

**Jahangirnagar University**  
**Department of Computer Science and Engineering**  
PMSCS Program, Summer-2021

Course Code: **PMSCS-602**

Title: *Object Oriented Programming*

Time: **1.5 hrs**

Marks: **30**

Answer any **THREE** of the following questions.

1.
  - a) What is a constructor? Differentiate between class data members and instance data members. 2
  - b) Explain the following concepts: (i) short-circuit evaluation (ii) off-by-one error. 3
  - c) What is exception? Differentiate between checked and runtime exceptions. 2
  - d) Write a program that computes your age in minutes. Input to the program is the year, month, day, hour, and minute information of your birth. 3
2.
  - a) Differentiate among local variable, parameter and data member inside a method in a class with example. 3
  - b) Define a class to represent a bank account which includes following members : 5  
Data members: i)Name ii)Account number iii)Type of account iv)Balance amount  
Member functions: i) constructor ii) To assign initial value iii) To deposit an account iv) To withdraw from an account v) To display name, account number & balance.  
Also write a main function to test the program.
  - c) What is a package in java? How can you put the class created in 2(b) into a package named *mypkg*? 2
3.
  - a) Demonstrate two different approaches to use *assertions* in java. 2
  - b) A perfect number is a positive integer that is equal to the sum of its proper divisors. A proper divisor is a positive integer other than the number itself that divides the number evenly (i.e., no remainder). For example, 6 is a perfect number because the sum of its proper divisors 1, 2, and 3 is equal to 6. Eight is not a perfect number because  $1 + 2 + 4 = 8$ . Write a program that accepts a positive integer and determines whether the number is perfect. 5
  - c) "The reserved word *this* can be used in three different ways"-demonstrate with example. 3
4.
  - a) Imagine a publishing company that markets both book and audiocassette versions of its works. Create a class *publication* that stores the title (a *string*) and price (type *float*) of a publication. From this class derive two classes: *book*, which adds a page count (type *int*), and *tape*, which adds a playing time in minutes (type *float*). Each of these three classes should have a *getdata()* function to get its data from the user at the keyboard, and a *putdata()* function to display its data. 5  
Write a *main()* program to test the book and tape classes by creating instances of them, asking the user to fill in data with *getdata()*, and then displaying the data with *putdata()*.
  - b) Explain *polymorphism* in object-oriented programming with example. 2
  - c) Discuss the effect of visibility modifiers on class methods and data members in context of a client and a subclass. 3