find the total number of food items available in each store.
4. Find the order details of those customers who lives in the same city where the customer "X" lives.

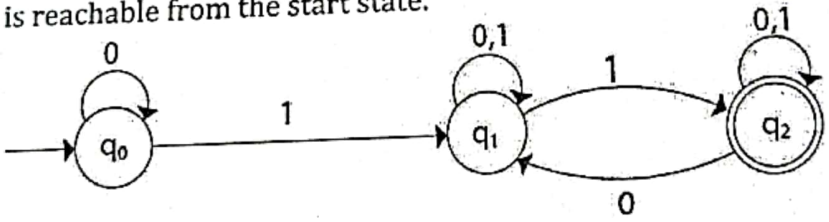
International Islamic University Chittagong
Department of Computer Science and Engineering
B. Sc. in CSE Midterm Examination, Autumn 2023
Course Code: CSE 2425 Course Title: Theory of Computing
Total marks: 30 *Time: 90 minutes*

[Answer all the questions; in some questions, there might be options; Figures in the right hand margin indicate full marks.]

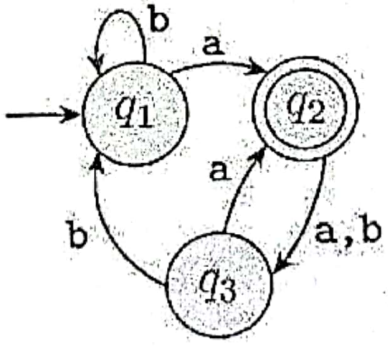
		CO	DL	
1.				
a)	Define Computability Theory.	CO1	U	1
b)	Construct DFA for the following languages where alphabet is {0, 1}.	CO1	C	4.5
	i. $\{w \mid w$ begins with 01 and the length of w is odd$\}$			
	ii. $\{w \mid$ w starts and ends with different symbols$\}$			
	iii. $\{w \mid w$ does not contain the substring 0011$\}$			
c)	Write regular expressions for the languages described in 1(b).	CO2	C	4.5
2.				
a)	Show the steps of computation of the string 011001 on the following NFA.	CO1	A	3



b)	What are the languages described by the following regular expressions? Write a one sentence description for each language.	CO2	N	2
	i. 1*(00)*			
	ii. (10 ∪ 0)*			
c)	Prove that every nondeterministic finite Automaton has an equivalent deterministic finite Automaton.	CO2	N	5
	OR			
	Prove that the class of regular languages is closed under star operation.			
3.				
a)	Convert the following NFA to an equivalent DFA. Give only the portion of the DFA that is reachable from the start state.	CO1	A	5



b)	Convert the following DFA to a regular expression	CO1	A	5



OR

Describe the pumping lemma of regular expression. Use it to determine if the following language is regular.

$A = \{w \mid w$ has m 0s followed by $2m$ 1s$\}$

International Islamic University Chittagong (IIUC)
Department of Computer Science and Engineering (CSE)
Mid Term Examination

Program: B. Sc. in CSE
Course Code: MATH-2407
Time: 1:30 hours

Semester: Autumn-2023
Course Title: Mathematics-IV
Total Marks: 30

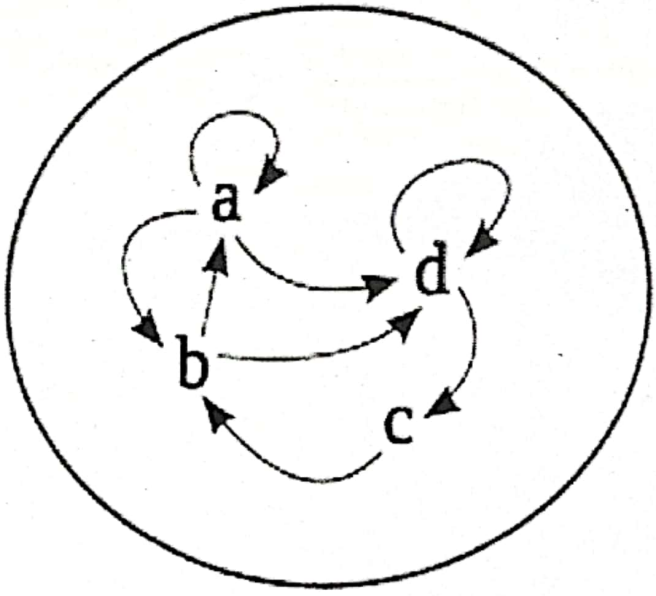
(i) Answer all the questions. The figures in the right-hand margin indicate full marks.
(ii) Please answer the several parts of a question sequentially.
(iii) Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns.

Bloom's Taxonomy Domain Levels of the Questions

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

			Marks	CLO	DL
1.	a)	Let the function $f: R^{\#} \to R^{\#}$ be defined by $y = f(x) = x^2 + x - 2$ then find the value of $f^{-1}(-5)$	2	CLO1	C2
	b)	If $z = x + iy$ then find the locus represented by $\|\bar{z} - 3\| = 4$	3	CLO1	C2
	c)	Using De-Moivre's theorem find the quadratic equation whose roots are the nth power of the roots of the equation, $x^2 - 2x\cos\theta + 1 = 0$	5	CLO1	C3

Or



State whether the relation is reflexive, symmetric, transitive and anti symmetric.

2. a) A straight line joining $A(-j)$ and $B(2+j)$ in the z-plane. Determine its image in the w-plane when it is transformed by $w = \frac{1}{z}$ — 7 CLO1 C2

b) Test the function $u = 3x^2y + 2x^2 - y^3 - 2y^2$ is harmonic or not. — 3 CLO2 C3

Or

Determine the function, $w = e^z$ is regular (analytic) or not. — 4 CLO2 C3

3. a) Evaluate the integral $\int_c \bar{z}\,dz$ from $z = 0$ *to* $z = 1 + i$ along the curve c. — 4 CLO2 C3

b) Using Cauchy's Integral Formula evaluate $\int_c \frac{z}{z^2 - 3z + 2} dz$ where c is the circle $|z - 1| = \frac{1}{2}$ — 2 CLO2 C2

c) Find the residue of $\frac{1 - 3z}{z(z-3)(z-1)}$ at pole $z = 0$ — CLO2 C2

Or

Find the singular points of $w = f(z) = \frac{1}{(z-1)(z-4)}$

International Islamic University Chittagong

Moral Development Program

Examination: Mid Term | Session: 2023 | Semester: Autumn

Course Title: Concepts of Moral Development-I | Course Code: MDP-2404

Full Marks: 30 | Time: 1 hour 30 minutes

[N.B: Answer the following questions]

1 What do you mean by the "Moral degradation"? What are the fundamental reasons of moral degradation? Discuss the solutions available to moral degradation? 10

2. a) What constitutes the perfect family? Determine the significance of the ideal family in Islam's viewpoint. 5

b) What causes family conflicts? How can we solve the problem? 5

3. a) Enumerate the duties and responsibilities of Parents towards their child in Islam. 5

b) What are the causes of suicide and discuss about the role of Islam in the solution of this disorder. 5

OR Discuss drug (Khamr) addiction briefly. Cite some negative repercussions of drug addiction in light of Islam. 10