Bangabandhu Sheikh Mujibur Rahman Science and Technology University

Department of Computer Science and Engineering

1st Year 2nd Semester B.Sc. Engineering Examination-2018

Course Code: CSE153 **Course Title: Discrete Computational Theory**

Total Marks: 60 **Time: 3 (Three) Hours**

N.B.

i. Answer **SIX** questions taking any **THREE** from each section.
ii. All questions are of equal values.
iii. Use separate answer script for each section.

Section: A

1. a) What is proposition? 1

b) Differentiate between tautology and fallacy. 2

c) Let A={1, 2, 3, 4}. Determine the truth value of each of the following statements. 3

(i) $(\exists x \in A)(x+3=10)$ (ii) $(\forall x \in A)(x+3<10)$

(iii) $(\exists x \in A)(x+3<5)$ (iv) $(\forall x \in A)(x+3<7)$

d) Using logical equivalence laws show that $\neg (p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent. 4

2. a) Define composition of relations with an example. 1

b) Given A={1, 2, 3, 4} and B={x, y, z}. Let R be the following relation from A to B: 2

R={(1, y), (1, z), (3, y), (4, x), (4, z)}.

(i) Determine the matrix of the relation.

(ii) Find the inverse relation of R.

c) Suppose R and S are relations on a set A and R is antisymmetric. Prove that R∩S is antisymmetric. 4

d) Let A={1, 2, 3, 4}. Consider the following relation in A: R = {(1, 1), (2, 2), (2, 3), (3, 2), (4, 2), (4, 4)} 3

(i) Draw its directed graph.

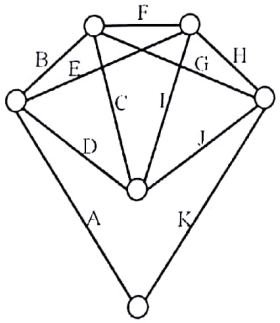
(ii) Is R transitive relation?

(iii) Find R^2 = RoR.

3. a) Briefly explain about the use of Hasse Diagrams. 3

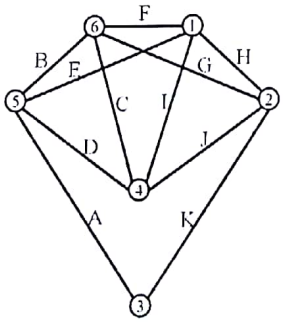
b) Any integer n> 1 is divisible by a prime number. Prove the statement. 2

c) What is Euler circuit? Draw the Euler Cycle from the graph if it is possible otherwise draw the Euler path. 5



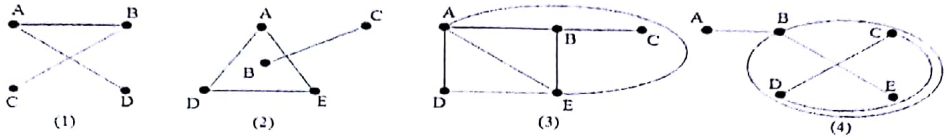
4. a) What is Hamiltonian Cycle? Is it different from Euler Cycle? If then give the explanation. 4

b) Draw the Hamiltonian Cycle from the Graph if it is possible otherwise draw the Hamiltonian path. 6



Section: B

5. a) Consider the following multigraphs: 4



(i) Which of them are connected? If a graph is not connected, find its connected components.
(ii) Which are cycle-free?
(iii) Which are loop-free?

b) Define Complete graph and Bipartite graph with example. 3

c) Prove the isomorphism of the following two graphs G1 and G2. 3

G1 G2

6. a) Suppose that either a number of the mathematics faculty or a student who is a mathematics major is chosen as a representative to a university committee. How many different choices are there for this representative if there are 37 members of the mathematics faculty and 83 mathematics majors and no one is both a faculty member and a student? 4

b) What are contrapositive, the converse and the inverse of the conditional statement "The home team wins whenever it is raining?" 3

c) How can this English sentence be translated into a logical expression? "You can access the Internet from campus only if you are a computer science major or you are not a freshman." 3

7. a) What is complete binary tree? Give figure. 1

b) Define binary search tree. How will you insert a data item in binary search tree? 2

c) Suppose the preorder and inorder traversals of a binary tree T yield the following sequence of nodes: 3

Preorder: G, B, Q, A, C, K, F, P, D, E, R, H
Inorder: Q, B, K, C, F, A, G, P, E, D, H, R

i. Draw the diagram of T.
ii. Find the depth d of T.
iii. Find the descendants of B.
iv. List the terminal nodes of T.

d) Consider the algebraic expression $E=(2x+y)(5a-b)^3$ 4

(i) Draw the tree T which corresponds to the expression E.
(ii) Find the preorder, inorder and postorder of T.

8. a) How many students must be in a class to guarantee that at least two students receive the same score on the final exam, if the exam is graded on a scale from 0 to 100 points? What is the minimum number of students required in a discrete mathematics class to be sure that at least six will receive the same grade, if there are five possible grades, A, B, C, D and F? 6 4

b) In the 17th century, there were more than 800,000 inhabitants in Paris. At the time, it was believed that no one had more than 200,000 hairs on their head. Assuming these numbers are correct and that everyone has at least one hair on their head (that is, no one is completely bald). Use the pigeonhole principle to show, as the French writer Pierre. Nicole did, that there had to be two Parisians with the same number of hairs on their heads. Then use the generalized pigeonhole principle to show that there had to be at least five Parisians at that time with the same number of hairs on their heads.

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
1st Year 2nd Semester B.Sc. Engineering Examination-2018

Course Title: Object Oriented Programming **Course No: CSE151**
Full Marks: 60 **Time: 3 hours**
N.B.
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.
iii) Use separate answer script for each section.

Section-A

Q.1 (a) What is object? What is the main difference between structure and class with example? 3

(b) Write down the output of the following code (if any error describe the reason). 3

(i)
```
#include <iostream>
using namespace std;
class Test {
   int x;
};
int main()
{
 Test t;
 t.x = 60;
 cout << t.x << endl;
 return 0;
}
```

(ii)
```
 #include < iostream >
 using namespace std;
 struct Test {
     int x;
 };
int main()
{
     Test t;
     t.x = 90;
     cout << t.x << endl;
     return 0;
}
```

(c) Consider the following class: 4

```
class Box
{
  public:
  double length; // Length of a box
  double breadth; //Breadth of a box
  double height; // Height of a box
};
```

Now, complete this class by writing a member function **area** to find the volume of a box.

Q.2 (a) Why you use namespace in C++? 2

(b) Consider the following class: 4

```
class Box
{
   double width;
   public:
   friend void printWidth( Box ob );
   void setWidth( double wid );
};
```

Now, complete the program that will print the width of a box using friend function.

(c) How can we open a file? Write a C++ program for opening a file. 4

Q.3 (a) When is the constructor called? 2

	(b)	Write C++ program to demonstrate calling of private member functions inside public member function.	4
	(c)	What is a class and data hiding? How does a class accomplish data hiding? Explain with appropriate diagram.	4
Q.4	(a)	Which function always begins C++ programs?	1
	(b)	To declare the class **Student**, with int data member called **age**. **Student** class has a constructor with one argument that sets the value of the **age** data member.	5
	(c)	To declare a function **printNumber** and overload it. Declare one **printNumber**, taking an integer parameter; and another **printNumber**, taking a float parameter.	4

SECTION-B

Q.5	(a)	Write down the differences between early and late binding.	2
	(b)	Write short note on Virtual Base Class.	4
	(c)	Type in the default values for the parameters of the function **volume**. Suppose the parameters: **x** has default value 2; **y** has default value 3; and **z** has default value 5.	4
Q.6	(a)	Write short description on Multiple Inheritance and diamond problem in C++ with proper example.	4
	(b)	Write short note on 'this' pointer in C++.	3
	(c)	What is generic functions? Why is it used?	3
Q.7	(a)	Why virtual functions is used in C++? Justify your answer "Virtual Functions Are Hierarchical".	5
	(b)	What is exception? Describe the exception handling mechanism.	3
	(c)	When will you make a function inline and why?	2
Q.8	(a)	Write a C++ program that finds the largest number out of given two numbers. You have to use nested member functions.	5
	(b)	Explain the following concept with example. i) Encapsulation ii) Polymorphism iii) Inheritance	4
	(c)	What is an abstract class?	1

Bangabandhu Sheikh Mujibur Rahman Science and Technology University

Department of Computer Science and Engineering

1st Year 2nd Semester B.Sc. Engineering Examination-2018

Course Title: Bangabandhu in Science and Technology **Course Code: BST155**
Total Marks: 60 **Time: 3 (Three) Hour**

N.B.
i) Answer SIX questions, taking any **THREE** from each section.
ii) All questions are of equal values.
iii) Use separate answer script for each section.

SECTION-A

1. (a) Briefly explain about the political activism of Bangabandhu Seikh Mujibur Rahman in the period of British India. 5
   (b) What is Agartala Conspiracy Case? Briefly explain about it. 5

2. (a) What is Six Point Movement? Briefly explain about it. 5
   (b) Write down the contribution of Bangabandhu for establishing Bangladesh. 5

3. (a) Analysis of the Unfinished memories of Bangabandhu. 5
   (b) Bangabandhu and Bangladesh are opposite sides of a same coin. Briefly explain about the statement. 5

4. (a) How Awami League was founded?. 3
   (b) What happened in Ramna Raecourse? Briefly explain about it. 7

SECTION-B

5. Bangabandhu Sheikh Mujibur Rahman had a fondness to those who participated in the struggle for independence. He showed partiality toward those by giving them appointments to the civil government and especially the military. This shortsighted practice proved fatal. 10

   Do you agree with the statement stated above? Does this weakness lead to the tragedy of 1975? Discuss the possible reasons behind the massacre of 1975

6. You have read about the Era of Bangabandhu Sheikh Mujibur Rahman. Write some good sides as well as bad sides of it. 10

7. (a) Briefly explain about the Juktofront Election. 5
   (b) Briefly explain about the Governiung period of Bangabandhu. 5

8. (a) Discuss the establishment of BAKSAL. 5
   (b) Write a short note on :- (**any one**) 5
       (i). 1954 Election
       (ii).1970 Election

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
1st Year 2nd Semester B.Sc. Engineering Final Examination-2018

Course Title: Co-ordinate Geometry & Ordinary Differential Equation **Course Code: MAT155**
Full Marks: 60 **Time: 3 Hours**

N.B.
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.
iii) Use separate answer script for each section.

SECTION-A

1. (a) Find the transformation equation of $5x^2 + 6xy + 5y^2 - 4x + 4y - 4 = 0$ when origin is shifted at $(1, -1)$ and the axes is turned through an angle 45°. 5

   (b) Reduce the equation $5x^2 - 24xy - 5y^2 + 4x + 58y - 59 = 0$ to its standard form. 5

2. (a) Show that the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represent two parallel lines if $\frac{a}{h} = \frac{h}{b} = \frac{g}{f}$ 5

   (b) Reduce the equation $3x^2 + 5y^2 + 3z^2 + 2yz + 2zx + 2xy - 4x - 8z + 5 = 0$ to the standard form and determine the nature. 5

3. (a) Define direction cosine. Find the angle between the line whose direction cosines are (l_1, m_1, n_1) and (l_2, m_2, n_2). 6

   (b) Show that, the four points $(0, -1, -1)$, $(4,5,1)$, $(3,9,4)$ and $(-4,4,4)$ are coplanar. 4

4. (a) Define straight line. Find the condition for a line $\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$ may lie on a plane $ax + by + cz + d = 0$ 5

   (b) Define sphere. Find the shortest distance between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ 5

SECTION-B

5. (a) Define order of a differential equation. Find the differential equation of all circles of radius a. 5

   (b) Define homogeneous differential equation. Solve the differential equation 5
   $$\left(x\sin\frac{y}{x} - y\cos\frac{y}{x}\right)dx + x\cos\frac{y}{x}dy = 0$$

6. (a) What do you mean by exact differential equation? State and prove the necessary condition for an equation to be exact differential equation. 5

   (b) What is Bernoulli's equation? Solve the linear differential equation 5
   $$(1 + x^2)\frac{dy}{dx} + y = \tan^{-1}x$$

7. (a) Find the solution of $x^3\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 12y = 0$ 3

   (b) Solve $x^3\frac{d^3y}{dx^3} + 3x^2\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2y = 0$ by Cauchy e Euler method. 7

8. (a) A thermometer is removed from a room where the temperature is 70°F and is taken outside where air temperature is 10°F. After one-half minute the thermometer reads 50°F. What is the reading of the thermometer at $t = 1$ minute? 5

   (b) The population of a country is known to increase at a rate proportional to the number of people present at time t. If an initial population P_0 has doubled in 5 years, how long will it take to triple? To quadruple? 5

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science & Engineering
2nd Year 1st Semester B.Sc. Engineering Examination-2018

Course Code: CSE205 **Course Title: Java Technology**
Full Marks: 60 **Time: 3(Three) Hours**

N.B.
i) Answer SIX questions, taking any THREE from each section.
ii) All questions are of equal values.
iii) Use separate answer script for each section.

SECTION-A(30 Marks)

Q.1 (a) Explain the characteristics of Object Oriented Programming (OOP). 2

(b) Can a main() method of class be invoked in another class? What is the difference between java command line arguments and C command line arguments? 5

(c) Write the output of following java programs. 3

```
// filename Main.java
classTest {
   protectedintx, y;
}

classMain {
   publicstaticvoidmain(String args[]) {
      Test t = newTest();
      System.out.println(t.x + " "+ t.y);
   }
}
```

Q.2 (a) What is the difference between abstract class and interface? 3

(b) Describe the java garbage collection operation. 3

(c) Translate the following algorithm into Java code: 4

Step1: Declare a double variable named miles with initial value 100

Step2: Declare a double constant named KILOMETERS_PER_MILE with value 1.609

Step3: Declare a double variable named kilometers, multiply miles and KILOMETERS_PER_MILE and assign the result to kilometers.

Step4: Display kilometers to the console.

Q.3 (a) Differentiate between String and String Buffer. 3

(b) Define String Tokenizer Class in Java. 2

(c) What is an exception? Describe the exception handling in Java through try and catch mechanism. 5

Q.4 (a) Explain the functions of **'this'** and **'final 'keyword.** 2

(b) What are types of constructor? Explain constructor overloading in java with example. 3

(c) Write down the difference between constructor and method in java. How do you call one constructor from another in Java? 5

SECTION-B(30 Marks)

Q.5 (a) What do you mean by InputStream and OutputStream in java? Describe the Java Run Time Type Identification with a proper example. 3

(b) What is Layout Managers? Describe Flow Layout, Box Layout and Grid Layout with figures. 3

(c) Write an applet in java to calculate and display the areas of a circle in an applet viewer where the radius is taken by the user from the keyboard. 4

Q.6 (a) What is Thread in Java? Write down the advantages of Multithreading in java. 3

(b) Write down the purpose of each of the following methods: 3

I. lastIndexof();
II. toCharArray();
III. charAt();

(c) Draw and describe the Thread States in Java. 4

Q.7 (a) What is Socket? Explain Socket programming with TCP according to TCP service. 3

(b) What is Servlet? Draw the diagram Servlet vs. CGI. 3

(c) Write a program in java to read information from a file named "in.txt" located at F:\CSE and display that information in a message dialog. 4

Q.8 (a) Define Exception handling. Briefly describe the exception handling mechanism with example. 3

(b) Why catching all exceptions is required? 3

(c) Write a program that illustrates the application of multiple catch statement. 4