

Reg. No.



**MANIPAL INSTITUTE OF TECHNOLOGY**  
MANIPAL  
(A constituent unit of MAHE, Manipal)

**I SEMESTER M.C.A**

**END SEMESTER EXAMINATIONS, NOVEMBER 2018**

**SUBJECT: OBJECT ORIENTED PROGRAMMING & DESIGN**

**[MCA 4101]**

**REVISED CREDIT SYSTEM**

**(21/11/2018)**

Time: 3 Hours

MAX. MARKS: 50

**Instructions to Candidates:**

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitable assumed.

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|-----|---|---|
| 1A. | Design a data conversion program to convert miles to kilometer and vice versa where miles is the user-defined data type and kilometers is the basic type float.<br><i>Hint: 1 mile = 1.6 km</i> | 5 |
| 1B. | Create a class template " <b>ALL_ARRAY</b> " that sorts elements of any data type, using selection sort method.   | 3 |
| 1C. | Identify differences between the following:<br>i. Aggregation and composition<br>ii. Extend and include dependencies  | 2 |
| 2A. | Justify the need for virtual functions in C++ with a suitable example. Explain the importance of base class pointers in handling virtual functions.   | 5 |
| 2B. | Illustrate the difference between sequence and collaboration diagrams with suitable examples for each.  | 3 |
| 2C. | Differentiate between 'const' qualifier and '#define' directive.  | 2 |

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|-----|--|---|
| 3A. | Write a file program to work like Linux <b>cp</b> command, it should copy the contents of a text file to another file. The file name must not be blank and must be accepted from the user. Ensure that the program checks that the files specified can be opened.  | 5 |
| 3B. | Consider the process of ordering a pizza over the phone. Draw an activity diagram representing each step of the process, from the moment you pick up the phone to the point where you start eating the pizza. Roles should be indicated in swim lanes. A customer places a call to the pizzeria, pizza-boy queries the customer for his name, address, pizza size and toppings. The pizza is prepared and delivered to the customer who waits for the pizza delivery, receives the pizza, pays for it by card and eats it.   | 3 |
| 3C. | Give an overview of the C++ exception handling mechanism.  | 2 |
| 4A. | <ul style="list-style-type: none"> <li>i. Describe an abstract class. Include syntax and example.</li> <li>ii. Imagine a publishing company that markets both hard cover books and kindle versions of its works. Create a class <b>Publication</b> that stores the title (a string) and price (type float) of a publication. From this class derive two classes: <b>Book</b>, which adds a page count (type int), and <b>E-Reader</b>, which adds a pages (type int). Each of these three classes should have a <code>getdata()</code> function to get its data from the user at the keyboard, and a <code>putdata()</code> function to display its data. Write a <code>main()</code> program to test the <b>Book</b> and <b>E-Reader</b> classes by creating instances of them, asking the user to fill in data with <code>getdata()</code>, and then displaying the data with <code>putdata()</code>.</li> </ul> | 5 |
| 4B. | <p>Implement a class called <b>Bank Account</b> with customer name, account number, balance as data members. Define a constructor such that the minimum balance in an account is Rs. 500. Overload + and - (binary) operators to credit or debit amount into the respective customer account using the option as given: 2000 + object where 2000 is the deposit amount. Similarly, object - 2000 where 2000 is withdrawal amount. Include a static data member for generating a unique account number starting at 100001 as well functions <code>add_Account()</code> and <code>display_Account()</code>.</p> <p><b>Constraints:</b> Every debit transaction must maintain the minimum balance of 500 and no more than 20,000 can be withdrawn or deposited in a single transaction. Also display appropriate messages after each transaction.</p>   | 3 |
| 4C. | Justify the statement "Friendship of classes is not transitive."   | 2 |

- 5A. The MAHE cricket league had been constituted a year ago, but it was not until recently that layout for the league was planned. The cricket will be made up of at least four cricket teams (one each from health sciences, engineering, nursing and pharmacy). Each team will be composed of twelve to fourteen players, and one player captains the team. A team will have a name and a record. Players will have a number and a position. The teams will play matches against each other. Each match has a score and a location. The teams can be at times lead by a coach. A coach should have a level of accreditation and experience of years and can coach multiple teams. Coaches and players are people, and people have names and addresses. Draw a **UML class diagram** for this information, and be sure to label all associations with appropriate multiplicities. 5
- Assumption:* Each player may play on one team, each captain only captains one team, each team only plays in one league.
- 5B. Write a program that includes a function (which passes an input string/word as an argument) to print all the non-vowels of a given word. For example: BEAUTIFUL would result in BTFL. Use switch-case construct for vowel check. 3
- 5C. The following program asks for input, you type two names (for example, Clark Kent? Predict the output of the program. 2

```
int main()
{
    std::cout << "What is your name? ";
    std::string name;
    std::cin >> name;
    std::cout << "Hello, " << name
    << std::endl << "And what is yours? ";
    std::cin >> name;
    std::cout << "Hello, " << name
    << "; nice to meet you too!" << std::endl;
    return 0;
}
```

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