Reg. No.										

Manipal Institute of Technology

(A Constituent Institute of Manipal University)

I SEMESTER M. C. A.
END SEMESTER EXAMINATION – NOV/DEC 2015

SUBJECT: OBJECT ORIENTED PROGRAMMING AND DESIGN [MCA 4101]

28-11-2015

Time : 3 hours Max. Marks : 50

Instructions to Candidates

1. Answer ANY FIVE FULL questions.
2. Missing data may be suitably assumed.

1A Justify the need for virtual functions in C++ with a suitable example. Explain the importance of base class pointers in handling virtual functions.

1B Draw a use case diagram for an Inventory System. In order to generate an invoice a clerk must log in. If a clerk is a first time user, he should have registered himself. There should be an option for a user to register oneself within the login page. Any user can use the system to view products online. The option of login is also provided when a user views products online. The clerk must be able to generate daily reports.

1C Differentiate between aggregation and composition relationships in UML. (5 + 3 + 2)

2A A person's name (Henry Frank Smith) can be thought of as having three parts: First name (Henry), middle name (Frank) and Last name (Smith). Write a program that defines a class "Person Name" to store these three parts of a name separately. Create two objects, one using parameterised constructor and the other accepted from the user. Display both names. However, the middle name should display only the first character followed by a full stop (Henry F. Smith). Overload the insertion operator when displaying the objects.

2B Explain how a friend function serves as a bridge between two classes with an example.

2C When is the function unexpected() invoked? Give an example for the same.

(5 + 3 + 2)

3A Explain the various compartments of a UML class diagram. Draw a class diagram for the following scenario: A school has one or more departments. A department offers one or more subjects. A particular subject will be offered by only one department. A department has instructors and instructors work for one or more departments. An instructor can teach up to 3 subjects. The same subject can be taught by different instructors. Students can be enrolled in more than one school. A student can enroll up to 5 subjects.

3B What are the two approaches to resolving the ambiguity that arises in multiple inheritance?

3C Differentiate between passing arguments by reference and by value.

(5 + 3 + 2)

4A Explain how data conversion is possible between two user-defined objects. Write a program to convert from a Fahrenheit class object (member date Fah) to its equivalent Centigrade class object (member Celsius). Use the formula °C = 5/9 (°F - 32).

4B Draw an activity diagram for withdrawing cash from an ATM. The steps include the ATM accepting a card, verifying if the card is stolen or not. If not, the pin number is accepted and only three attempts are provided for entering the correct pin number. If pin entry is successful, the present balance of the customer is displayed. Amount is accepted and checked for conditions: (a) amount entered is less than amount present in savings account of customer and (b) amount entered is greater than amount present in savings account of customer. Cash is generated, balance is displayed for first condition but a message "Insufficient funds" is flashed and re-entry of amount option displayed for second condition. On successful cash generation, card is sent out.

4C Differentiate between new and delete operators.

(5 + 3 + 2)

5A Write a C++ program that creates a file "Student.dat" and stores the following information for 5 students: Student name, Student Registration number, and Date of Joining. Read the stored information from the file and display the records in ascending order student registration numbers.

5B Write a template function that returns the average of all the elements of a two dimensional array. The arguments to the function should be the array name, row and column (type int). In main() function implement the same with arrays of type int, float and double.

5C Explain the bitwise exclusive OR operator with an example.

(5 + 3 + 2)

6A Explain the C++ exception handling mechanism. Write a program to compute the product of two numbers. The input numbers must be tested for validity. If found to be negative, the user-defined function find_product() must raise an exception.

6B Discuss the importance of static members of a class. Give an example for each.

6C Describe the notations used in state chart diagrams.

(5 + 3 + 2)

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