DEPARTMENT OF COMPUTER SCIENCE
Cochin University of Science and Technology
M.Sc. (Five Year Integrated) in Computer Science (AI & DS)
First Semester
21-805-0103: Object Oriented Programming
First Series Examination, January 2022

Time: 2 hours   *Answer All Questions*   Maximum Marks: 20

1. Write a user-defined function **power()** in C++ to raise a number m to a power n. The function takes a **double** value for m and **int** value for n and return the result correctly. Write a **main()** function that gets the values of m and n from the user to test the function.
   (*Hint:* Use **std::stod(string_var)** and **std::stoi(string_var)** to convert a string to **double** and **int**, respectively.)   [5]

2. An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a C++ program to read the ballots and count the votes cast for each candidate using an array variable **count**. In case, a number read is outside the range 1 to 5, the ballot should be considered as spoilt ballot and the program should also count the number of spoilt ballots.   [5]

3. An Electricity Board charges the following rates to domestic users:
   For the first 100 units - 40*paise/unit*
   For the next 200 units - 50*paise/unit*
   Beyond 300 units - 60*paise/unit*
   All users are charged a minimum of Rs.50.00/-. If the total close is more than Rs.250.00/-, then an additional surcharge of 15% is added. Write a C++ program to read the names of users and number of units consumed and print out the charges with names.   [5]

4. Briefly explain the concepts of call-by reference and return-by reference mechanisms with the help of your own example programs.   [5]

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1. Define a class to represent a bank account. Include the following data members:
   (i) Name of the depositor (ii) Account Number (iii) Type of Account (iv) Balance Amount.
   Add the following member functions:
   (i)To assign initial values (ii) To deposit an amount (iii) To withdraw an amount after checking the balance (iv) To display name, account number, type of account and balance.
   Write a C++ program to implement the above class. [6]

2. Write a C++ program to define a class *weight* with data members *kilogram* and *gram* to represent the weight of an object. Include member functions to read and display the weight of an object. Add a friend function *sum* which takes two weight objects as arguments and returns an object whose weight is the sum of the weights of two objects passed as arguments. [5]

3. Write a C++ program to implement the following:
   (i) To create a class named *vector* which consists of an integer array V and an array size S as data members.
   (ii) Add default and parameterized constructors to create uninitialized and initialized vector objects.
   (iii) Add a member function to merge two vector objects and return a new vector object.
   (iv) Add a member function to display the data members of a vector object. [5]

4. Discuss the concept of copy constructor with the help of an example program. Highlight the signficance of using *const* keyword along with the argument. [4]