2012

MCA

3rd Semester Examination

OBJECT ORIENTED PROGRAMMING LAB

PAPER—MCA-306

(PRACTICAL)

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Answer any *one* question from each group. 1×30

Group — A

(C++)

1. Create a class "EMPLOYEE' which will contain following numbers :

   Data Members :

   employee number, employee name, Basic, DA, IT, Net Salary

   Member Functions :

   - To read data of N employees
   - Compute Net salary of each employee
   - To display the employees data

   (D.A. = 52% of Basic, IT = 30% of gross salary, Net Salary = Basic + DA – IT).

2. Define a STUDENT class with name and marks in 3 tests of a subject. Declare a array of 10 STUDENT objects. Using appropriate functions find the average of two better marks for each students and display the name and the average of the marks of all students.

3. Implement a Class Matrix that adds, subtracts and initializes the matrix.

4. Implement a string object and include member functions to compare two strings and to concatenate two strings.

5. Create two classes CLASS1 and CLASS2 which will contain the following members:

   Data Members :

   CLASS1: num and CLASS2 : numl.

   Member Function:

   - To read the data of each classes.
   - To display the data.

   Create a common friend function that will exchange the private values of the two classes and then display the exchanged value. Note that the function is called by reference.

6. Create a class COMPLEX that will have two complex objects A & B. the value of the complex objects will be added to produce another complex objects C. Display all the three values of the objects.

7. Write a program to implement a telephone bill class with Name, Address, Tel. No., No. of calls as data members. Compute the total amount to be paid for three months if the charges per call is Rs. 2/- and no. of free call is 50/month.

8. Write a C ++ program to implement a date class with member functions as next, previous which return next date and previous date objects.

9. Define a class to represent a bank account. Include the following members:

   Data Members :

   Name of the depositor, Account number, Type of the account, Balance amount in the account.

   Member Function :

   - To assign initial values.
   - To deposit an amount.
   - To withdraw an amount after checking the balance.
   - To display name and balance.

10. Write a program to implement time class that has separate data members for hours, minutes and seconds. It will have member function that will convert the time in 24 hrs /12hrs.

11. Create a class distance which stores the value of distances in feet-inches. Write a program to perform the following operations :

- Initialize value of distances to 0' - 0.00".
- Declare three objects d_1, d_2 and d_3.
- Read data of d_1.
- Initialize distance of d_2.
- Calculates d_3 as the sum of distances d_1 and d_2.

12. Define a class fraction. The class should contain two data members depicting numerator (n) and denominator (d). Include methods to perform addition, subtraction, multiplication, division and simplification of two fraction objects. The output should be expressed both as a fraction (i.e. in the form n/d like $\frac{1}{2}$ or $\frac{11}{17}$ where the fraction is in simplified form) and as a floating point number (i.e. in the form 0·5 or 0·1267).

13. Write a program to facilitate the searching of an entered book from a book list and manipulate accordingly.

14. An electrical board charges the following rates to domestic users to discourage large consumption of energy :

For the first 100 units — 60p. per unit
For next 200 units — 80p. per unit
Beyond 300 units — 90p. per unit

All users are charged a minimum of Rs. 50.00. If the total amount is more than Rs. 300.00 then an additional surcharge of 15% is added. Write a program to read the names of users and number of units consumed and point out the charges with names.

15. Write a program to encode each word of a sentence in reverse order. For ex. : "Object oriented programming" will be encoded by 'tecjbo detneiro gnimmargorp".

16. Create two classes DM and DB which store the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add object of DM with another object of DB. Use friend function to carry out the addition operation. The object that stores the results may be a DM object or DB object, depending on the units in which the results are required. The display should be in the format of feet and inches or meters or centimeters depending on the project on display.

17. Write a program to define a class Matrix which uses a 2D array and two counters r limit and c limit to hold the row size and column size of the matrix respectively. Also, member functions are defined which perform the following operations :

(i) Matrix addition ;

(ii) Matrix multiplication.

18. Define a class with following description :

Private Members

A data member Flight number of type integer

A data member Destination of type string

A data member Distance of type float

A data member Fuel of type float

A member function CALFUEL () to calculate the value of Fuel as per the following criteria :

Distance	*Fuel*
< = 1000	500
more than 100 and < = 2000	1100
more than 2000	2200

Public Members

A function FEEDINFO () to allow user to enter values for Flight Number, Destination, Distance and Call function CALFUEL () to calculate the quantity of Fuel. A function SHOWINFO () to allow user to view the content of all the data members.

19. Write the definition for a class called time that has hours and minutes as integer. The class has the following member functions :

Void set time (int, int) to set the specified value in object

Void show time () to display time object

time sum (time) to sum two time object and return time

1. Write the definitions for each of the above member functions.
2. Write main function to create three time objects.

   Set the value in two objects and call sum() to calculate sum and assign it in third object. Display all time objects.

Group — B

(*JAVA*)

20. Write a program to sum up the following for a given value of X and N :

$$1 - \frac{x}{1!} + \frac{x^2}{2!} + \ \ldots \ + \frac{x^N}{N!}$$

21. Write a program to check a matrix of order m×n is symmetric or skew symmetric or not.

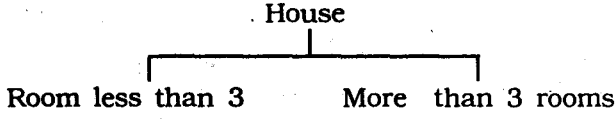
22. Create a package to show whether a number is prime or not. Use this package in your application program to test for above.

23. Write a program for inter-conversion of a decimal, octal and Hexadecimal number.

24. Write a program to show the use of multiple inheritance.

25. Write a program to calculate the volume of different geometrical figure using constructor.

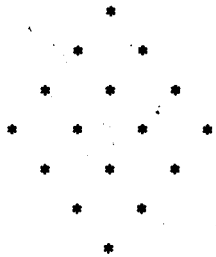
26. Design and implement the following class hierarchy :



Each house has a specific covered area and costs the houses that have more than 3 rooms have a balcony which may be of different size for each house.

- the member variables for each class ;
- a function that uses polymorphism and prints the details of a house.

27. Write a program to print the following output :



28. Write a program to show the concept of multi-threading.

29. Write a menu driven program to find :

(i) Sum of the numbers ;

(ii) maximum of the numbers ;

(iii) Average of the numbers.

30. Write a program that accepts a shopping list of five items from the command line and store them in a vector. The program is to accomplish the following :

- To delete an item in the list ;
- To add an item at a specified location in the list ;
- To add an item at the end of the list ;
- To print the contents of the vector.

31. Define an exception called "Not Equal Exception" that is thrown when a float value is not equal to 3·14. Write a program that uses the above user defined exception.

32. Write a program that takes three names as input and print them in their alphabetical order.

33. Write a program to implement simple calculator using applet.

34. Write a program to display the following output for any given height : (Here, Height = 5)

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

35. Write a program to :

(a) print the name, priority and thread group of the thread.

(b) Change the name of the current thread to "JAVA".

(c) Display the details of the current thread.

36. Develop a program to illustrate a copy constructor so that a string may be duplicated into another variable either by assignment or copying.

37. Write a package called Clear, it contains one public method clrscr (). It is used to clear the screen. Import the package and use it in another program. Add another public method starline (). It prints the line for 15 stars.

38. Write a Class Teacher contains two fields Name and Qualification. Extends the class to Department which contains Dept. No. and Dept. Name. An interface named as College, contains one field Name of the College. Using the above classes and Interface, get the appropriate information and display it.

39. Write a person to construct Inter Thread Communication in Multi-Threading.

Viva - 30

Practical Note Book — 10

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