International Islamic University Chittagong
Centre for General Education(CGED)
Midterm Examination **Autumn Semester- 2022**
Course Code: URBL-2401
Course Title: Functional Bengali Language and Literature
Full marks : 30 Time: 1.30 Hours

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

নিচের প্রশ্নগুলো থেকে যেকোনো দুইটি প্রশ্নের উত্তর দাও। ১০×২=২০

০১. ভাষা কাকে বলে? বাংলা ভাষার উদ্ভব ও বিবর্তনের ইতিহাস বর্ণনা কর।
০২. স্বরধ্বনি কাকে বলে? বাংলা মৌলিক স্বরধ্বনির পরিচয় ব্যাখ্যা কর।
০৩. 'দ্রব্যমূল্যের উর্ধ্বগতি, জনগণের দুর্ভোগ'-শীর্ষক সংবাদপত্রে প্রকাশের উপযোগী একটি প্রতিবেদন উপস্থাপন কর।

খ- বিভাগ
সাহিত্য :১০
(প্রতিটি প্রশ্নের মান সমান)

নিচের প্রশ্নগুলো থেকে যেকোনো একটি প্রশ্নের উত্তর দাও : ১০×১=১০

০১. রবীন্দ্রনাথ ঠাকুরের 'পোস্টমাস্টার' গল্পের রতন ও পোস্টমাস্টার চরিত্র বিশ্লেষণ কর।
০২.'নয়নচারা' গল্পের নগর জীবন ও গ্রামীণ জীবনের তুলনামূলক চিত্র আলোচনা কর।


International Islamic University Chittagong

Morality Development program

Mid-Term Examination Autumn-2022

Course Title: Concepts on Moral Development -1

Course Code: MDP -2404

Full Marks: 30 Time: 1.5 hours

Answer any three of the following questions:

1. What is morality? How can you describe the moral degradation, causes and remedies? 1
2. Enumerate the social injustice prohibition on the basis of Quran and Sunnah. Suggest some possible way-out for this problem.
3. Explore the causes of suicide. Narrate the possible solutions from Islamic perspective.
4. "Old Home concept has tremendously hampered the rights of parents"- Do you agree to this? Give reasons for or against your answer.

23550

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

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

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

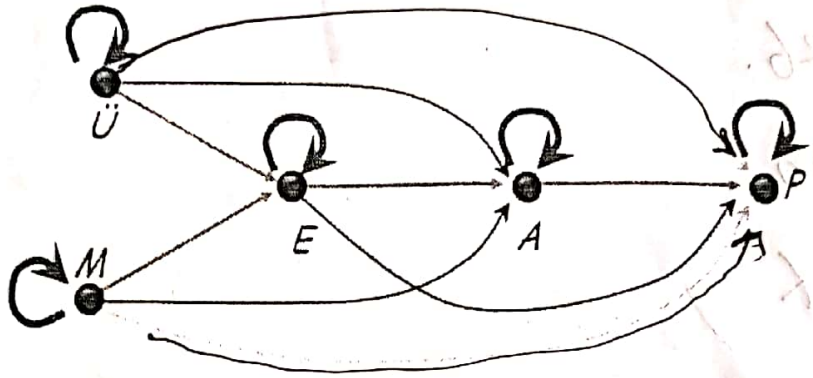
1)	a)	Discuss the branches of accounting and different types of Business Organization.	CO1	Un	4
1)	b)	Explain Accounting Equation with example. Discuss any five of the accounting concepts and principles.	CO1	Un	6
2)	a)	Mr. John opens a business firm that names JOHN ENTERPISE on Jan 01, 2015. He will 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:** 1) Journalize the above transactions. 2) Post the transaction into the ledger. 3) Prepare the trial Balance.	CO2	An	10
3)		Lisa Reed owns and operates an interior design studio called Reed Interiors. The following amounts summarize the financial position of her business on August 31, 19X2: Assets = Liabilities + O's Equity Cash + A. Rec. + Supplies + Land = A. Payable + Capital Bal. 1,250 1,500 12,000 8,000 6,750 During September 19X2 the following events occurred: a. Reed inherited $15,000 and deposited the cash in the business bank account. b. Performed services for a client and received cash of $700. c. Paid off the beginning balance of accounts payable. d. Purchased supplies on account, $500. e. Collected cash from a customer on account, $1,000. f. Invested personal cash of $1,000 in the business. g. Service provided on account $2,400. h. Recorded the following business expenses for the month: (1) Paid office rent - $900 (2) Paid advertising - $100.	CO2	E	10

		i. Sold supplies to another business for $150 cash, the cost of the supplies was $180. j. Withdrew cash of $1,800 for personal use. k. Collected cash from his friend for buying a personal car $1,00,000. l. Reed deposited $15,000 cash to his personal bank account by selling some his personal common stocks. **Required** Analyze the effects of the above transactions on the accounting equation of Reed Interiors.			
		OR			
3)		1) Mr. Ahmed invested $50,000 cash in the business. 2) Paid $50,000 cash for Land. 3) Purchased $400 of Office Supplies on account. 4) Received $5,000 cash from clients for accounting service revenue earned. 5) Performed accounting service for a client on account, $3,000. 6) Paid cash expenses: rent, $1,200; Employee salary, $800; utilities, $200. 7) Paid $200 on the account payable created in transaction-3. 8) Remodeled his personal residence funding personally. 9) Received $1,500 on the account receivable created in transaction-5. 10) Sold land for cash $22,000 but its cost was $20,000. 11) Withdraw $2,000 cash for personal living expenses. ***Required:*** a) Analyze the effects of the above transactions on the accounting equation. b) Prepare an Income Statement, Owners' Equity Statement and a Balance Sheet.	CO2	E	10

International Islamic University Chittagong (IIUC)
Department of Computer Science and Engineering (CSE)
B. Sc. in CSE, Mid Term Examination, Autumn-2022
Course Code: MATH-2407, Course Title: Mathematics-IV

Time: 1:30 Hours | Marks: 30

[N.B. Please answer the questions sequentially. Figures in the right margin indicates full marks]

		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 $f^{-1}(10)$	3	CLO1	C2
b)	 Determine whether the above relation is Transitive, Anti-symmetric and Transitive Reflexive	3	CLO1	C2
c)	Using Demoivres theorem find the quadratic equation whose roots are the nth power of the roots of the equation, $x^2 - 2x\cos\theta + 1 = 0$	4	CLO1	C2
	Or			
c)	If $(1+i\frac{x}{a})(1+i\frac{x}{b})(1+i\frac{x}{c})\ldots\ldots = A+iB$, Then prove that $(1+\frac{x^2}{a^2})(1+\frac{x^2}{b^2})(1+\frac{x^2}{c^2})\ldots\ldots = A^2+B^2$	4	CLO1	C2
2. a)	A circle $\lvert z-3\rvert = 2$ in the z-plane. Determine its image in the w-plane when transformation by $w = \frac{1}{z}$	8	CLO1	C2
b)	Test the function $f(x,y,z) = x^2y + y^2z + z^2y$ is harmonic or not.	2	CLO2	C3
	Or			
b)	Determine the function, $w = e^z$ is regular (analytic) or not.	2	CLO2	C3
3. a)	Evaluate the integral $\int_c \bar{z}\,dz$ from $z = 0$ to $z = 1+i$ along the curve c.	6	CLO2	C
b)	Using Cauchy's Integral Formula evaluate $\int_c \frac{z}{z^2-3z+2}dz$ where c is the circle $\lvert z-1\rvert = \frac{1}{2}$	4	CLO2	C
	Or			
b)	Evaluate $\int_c \frac{2z+1}{z^2+z}dz$ Where c is the circle $\lvert z\rvert = \frac{1}{2}$	4	CLO2	

International Islamic University Chittagong

Department of Computer Science and Engineering

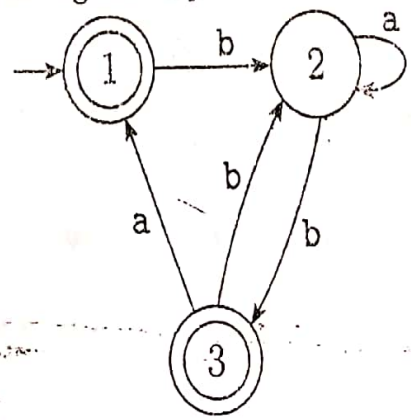
B. Sc. in CSE Midterm Examination, Autumn 2022

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)	Why do you think that the study of the theory of computation is important? Mention any two reasons in brief.	2	CO1	E
b)	Construct a DFA for recognizing decimal integers which are divisible by 2 and starts with Y. Here, Y is the last digit of your ID.	2	CO1	C
	OR			
	Construct a DFA for recognizing binary numbers which are divisible by 2 and whose length is odd.			
c)	Construct DFA for the following languages where alphabet is {0, 1}.	3	CO1	C
	i. $\{w \mid$ every 0 in w is followed by a 1$\}$			
	ii. $\{w \mid w$ has exactly two 0's and at most three 1's$\}$			
	iii. $\{w \mid w$ does not contain the substring 0110$\}$			
d)	Write regular expressions for the languages described in 1(c).	3	CO2	C
2.				
a)	What are the languages described by the following regular expressions? Write a one sentence description for each language. (**Any two**)	2	CO2	N
	i. $0^*(0 \cup 11)^*$			
	ii. $(00 \cup 1)^*(11)^*$			
	iii. $((1(11)^*00) \cup (11)^*0)^*$			
	iv. $101((11)^* \cup (00)^*)$			
b)	Prove that every nondeterministic finite automaton has an equivalent deterministic finite automaton.	4	CO2	N
c)	Prove that the regular language is closed under the concatenation operation.	4	CO2	N
	OR			
	Prove that the regular language is closed under the star operation.			
3.				
a)	Convert the following regular expressions to NFA. (**Any two**)	2	CO1	A
	i. $(1^* \cup 0(00)^*)^*111$			
	ii. $101((11)^* \cup (00)^*)$			
	iii. $((1(11)^*00) \cup (11)^*0)^*$			
	iv. $(00 \cup 1)^*(11)^*$			
b)	Give an NFA recognizing the language $(11 \cup 00)^*$. Convert this NFA to an equivalent DFA. Give only the portion of the DFA that is reachable from the start state.	4	CO1	A
c)	Convert the following DFA to regular expression	4	CO1	A



International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE, Midterm Exam, Autumn 2022

Course Code: CSE 2423 Course Title: Database Management System

Total marks: 30 Time: 1 hours 30 minutes

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

				CO	DL
1.	a.	Describe database instance and schema with example? What are the functions of a Storage Manager?	3	CO1	Un
	b.	How does database system ensures atomicity and concurrency? Explain each with example. **OR** Compare among Primary key, Super key, Candidate key, and Foreign key with examples.	4	CO1	Un
	c.	What is Data Model? Give examples of some popular data model. Compare between DDL and DML.	3	CO1	Re
2.	a.	Define cardinality ratio, partial, and total participation.	3	CO1	Re
	b.	Construct an E-R diagram for a Grocery shop with a set of customers and a set of products. Associate with each customer a log of the various products and provided each customer with the voucher, showing Total Amount being purchased. An employee can sell any number of products and can also be a manager. Consider the necessary mapping cardinalities, participation constraints and attributes.	4	CO3	Cr
	c.	Briefly explain different types of attributes with example.	3	CO1	Un
3.	a.	Consider the Following Relational Database of ***Pure Islamic Bank***:	6	CO2	An

branch (branch_name, branch_city, assets)
customer (customer_name, customer_street, customer_city)
account (account_number, branch_name, balance)
loan (loan_number, branch_name, amount)
depositor (customer_name, account_number)
borrower (customer_name, loan_number)

Write Relational Algebra Expression **(Any three)**

(i) Find all customers who have a loan, an account, or both.
(ii) Find all customers who have a loan at the ***Kumira*** branch.
(iii)Find the names of all customers who have a loan in ***GEC*** branch but do not have an account in the bank.
(iv)Find the account numbers of the Millionaires of the bank.

	b.	Describe the basic Operators of Relational Algebra with example.	4	CO2	Un

Or

Explain how you could map ER diagram to database with example.

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Autumn 2022

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.]

		CO	DL	
1.				
a)	Let **K = ((X MOD 2)+1)*2**, where **X** is the last digit of your ID. Now, find the asymptotic upper bound of the following recurrence by using master method. **T(n) = KT(n/2) + n** Verify your answer through recursion tree method.	CO4	N	4
b)	Compare the time complexity of the following two functions. Which one runs faster.	CO4	E	3

```
void Chip (int n)
{
  for (int i = 1; i <= n; i++)
    for (int j = 1; j <= i; j = j*2)
      k = k + 1;
}

void Dale (int n)
{
  for (int i = 1; i <= n; i = i*2)
    for (int j = 1; j <= i; j++)
      k = k + 1;
}
```

c)	Show that the asymptotic upper bound of the following function is not $O(n^2)$: $An^3 + Bn^2 + C$. Assume that A, B, and C are any constants.	CO4	N	3
	OR			
	Show that the asymptotic lower bound of the following function is not $\Omega(n^2)$: $An^3 + Bn^4 + Cn^5$. Assume that A, B, and C are any constants.			
2.				
a)	Prove that we can convert an array into a heap in **O(n)** time.	CO4	N	4
b)	Write down the recurrence equation for the running time of quicksort algorithm in which partition always produces a 9-to-4 proportional split. Solve the recurrence using recursion tree and show that in this case running time is **O(nlgn)**.	CO3	N	3

c) The operation **Heap-Delete(A, i)** deletes the item in node **i** from heap **A**. Give an implementation of **Heap-Delete** that runs in **O(lgn)** time for an n-element max-heap. CO2 A 3

OR

Show the steps of the operation **Extract-Max()** on the following Max-Heap $A = \langle 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 \rangle$.

3.

a) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 7, 4, 5, 3, 3 \rangle$. CO1 A 4

OR

Find a Longest Common Sequence of the following two sequences using dynamic programming and show the steps.
$X = \langle A, B, C, D, E, F \rangle$
$Y = \langle D, C, B, E, A, F, E \rangle$

b) Give a brief argument why we cannot apply the technique of dynamic programming if the problem does not have optimal substructure property. CO5 N 2

c) Show the operation of the first PARTITION of the quick sort algorithm on the array CO1 A 2

$A = \langle 6, 4, 8, 9, 2, 3, 7, 4, 8, 5 \rangle$

d) What is the smallest value of **n** such that an algorithm whose running time is $100*(X+1)*n^2$ runs faster than an algorithm whose running time is 2^n on the same machine? Assume that **X** is the last digit of your ID. CO4 N 2