Department of Computer Science and Engineering
Begum Rokeya University, Rangpur.

2nd Year 2nd Semester Final Examination, 2016 (Session: 2014-15)

Course Title: Object Oriented Programming Course Code: CSE 2201

Time: 3:00 Hours

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

---

1. **(a)** Define Object Oriented Programing (OOP) and explain the features of OOP. **3**

(b) What does give JAVA its 'write once and run anywhere' nature? **1**

(c) Discuss the issue of procedure oriented programming systems with respect to data security. If OOP solves it, then how? **3**

(d) Describe the structure of a typical java program. **3**

2. **(a)** What is ***Constructor*** in java? Why constructor does not have return type in java? Explain with proper example. **3**

(b) Why do we need Static members and how to access them? Explain it with clear example. What is the difference between static binding and dynamic binding? **3**

(c) Discuss with example, the implications of deriving a class from an existing class by the 'public' and 'protected' access specifiers. **4**

3. **(a)** What is ***accessor*** method and ***mutator*** method? What are the naming conventions of ***accessor*** method and ***mutator*** method? **2**

(b) What are the benefits of data field encapsulation? Describe the difference between passing parameters of primitive type and reference type with java code segment. **3**

(c)
```
Class Atom {
 Atom() { System.out.print("atom "); } }
 Class Rock extends Atom {
 Rock(String type) { System.out.print(type); } }
 public class Mountain extends Rock {
  Mountain() {
  super("granite ");
  new Rock("granite "); }
  public static void main(String[] a) { new Mountain(); } }
```
3

What is the result after execution of above code? Give reason to your answer.

(d) Describe the scope of ***super*** and ***this*** reference keyword. **2**

4. **(a)** What is ***class***? How does it accomplish data field encapsulation? **2**

(b) Can you invoke an instance method or reference an instance variable from a static method? Can you invoke a static method or reference a static variable from an instance method? What is wrong in the following code: **3**

```
public class Foo {
public static void main(String[] args) {
   method1();
 }
public void method1() {
   method2();
 }
public static void method2() {
System.out.println("What is radius " + c.getRadius());
Circle c = new Circle();
}
```

(c) "Overloading and overriding facilitate the polymorphic behavior of a method." Justify this with java code segement. **3**

(d) What is Run-time Polymorphism and compile-time Polymorphism? **2**

5. **(a)** What is the default value of an object reference declared as an instance variable? Can a top level class be private or protected?

(b) How do you prevent a class from being extended? How do you prevent a method from being overridden? **3**

(c) In the code below, classes **A** and **B** are in the different package. If the question marks are replaced by blanks can class **B** be compiled? If the question marks are replaced by **private**, can class **B** be compiled? If the question marks are replaced by **protected**, can class **B** be compiled? **3**

```
package p1;
public class A{
   ?  int i;
   ?  void m(){
   .....
}
}
```

```
package p2;
public class B extends A{
  public void m1(String[] args){
    System.out.println(i);
     m();}
}
```

(d) What is the difference between ***StringBuffer*** and ***String***? **2**

6. **(a)** How do you create an ***ArrayList***? How do you append an object to a list? How do you insert an object at the beginning of a list? How do you find the number of objects in a list? **4**

(b) What is the difference between abstract class and interface? **2**

(c) Java introduces ***Interface*** to discard multiple inheritance. How can you create and use interface as multiple inheritance of any filed or methods. **4**

7. **(a)** What are the differences among **Swing**, **AWT** and **JAVA-FX**? **3**

(b) Four aspects of object-oriented programming are recalled in the mnemonic 'A PIE': ***abstraction***, ***polymorphism***, ***inheritance*** and ***encapsulation***. Explain the meaning of each of these terms. **4**

(c) What is a thread? Describe the complete life cycle of thread with example. **3**

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd Year 2nd Semester Final Examination-2016 (Session: 2014-15)

Course Title: **Operating System and Systems Programming**; Course Code: **CSE 2203**

Total Marks: **50** Time: **3.00 hours**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

1.	a)	What is a system call?	1
	b)	Describe the states of a process with figure.	3
	c)	Analyze the usefulness of multi-process architecture in case of **Chrome** browser.	3
	d)	What is context switch? What are the main advantages of multiprogramming?	3
2.	a)	What is race condition? How does semaphore play role in process synchronization?	3
	b)	Explain Readers-Writers Problem in process Synchronization.	5
	c)	Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor systems	2
3.	a)	What are the criteria to schedule a CPU? Describe in brief.	4
	b)	Make a comparative analysis of various CPU scheduling algorithms with their shortcomings.	6
4.	a)	What do you mean by a deadlock and starvation? Is it possible to have a deadlock involving only one process? Explain your answer.	4
	b)	What are the measures for avoidance and prevention dead lock in OS?	3
	c)	Briefly describe deadlock detection approach.	3
5.	a)	What is segmentation? Why are segmentation and paging sometimes combined into one scheme?	4
	b)	With T.L.B. effective access time minimizes to less than 50%. Justify it.	2
	c)	A byte addressable system has a logical address of 22 bits, a physical address of16 bits and a page size of KB i).How many logical addresses can we generate? ii).How many frames can we generate? iii).What is the size of the instruction offset? iv).What is the total address space need for the physical memory and logical memory?	4
6.	a)	Under what circumstances do page fault occurs? Describe the actions taken by operating the system when a page fault occurs?	3
	b)	Describe various page replacement algorithm with example.	4
	c)	What is the concept of virtual memory? List the cost and benefits carried in implementing virtual memory.	3
7.	a)	What is file system? What is the main responsibility of a file system?	5
	b)	Illustrate the design principles of **UNIX** system	5

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd year 2nd Semester Final Examination, 2016. (Session: 2014-15)

Course Code: **MAT 2221** Time: **3.00 hours**

Course Title: **Numerical Methods** Total Marks: **50**

*[N B: **Answer any five (5) questions and figures in the right margin indicate full marks]***

1. a) Write an algorithm for fixed point iteration technique to find a solution to $p=g(p)$, given an initial approximation p_0. **3.5**

b) Write down the fixed-point theorem. **1.5**

c) Use Bisection method to find the solution accurate to four significant digits for $x+1.0+\cos\pi x=0$ **5**

2. a) What are divided differences? Establish the Newton's divided difference formula for unequal intervals. **5**

b) The table gives the distance in nautical miles of the visible horizon for given heights in feet above the following table: **5**

x (height)	100	150	200	250	300	350	400
y (distance)	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the distance of the visible horizon for the height 385.

3. a) State Lagrange's interpolation formula for unequal intervals. Using Lagrange's interpolation formula, find the form of the function $y = f(x)$ from the following data: **5**

x	-1	0	2	5
$y = f(x)$	9	5	3	15

b) Apply Gauss forward central difference formula to find the value of y when $x=3.75$ given the following table: **5**

x	2.5	3.0	3.5	4.0	4.5	5.0
y	24.145	22.043	20.225	18.644	17.262	16.047

4. a) Establish general quadrature formula for equidistance ordinates and derive Simpson's three-eight rule. **5**

b) Use the Newton-Raphson method to find a root of the equation $x^3-2x-5=0$ up to four decimal places. **5**

5. a) Solve the following system of linear equation by Gauss Jordan method: **5**

$$3x+y+2z=3$$
$$2x-3y-z=-3$$
$$x+2y+z=4$$

b) Solve the following system of linear equation by Gauss-Seidal method: (correct up three decimal places) **5**

$$8x-3y+2z=20$$
$$4x+11y-z=33$$
$$6x+3y+12z=35$$

6. a) Discuss Euler's method for solving first order ordinary differential equation. Give modification of Euler method. How is the modified Euler's method better than Euler's method? **5**

b) Using Euler's method solve the following differential equation **5**

$$\frac{dy}{dx} + 2y = 0, y(0) = 1$$

7. a) Discuss the procedure of Gaussian elimination with backward substitution. **5**

b) Compute $y(0.2)$ by Runge-Kutta method of fourth order for IVP **5**

$$\frac{dy}{}$$

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd year 2nd Semester Final Examination, 2016. (Session: 2014-15)

Course Code: **MAT 2222** Time: **3.00 hours**

Course Title: **Complex Variable, Laplace Fourier Series** Total Marks: **50**

*[N B: **Answer any five (5) questions and figures in the right margin indicate full marks**]*

1. **a)** Find the modulus and argument of $z = \left(\frac{1+i}{1-i}\right)^2$. **2**

b) Prove that $|z-3| - |z+3| = 4$ represents a hyperbola. **4**

c) Find each of the indicated roots and locate graphically for $(-2\sqrt{3} - 2i)^{1/4}$ **4**

2. **a)** State necessary and sufficient conditions of Cauchy-Riemann equation. Test the following function satisfy the C-R equation or not: $f(z) = u + iv$ where $u = e^{x^2-y^2}\cos 2xy$ and $v = e^{x^2-y^2}\sin 2xy$. **5**

b) Define harmonic function. Prove that $u = 3x^2y + 2x^2 - y^3 - 2y^2$ is a harmonic function. Find its harmonic conjugate v and express $f(z) = u + iv$ as an analytic function of z. **1+4**

3. **a)** State Cauchy's integral formula for the higher derivative of an analytic function. Hence show that $\frac{1}{2\pi i}\oint_C \frac{ze^{tz}}{(z+1)^3}dz = \left(t - \frac{t^2}{2}\right)e^{-t}$, where C is any simple closed curve enclosing the point $z = -1$ and $t > 0$. **5**

b) State Laurent's theorem. Expand $f(z) = \frac{z-1}{(z+2)(z+3)}$ in a Laurent series valid for **5**

(i) $|z| < 2$ and (ii) $2 < |z| < 3$.

4. **a)** Define residue. State and prove Cauchy's residue theorem. **5**

b) Evaluate the following integrals using Cauchy's residue theorem **5**

$$\oint_c \frac{2z^2 - z + 1}{(2z-1)(z+1)^2}dz, C: r = 2\cos\theta, \quad 0 \le \theta \le 2\pi$$

5. **a)** Define Laplace transform. State and prove the second translation property. Find the Laplace transform of *F(t)* where $F(t) = e^{-at}$ **4**

b) Find (i) $\mathcal{L}\{6e^{3t} + 7t^7 - \sin 4t - 3\cos 2t\}$. **3×2**

(ii) $\mathcal{L}\{t^2\cos 3t\}$.

6. **a)** (a) Solve: $Y'' - 3Y' + 2Y = 4e^{2t}, \quad Y(0) = -3, \quad Y'(0) = 5$ **5**

b) State the Heaviside expansion formula and hence find $\mathcal{L}^{-1}\frac{2s^2-6s+5}{s^3-6s^2+11s-6}$. **5**

7. **a)** Define Fourier transform and complex Fourier transform. Find the Fourier transform of *F(x)*, where **4**

$F(x) = \begin{cases} 1 & when\ -a < x < a \\ 0 & when\ -a > x > a. \end{cases}$ Hence show that $\frac{\pi}{2} = \int_0^\infty \frac{\sin a\lambda}{\lambda}d\lambda$

b) Find the Fourier coefficients corresponding to the function **6**

$$F(x) = \begin{cases} 0 & -5 < x < 0 \\ 3 & 0 < x < 5 \end{cases} \quad \text{Period=10}$$

Write the corresponding Fourier series.

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd year 2nd Semester Final Examination, 2016. (Session: 2014-15)

Course Code: **BUS 2225** Time: **3.00 hours**

Course Title: **Introduction to Business** Total Marks: **50**

*[N B: **Answer any five (5) questions and figures in the right margin indicate full marks]***

1.	**a)**	What is meant by industry?	**1**
	b)	State the types of industry with example.	**3**
	c)	Explore the interrelationship among industry, commerce and trade.	**6**
2.	**a)**	Define partnership business and joint stock company with example.	**3**
	b)	Identify and discuss the social objectives of modern business firm.	**5**
	c)	State the importance of management functions to managers in each level of management.	**2**
3.	**a)**	What do you understand by memorandum of association and articles of associations?	**2**
	b)	In what extend public company differs with private company.	**6**
	c)	State the process of conflict.	**2**
4.	**a)**	Define Management.	**1.5**
	b)	Mention the principles of modern management.	**3.5**
	c)	How do you judge the Maslow's need hierarchy theory?	**5**
5.	**a)**	"Morale conveys different meanings to different people". Justify this statement.	**5**
	b)	In what way you can understand that your organization is in trouble.	**5**
6.	**a)**	Mention the factors that influence location decisions for new manufacturing firms.	**3**
	b)	Why Geography and distance are becoming increasingly irrelevant in location decisions? Explain.	**5**
	c)	What do you mean by collective bargaining?	**2**
7.	**a)**	Define accounting.	**2**
	b)	What is Generally Accepted Account Principles (GAAP)? Identify the accounting entity assumption with an example.	**3**
	c)	"Accounting is the language of business". Explain.	**3**
	d)	Identify the financial statements.	**2**