BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   B. Sc. Engineering Examinations 2020-2021

Sub : **CSE 103** (Discrete Mathematics)

Full Marks : 210   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Describe converse, contrapositive and inverse of the following statement: **(6)**

   "If at least one of two numbers is divisible by 6, then the product of these two numbers is divisible by 6".

   (b) Demonstrate that $P \rightarrow (Q \lor R)$ is logically equivalent to $(P \land \neg Q) \rightarrow R$.   **(8)**

   (c) Translate each of the following propositions (i & ii) as an English sentence. The relevant predicates are defined as follows: **(6)**

   - P be a set of all people
   - A(x) means "x is teaching CSE 105."
   - T(x) means "x is taking CS 473."
   - F(x) means "x has a Facebook page."
   - C(x) means "x likes to cook."

   (i) $\exists x \in P \, [A(x) \land C(x)]$

   (ii) $\neg \forall x \in P \, [T(x) \rightarrow (F(x) \lor C(x))]$

   (d) Demonstrate that the conclusion "We will be home by sunset" can be obtained by applying rules of inference on the following hypotheses: **(15)**

   "It is not sunny this afternoon and it is colder than yesterday", "We will go swimming only if it is sunny", "If we do not go swimming, then we will take a canoe trip", and "If we take a canoe trip, then we will be home by sunset".

2. (a) Explain different steps needed to prove universal statements using well ordering principle.   **(10)**

   (b) Using the principal of contradiction, judge whether $\sqrt{2}$ is irrational or rational.   **(10)**

   (c) Using the principal of induction, judge whether $2^{2n} - 1$ is divisible by 3, $\forall n >= 1$.   **(15)**

3. (a) Judge whether   **(15)**

   (i) an empty set is a subset of any set or not.

   (ii) any set S is a subset of itself or not.

   (b) Using an appropriate example with Venn diagram, demonstrate that   **(10)**

   $$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

CSE 103
Contd ... Q. No. 3

(c) Consider that 200 candidates were interviewed for a position at a call center. Of them, 100 had a two-wheeler, 70 had a credit card and 140 had a mobile phone. 40 of them had both a two-wheeler and a credit card, 30 had both a credit card and a mobile phone, 60 had both a two-wheeler and mobile phone, and 10 had all three. Using the concept of set theory, find how many candidates had none of the three? **(10)**

4. (a) Differentiate injective, bijective and surjective functions using appropriate examples. **(10)**

(b) Compare two composite functions denote by f o g and g o f using appropriate examples. **(13)**

(c) Judge whether the following three statements are true of false. Justify your answers. **(12)**

(i) If two elements in the domain of a function are equal, then their images in the co-domain are equal.

(ii) If two elements in the co-domain of a function are equal, then their pre-images in the domain are also equal.

(iii) A function can have the same output for more than one input.

SECTION – B
There are **NINE** questions in this section. Answer any **SEVEN**.

5. (a) Derive a combinatorial proof for the following identity. **(10)**

$$1 \times n + 2(n-1) + 3(n-2) + \dots + (n-1)\,2 + n \times 1 = \binom{n+2}{3}$$

(b) Your teacher gave your friend a problem of counting and his result is: $\binom{10}{4}\binom{6}{3}\binom{3}{2}\binom{1}{1}$.

However, his lab partner came up with the following result: $\binom{10}{1}\binom{9}{2}\binom{7}{3}\binom{4}{4}$. The teacher gave both of them full marks. Can you propose a scenario and analyze it to derive a combinatorial argument on how the two terms are counting the same? **(5)**

6. All of your classmates in your section went to a restaurant to dine. Since you are on budget, you decided to choose one of the set menus. There are a total of five different set manus having the least cost, which however is higher than your budget. The owner of the resultant, a math-enthusiastic, gave you a life-line: "If you can count the number of different ways to select set menus for you (i.e., you and your classmates), I will offer you 'Buy 1 get 1 Free'." Analyze the scenario and determine the count (i.e., the number of different ways to select set menus for you all). **(15)**

CSE 103

7. Determine the closed form expression for $\sum_{i=1}^{n} i^2$ with the help of the integral method. **(15)**

8. Deduce a meaningful lower and upper bound of $n!$. **(15)**

9. Prove the following properties of a tree: **(15)**

   (i) There is a unique simple path between every pair of vertices in a tree.

   (ii) Adding an edge between two vertices in a tree creates a cycle.

   (iii) Removing any edge from a tree disconnects the graph.

   (iv) In a tree with at least two vertices, there are at least two leaves.

   (v) The number of vertices is one larger than the number of edges.

10. (a) Your team is playing the final match of a 5-a-side football tournament and drew the match with the opponent team. The winner now will be decided through a penalty shootout where 2 of the players will be selected from each team who will take part in the penalty shootout as per the by-laws of the tournament. As the adviser you now need to decide the two penalty shooters from your team. Your genius little brother proposes: "Choose two players having jersey numbers such that their difference is divisible by 4." You inquire: "If there are more than one such pair?" He replies: "In that case, choose at random." You further inquire: "If there are no such pair?" He winks at you and replies: "According to Pigeon Hole Principle, you are bound to find one such pair." Before you can follow his proposal, you need to derive a proof that you indeed will get one such pair. **(10)**

    (b) There are 5 points in a square of side length 2. Derive a proof that at least two of them are with the distance at most $\sqrt{2}$. **(5)**

11. Solve the recurrence relation defined by the Fibonacci Sequence applying the Distinct-Roots Theorem. **(15)**

12. Derive a proof of the following theorem: "A connected graph has an Eulerian cycle if and only if every vertex is of even degree." **(15)**

13. Suppose S_n is the number of moves needed in the Towers of Hanoi problem with n disks. Now derive a closed form for S_n with the help of generating function. **(15)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   B. Sc. Engineering Examinations 2020-2021

Sub: **CSE 107** (Object Oriented Programming Language)

Full Marks: 210   Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

1.   (a) Explain abstraction with appropriate example. Write down the properties of abstract
     class and abstract method.   **(5+3+2=10)**

     (b) What is inline function? How does it differ from automatic inline function? Inline
     specifier is a request, not a command — explain.   **(3+2+5=10)**

     (c) Imagine a tollbooth at a bridge. Cars passing by the booth are expected to pay a 50-
     cent toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth
     keeps track of the number of cars that have gone by, and of the total amount of money
     collected.   **(15)**

     Model this tollbooth with a class called tollbooth. The three data items are a list of
     string to hold the registration numbers of the cars passing through the bridge, a type
     unsigned int to hold the total number of cars, and a type double to hold the total
     amount of money collected. A constructor initializes both of these to 0. A member
     function called payingCar() adds the car registration number in the list, increments the
     car total and adds 0.50 to the cash total. Another function, called nopayCar(), adds the
     car registration number, increments the car total but adds nothing to the cash total.
     Finally, a member function called display() displays the list of cars' registration
     numbers and the two totals. Make appropriate member functions const. Use proper
     naming convention and setter-getter functions.

2.   (a) Two overloaded functions are declared as follows-   **(7)**

```
     void space(char ch){
     -----------------------------------
     }
     void space(char ch, int count){
     -----------------------------------
     }
```

     Write down the main() function that declares two variables for storing the addresses of
     the above two functions and make function calls using those variables. What problem
     is observed if the second function is declared as follows-

```
     void space(char ch, int count = 0){
     -----------------------------------
     }
```

CSE 107

Contd.... for Q. No. 2

(b) Let xi+yj+zk be a vector where x, y and z are real numbers as well as i, j and k represent unique vectors along x-axis, y-axis and z-axis. There is a description for each point of the vector and hence each object has a pointer to point the description. Declare a class named "vector" that has members and/or friends to fulfill the following requirements. Don't use friend function if it can be implemented using member function. **(7×4=28)**

Requirement	Sample Code	Explanation
Creating instance	Vector ob(12.0, 5.0, 2.0), ob1(3.0, 2.0, 5.0, "The peak point"), ob2;	Use default arguments to set the vector point at the origin with null description when no parameter is given. Write appropriate constructor and copy constructor.
Addition of two complex number objects	ob1 = ob2 + ob3;	The values in each dimension will be added separately, i.e., the x values of ob2 and ob3 will be added together to give x value of ob1 and so on. Descriptions of ob2 and ob3 will be concatenated by adding a space between them to give the description of ob1.
Incrementing a complex number	ob = ob1 += ob2;	Overwrite = and += operators.
Adding a real number to an object	ob2 = ob1 + 100.0; ob2 = 100.0 + ob1;	The real number will be added to each value of the object, i.e., each value of x, y and z will be incremented by the amount of the real number.

3. (a) Differentiate between early binding and late binding with appropriate examples. **(8)**

(b) Write a C++ program that emulates the DOS "filesize" command and returns the size in bytes of a program entered on the command line. Invoke the program with one command-line argument—the file name—like this: **(7)**

C>filesize program.ext

In the program, check that the user has typed the correct number of command-line arguments, and that the file specified can be opened.

CSE 107

Contd.... for Q. No. 3

(c) Consider the following class declaration-   (12)

```
class inventory {
    char item[40];
    int onhand;
    double cost;
public:
    inventory (char *i, int o, double c ) {
        strcpy(item, i);
        onhand = o;
        cost = c;
    }
};
```

Write down the inserter and the extractor methods for the class and modify the class as necessary to work with the inserter and the extractor.

(d) Write down a manipulator named "setup" that will generate the following output against the statement of "cout<<setup<<123.45678;"   (8)

123.456%%%

4.   (a) Consider that the map <stdId, student> is used in an object-oriented programming to store the records of the students, where stdID (i.e., student identification number) is unique for each student. A object "student" contains student ID, student name, address, mobile number and CGPA. The class "student" contains three member functions – a constructor, a getter for student ID and a display() function showing all of the above information about a student. Write down the class "student". Also write down a C++ program that (i) takes information about a student from the keyboard and inserts a pair into the map; and (ii) scan stdId from keyboard buffer and print all information abut that student from its associated object using map. Make necessary assumptions.   **(6+7+7=20)**

(b) A "queue" is a data-structure in which a newly entered element is placed in the back of the queue; however, elements are served or going out of the queue from the front. Write down a generic class named "queue" where all types of data such as integer, character, string, double and object of any kind can be stored and queued. The queue will support following member functions: push(), pop(), size().   **(15)**

Write down the codes for the necessary exception handling during performing different operation on the queue.

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE** questions.

5. (a) Identify the problems in the following code segment and write the complete code after fixing them. **(10)**

```
class A {
  var x;

  void getX() {
    return x;
  }

  void setX(int x) {
    x = x;
  }
}
```

```
public static void main(String[] args) {
  A [] a = new A[10];
  for (int i = 0; i < a.length(); i++) {
    a[i].setX(i);
  }
  for (int i = 0; i < a.length(); i++) {
    System.out.println(a[i].getX());
  }
}
}
```

(b) Write 2 (two) different ways of creating the following array in Java. **(10)**

1	2	3	4	5
6	7	8	9
10	11	12
13	14
15

(c) A singleton class is a class that can have only one object at a time. After the first time, if we try to instantiate a singleton class, the new variable also points to the first object created. Write a complete Java code to create a singleton class named MySingleton, where the single instance can be retrieved using a method called getInstance. **(10)**

(d) Consider the following code segment. There are 4 (four) method calls in the main method. How many of them will generate compiler error and why? **(5)**

```
public class VarArgsTest {
  static void f(int... v) {
  }

  static void f(String msg, boolean... v) {
  }

  static void f(String msg, int... v) {
  }

  static void f(int n, int... v) {
  }
```

```
  static void f(double... v) {
  }

  public static void main(String[] args) {
    f("int", 10, 20, 30);
    f("boolean", true, false, false);
    f();
    f(1, 2, 3);
  }
}
```

6. (a) Consider your own StringTokenizer class - MyStringTokenizer with the following methods: **(10)**

> MyStringTokenizer (String str, String delimiter) - the only constructor that takes the main String and the delimiter for tokenize
>
> int countTokens () - returns total number of tokens
>
> boolean hasMoreTakens () - returns false if no more token left, true otherwise
>
> String nextToken () - returns the next token

Write complete Java code for your MyStringTokenizer class. You can add necessary instance variables.

You are not allowed to use the original StringTokenizer class, but you can use methods of the String class.

(b) You are given the following Java code with the main method. **(10)**

```
class Animal {
  private String name;
  private int age;

  public Animal(String name, int age) {
    this.name = name;
    this.age = age;
  }
}

class TestAnimal {
  public static void main(String[] args) {
    Bird alex = new Albatross("Alex", 39);
    Mammal spot = new Dog("Spot", 7);
    Mammal fred = new FruitBat("Fred", 10);
    Reptile steph = new EasternBrownSnake("Steph", 12);
    Fish bruce = new GreatWhiteShark("Bruce", 40);
    Arachnid charlotte = new RedBackSpider("Charlotte", 1);
    Mammal perry = new Platypus("Perry", 5);
    Mammal bob = new Human("Bob", 20);
    Animal[] animals = {alex, spot, fred, steph, bruce, charlotte, perry, bob};
  }
}
```

Write Java code for the necessary classes to support the main method where you can't create any object of the Animal class. You can add/modify code to the Animal class if required, but you are not allowed to change the main method.

Contd.... for Q. No. 6

    (c) Consider the following code segment: **(10)**

```java
public class Movie {
    private String title;
    private int releaseYear;
    private String productionCompany;
    private int runningTime;

    public Movie(String title, int releaseYear, String productionCompany, int runningTime) {
        this.title = title;
        this.releaseYear = releaseYear;
        this.productionCompany = productionCompany;
        this.runningTime = runningTime;
    }

    public static void main(String[] args) {
        Movie m1 = new Movie("The Lord of the Rings", 2001, "New Line Cinema", 178);
        Movie m2 = new Movie("The Lord of the Rings", 2001, "WingNut Films", 178);
        System.out.println(m1 == m2); // false
        System.out.println(m1.equals(m2)); // true
        HashMap map = new HashMap();
        map.put(m1, 93);
        System.out.println(map.get(m2)); // 93
    }
}
```

The expected output of the above code segment is given as comments. Complete the Movie class to achieve the expected output.

    (d) Write Java codes to fix the problems (if any) in the main method of the following code segment.   **(5)**

```java
class P {
    int x = 1;

    class Q {
        int y = 2;
    }

    static class R {
        int z = 3;
    }
}
```

```java
public class NestedClassTest {
    public static void main(String[] args) {
        P p = new P();
        p.print();
        p.show();
        Q q = new Q();
        q.print();
        R r = new R();
        r.print();
    }
}
```

CSE 107

7. (a) Suppose there are 7 methods defined as follows: **(10)**

    void f1(), void f2(), void f3(), void f4(), void f5(), void f6(), void f7()

    There are also three interfaces named as i1, i2, i3, and one abstract class named A.

    There is a class named MyClass that needs to be forced to implement all the above 7 methods, where you must maintain the following constraints:

    (i)   Each interface can define at most 2 methods.

    (ii) The abstract class A can only implement 1 interface and can define at most 1 abstract method.

    (iii) The class MyClass can only extend a class but can't implement any interface.

    Write Java code for MyClass to achieve the above scenario.

    (b) Consider a class named Inventory with the following information: **(10)**

    double stock - the stock of the inventory

    double minStock - the minimum stock of the inventory

    void setInitialStock (double amount) - this method sets the amount as the initial stock

    void addToInventory (double amount) - this method adds the amount to the stock

    void removeFromInventory (double amount) - this method subtracts the amount from the stock

    The amount provided in the above four methods can't be negative. The stock of the inventory can't also be below the minimum stock.

    Write Java code for the following:

    (i)   A custom exception named InvalidStockAmountException with appropriate parameters that triggers when the given amount is negative and shows the message 'The given stock amount can't be negative'.

    (ii) A custom exception named InvalidInventoryStockException with appropriate parameters that triggers when the stock goes below the minimum stock and shows the message 'The stock can't be less than the minimum stock'.

    (iii) The complete Inventory class to trigger these exceptions when needed. You don't need to write any main method.

    (c) With Java threads, it is very easy to parallelize computations. Suppose you are in a job interview with Oracle and the interviewer asks you to write Java code to find out summation of 1 to 10000. You can't use any mathematical equation; you can only use loops. But you are asked to divide the work equally among 5 different threads. Write complete Java code to compute the summation of 1 to 10000 by dividing the work equally among 5 different threads. The main thread will wait for the 5 threads to finish and will only print the final summation. **(10)**

CSE 107

Contd.... for Q. No. 7

(d) Consider the following SharedCounter class: **(5)**

```
class SharedCounter {                        public int get() {
    private int counter;                         return this.counter;
                                             }
    SharedCounter () {
        this.counter = 0;                    public void count () {
    }                                            for (int i = 1; i <= 1000; i++) {
                                                     increment();
    private void increment () {                  }
        this.counter++;                      }
    }                                    }
}
```

Explain with code how you can fix the SharedCounter class so that multiple threads can correctly operate on it. You don't need to write the whole class.

8. (a) What are the differences between ArrayList and Vector? **(10)**

Consider the following class:

```
public class Fruit {

    private String name;

    private int quantity;

}
```

Suppose there is an ArrayList of Fruit named listFruits. Write necessary Java code so that when Collections.sort(listFruits) is called, the products are sorted by descending order of quantity and if quantity matches then by lexicographic order of their name.

(b) Write a generic interface named iStack with methods push, pop and isEmpty. Then write a generic class Stack that implements the iStack interface. Please note that iStack interface only supports numeric types. **(10)**

(c) Suppose a client wants to connect to a server on IP address 192.168.1.1 and port 44444. Just draw the scenario of operations needed for the successful connection establishment and data transfer between the server and client. You do not need to write any code. What are the names of the classes generally used to read and write objects in networking? What restriction do they impose on the class? **(10)**

(d) Consider the following statement: **(5)**

```
public class ABC<S extends Z & Y & X> {

}
```

What can you say about ABC, S, X, Y, and Z?

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   B. Sc. Engineering Examinations 2020-2021

Sub: **CHEM 113** (Chemistry I)

Full Marks: 210   Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

1. (a) Bends, the decompression sickness, is a medical condition for divers. Relate this with the effect of pressure on the solubility of gas in liquid. **(12)**

    (b) Define lattice energy and hydration energy for the ionic compound. Explain that both lattice and hydration energy mutually control the solubility of ionic crystals in polar solvent. **(15)**

    (c) The ecological imbalance in aquatic system is one of the consequences of thermal pollution— Explain. **(8)**

2. (a) Compare the vapor pressure theory and membrane solution theory of the osmosis process through the semipermeable membrane. **(12)**

    (b) Identify the reason for the use of van't Hoff factor, i in the mathematic expressions of colligative properties and also identify the conditions with suitable example when van't Hoff factor, i (i) is equal to one (ii) less than one and (iii) greater than one. **(15)**

    (c) 0.5 g of a carbon sample from a mine is placed in a calorimeter with excess oxygen at 25°C and 1 atm pressure. On reaction, the calorimeter temperature rises from 25°C to 25.89 °C. The heat capacity of the calorimeter is 20.7 KJ/°C. Calculate the heat of reaction at 25°C and 1 atm pressure and express the result as a thermochemical equation. **(8)**

3. (a) With the appropriate phase diagrams interpret the physical state of water and carbon dioxide on a summer day. **(12)**

    (b) Draw the phase diagram of sulfur. **(15)**
     (i)   demonstrate the three-phase equilibriums in the diagram.
     (ii)   The existence of monoclinic sulfur is not possible in metastable equilibrium— justify.

    (c) Two pollutants that form in the auto exhaust are CO and NO. An Engineer must convert these pollutants to less harmful gases through the following reaction. **(8)**
    $$CO(g) + NO(g) \rightarrow CO_2(g) + \tfrac{1}{2} N_2(g)$$
    Calculate the ΔH of the reaction from the following information given below.
    $$\text{Equation} - 1 : CO(g) + \tfrac{1}{2} O_2(g) \rightarrow CO_2(g) \quad \Delta H = -283.0 \, kJ$$
    $$\text{Equation} - 2 : N_2(g) + O_2(g) \rightarrow 2NO(g) \quad \Delta H = 180.6 \, kJ$$

4. (a) Identify and explain the different methods involved in the purification of colloids. **(15)**

    (b) Differentiate the sol-gel method and gel formation method for the preparation of nanoparticles with suitable examples. **(12)**

    (c) Selective adsorption of ions from solution imparts charge on colloidal particles— justify. **(8)**

CHEM 113/CSE

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE** questions.

5.   (a) Explain why each element having a characteristic emission and absorption spectra is significant in understanding dual nature of electron?   **(10)**

   (b) Show the radial distribution function for hydrogenic 1s, 2s and 2p orbitals with nodes. Why 2s gives the electron a greater probability of close approach to the nucleus compared to 2p orbital?   **(10)**

   (c) In making a transition from an orbital with a principal quantum number of 4 to an orbital with a principal quantum number of 7, does the electron of a hydrogen atom emit or absorb a photon of energy? What would be the energy of the photon? To what region of the electromagnetic spectrum does this energy correspond?   **(10)**

   (d) Describe the relationship between electron shielding and Zeff on the outermost electrons of an atom. Predict how chemical reactivity is affected by a decreased effective nuclear charge.   **(5)**

6.   (a) Predict the shapes of (i) SO_3^{2-} and (ii) PCl_4^+ ions showing all the necessary steps.   **(10)**

   (b) From the three possible ways to connect carbon, nitrogen, and oxygen to form a monoanion: CNO^-, CON^-, and OCN^-, one is the cyanate ion, a common and stable species; one is the fulminate ion, salts of which are used as explosive detonators; and one is so unstable that it has never been isolated. Use Lewis electron structures and the concept of formal charge to determine which isomer is cyanate, which is the fulminate, and which is the least stable.   **(10)**

   (c) Using 'Linear Combination of Atomic Orbitals' explain why hydrogen is found as H_2 molecule in nature.   **(10)**

   (d) Account for the large decrease in electron affinity between Li and Be despite the increase in nuclear charge?   **(5)**

7.   (a) "Benzene has no single bond or double bond." — justify by applying your knowledge of chemical bonding.   **(10)**

   (b) What is conjugation? Draw the possible π-molecular orbitals formed by the overlapping of four atomic p orbitals in 1,3-butadiene and identify HOMO and LUMO.   **(10)**

   (c) How does hydrogen bonding and hydrophobic interaction influence the structure of biomolecules?   **(10)**

   (d) Name the different types of polymerization processes with examples.   **(5)**

8.   (a) What are the different applications of conducting polymers? Discuss the general mechanism of conduction in conjugated polymers.   **(10)**

   (b) "The conductivity of doped polyacetylene is more than undoped molecule"— justify by showing the addition of Lewis acid and Lewis base as dopant.   **(10)**

   (c) What computable properties are studied by computational chemistry? Discuss the methods most commonly used in computational chemistry in terms of theories and cost (time) effectiveness.   **(10)**

   (d) What precautions should one follow in computational chemistry?   **(5)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   B. Sc. Engineering Examinations 2020-2021

Sub : HUM 183 (English)

Full Marks : 210   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions
including **Q. No. 1** as compulsory.

Symbols indicate their usual meaning.

1. (a) Explain with reference to the context any two of the following: **(15)**

    (i) "I shouldn't like mother to know I was lucky," said the boy.

    (ii) He had left his village without previous thought or plan.

    (iii) Feelings like these are the normal by-products of imperialism.

    (b) Answer any one of the following: **(15)**

    (i) Discuss 'An Astrologer's Day' as a story of crime, remorse and redemption.

    (ii) How would you describe the writer's attitude towards imperialism in 'Shooting an Elephant'?

    (c) Answer any three of the following: **(15)**

    (i) What sort of rules does Ralph establish for the assembly?

    (ii) Do you think Oscar and Bassett were right to encourage Paul to keep betting? Why or why not?

    (iii) Discuss the role of fate in the story 'An Astrologer's Day'.

    (iv) How does R.K. Narayan describe the appearance and paraphernalia of the Astrologer?

    (v) Do you sympathize with the astrologer?

2. (a) Recast and correct any ten of the following sentences: **(15)**

    (i) You could not think up an answer.

    (ii) I enjoyed during the holidays.

    (iii) I was angry at his comments.

    (iv) The jury are among itself.

    (v) Do not approach to that house.

    (vi) I was absent one time or two times.

    (vii) If I were him, I should not accept he post.

    (viii) My friend shared me his book.

    (ix) Shameem is the one of the boys who are on time.

    (x) I see you have made less mistakes this week.

    (xi) The memoranda is not important.

    (xii) I should have liked to have heard music.

    (b) Give the meaning of and make sentences with any ten of the following words: **(15)**

    Astray, Bellow, Castigate, Drench, Entice, Flounder, Hubbub, Lustrous, Munch, Outrageous, Posterity, Ratify

HUM 183/CSE

3. Expand any one of the following ideas: **(30)**

    (i) "Some people use things: they destroy. You're a creator, a builder."

    (ii) "It is better to be hated for what you are than to be loved for what you are not."

4. Write a précis of the following: **(30)**

A great location, honest government and lots of foreign trade helped transform this tiny state into a regional powerhouse. When it started life as an independent, separate country in 1965, Singapore's prospects did not look good. Tiny and underdeveloped, it had no natural resources and a population of relatively recent immigrants with little shared history. The country's first prime minister, the late Lee Kuan Yew, is credited with transforming it. He called one volume of his memories, "From Third World to First". First, its strategic location and natural harbour helped. It is at the mouth of the Malacca Strait, through which perhaps 40% of world maritime trade passes. It was an important trading post in the 14th century, and again from 19th, when British diplomat Sir Stamford Raffles founded the modern city. Now it is at the heart of one of the world's most dynamic regions. Under Mr. Lee, Singapore made the most of these advantages. Second, under Mr. Lee, Singapore welcomed foreign trade and investment. Multinationals found Singapore a natural hub and were encouraged to expand and prosper. Third, the government was kept small, efficient and honest – qualities absent in most of Singapore's neighbours. It regularly tops surveys for the case of doing business. But the island city is not ideal. Although clean and orderly, it has harsh judicial punishments, a tame press and illiberal social policies. Mr. Lee saw his authoritarian style of government as an essential ingredient in Singapore's success, emphasizing the island's vulnerability in a potentially hostile neighbourhood. But younger people now question whether Singapore really is that fragile, and dislike the restrictions on their freedom.

SECTION – B

There are **FOUR** questions in this section. Answer **Q. No. 5** and any **TWO** from the rest.

5. Read the passage below carefully and answer the questions that follow. **(45)**

Looking at the rate of climate change and the disastrous effects it is having on the world, scientists are concerned that we are acting too slowly. Many are now looking to geoengineering – large-scale human interventions to change the world's climate – to counteract global warming. The schemes range from the mundane to science fiction but all come from the same impulse: if we don't do something now, it may be too late to do anything.

Climate change is now so rapid that, in the very near future, the Arctic will be ice-free during winter as less ice forms during winters and more melts in summer. Scientists say that tackling climate change isn't a problem we need to deal with in 10 or 20 year's time; we need to look at radical solutions now. A study has shown that the technologies to produce these geoengineering projects already exists and could be in place for around $5 billion a year. This is a bargain when compared with the cost of reducing carbon dioxide emissions, a major greenhouse gas: that figure stands at somewhere between $200 and $2,000 billion.

HUM 183/CSE

Contd ... Q. No. 5

So what exactly are scientists planning to do to deal with global warming in the short term? Among the main schemes are shielding the earth from the sun's rays either at ground or atmospheric level, or capturing the carbon produced by industry and sinking it back into the ground or the sea. Shielding the world has produced ideas that range from simple science to science fiction. One suggestion has been to make the roofs of buildings and roads whiter to reflect the sun's rays back into space. While this has the advantage of simplicity, it simply won't make much difference, reflecting only 0.15 watts per square metre, averaged across the planet. To put this into perspective, to stop earth warming we need to increase heat loss by about 3.7 watts per square metre averaged over the world. Another idea is to protect the Greenhouse ice field by covering it in giant sheets of reflective material. If this works, it could help in the Antartic where the giant Filchner-Ronne ice shelf is melting rapidly. If this glacier disappears completely, it would raise sea levels, causing catastrophic flood damage around the planet.

Whatever actions we take to block or reflect the heat from the sun, we will still need to reduce the amount of carbon dioxide in the atmosphere. Various geoengineering projects have been proposed to do this. Carbon capture technologies range from planting trees, which naturally use carbon dioxide as they grow, to pumping carbon back into the earth and trapping it there. This is a good idea but would only account for about 0.5 watts per square metre. Carbon capture technologies are already in use at power stations where the greenhouse gas is taken at point of production and pumped underground into depleted gas and oil reserves. However, the technology to do this is not very efficient. Other ideas for taking carbon out of the atmosphere include seeding the oceans with iron. This would increase the growth of plankton which, like trees, use carbon naturally. Unfortunately, this would only account for 0.2 watts per square metre.

Proponents of geoengineering have never regarded the earth-changing engineering projects as a complete solution. Nevertheless, the concept as a whole attracts many criticisms. One is that the problem of climate change is of such huge scale and complexity that there will not be one single solution. All proposals so far have advantages and disadvantages. The biggest problem of all is that many of the projects are untested and any of the proposals may have unforeseen consequences. For example, we could not suddenly stop a geoengineering scheme: keeping temperatures artificially low for a period then taking away the cause of this would cause the temperature to rise again rapidly. Furthermore, global engineering solutions to the problem of climate change would need the agreement of all the world's leaders: having an American solution, a Chinese solution, a Brazilian solution, and so on simply wouldn't be politically acceptable. But the biggest downfall is that geoengineering projects could reduce the political and popular pressure for reducing carbon emissions, as politicians point to geoengineering for an answer rather than tackling the real cause of climate change: human activity.

HUM 183/CSE

Questions:

(a) Define geoengineering.

(b) Comment on the comparative cost of geoengineering and reducing carbon dioxide emissions.

(c) How can geoengineering projects reduce the volume of carbon dioxide in the atmosphere?

(d) What are the main criticisms against geoengineering?

(e) Give an appropriate title to the passage and justify it.

(f) Give the meanings of the following words as used in the passage.

Intervention, plankton, catastrophic, radical, unforeseen, emission

6. (a) What is tender? Discuss different types of tenders. **(10)**

(b) You are planning to buy some electronics appliances from Rangs Electronics Ltd. Write an inquiry letter to the Sales Manager of Rangs Electronics Ltd. asking information about their products, prices and after-sales services (Full Block). **(10)**

(c) Write phonetic transactions of any five of the following words. **(10)**

King, healthy, mother, adventure, education, that

7. (a) Briefly discuss the front matters of a report. **(10)**

(b) Write a short essay on any one of the following topics. **(10)**

    (i) The Causes of Inflation

    (ii) Real Friends and Facebook Friends

    (iii) Promoting People's Scientific Mindset in Bangladesh

(c) Write a dialogue between you and your friend on Importance of Entrepreneurship Development. **(10)**

8. (a) Transform any five of the following sentences as directed. **(10)**

    (i) Health is wealth. (make it complex)

    (ii) As he forgot the time, he could not attend the meeting. (make it simple)

    (iii) I saw a bird that was flying. (make it compound)

    (iv) Had I the wings of a bird. (make it assertive)

    (v) I asked him some questions and he could not answer them. (make it complex)

    (vi) Wherever you go, I shall follow you. (make it simple)

(b) Discuss the main components of a paragraph in brief. **(5)**

(c) Write short notes on any three of the following. **(15)**

    (i) Vowel and consonant sounds

    (ii) Plagiarism in research

    (iii) Research problem

    (iv) Features of a refusal letter