

22393

12425

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) State any four applications of OOP.
- (b) List two memory management operators available in C++. Also state its use.
- (c) Define constructor & list types of constructor.
- (d) Write syntax to define a derived class.
- (e) Define complexity & classify it.
- (f) Draw the diagram describing node structure of singly link list.
- (g) Write C++ program to perform PUSH operation on stack using link list.

**2. Attempt any THREE of the following :**

**12**

- (a) Write a C++ program to check whether the entered string is palindrome or not using string handling function.
- (b) Describe how memory is allocated to objects of class with suitable diagram.



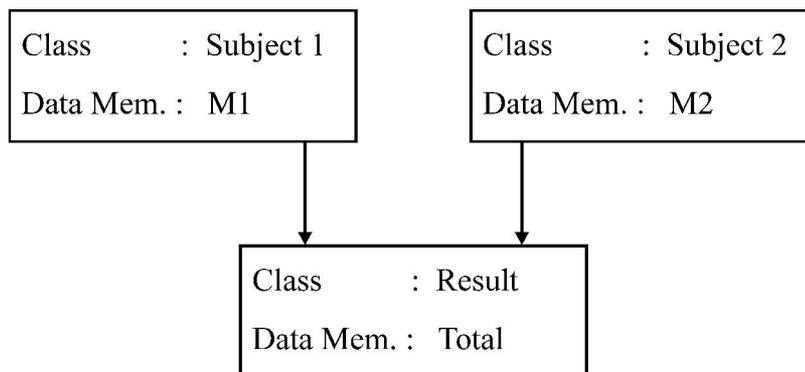
- (c) Differentiate between stack & queue.
- (d) Convert the infix expression to prefix expression using stack for –  
 $((A + B) * D/E) ^ (F + G)$

**3. Attempt any THREE of the following :**

**12**

- (a) Write a C++ program to accept array of five elements, find & display smallest number from an array.
- (b) Explain constructor overloading with suitable example.
- (c) Write a program to implement multiple inheritance as shown in following Fig. No. 1.

Accept & display data for one object of class Result.



**Fig. No. - 1**

- (d) Find the position of element 29 using binary search method in an array 'A' given below, show each step.

$A = \{15, 10, 20, 2, 29, 19, 1, 45\}$

**4. Attempt any THREE of the following :**

**12**

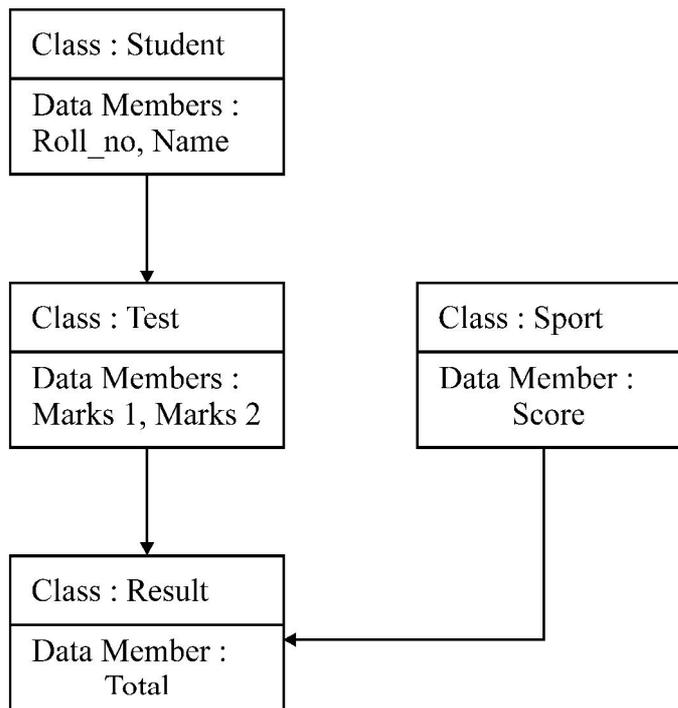
- (a) Differentiate Procedure Oriented Programming & Object Oriented Programming.
- (b) Write a C++ program to define a class 'Employee' having data members Emp\_id, Emp\_name, & Emp\_salary. Accept this data for 5 employees & display details of employees having salary greater than 25,000.

- (c) Describe function overloading with suitable program.
- (d) Describe working of linear search with example.
- (e) Explain the memory representation of queue with the help of diagram using
  - (i) Array
  - (ii) Link list.

**5. Attempt any TWO of the following :**

**12**

- (a) Write any two characteristics of static data member. Write C++ program to count no. of objects created with the help of static data member.
- (b) Write a program to implement the following hierarchy using suitable member functions. (Fig. No. 2)



**Fig. No. - 2**

- (c) Explain with suitable diagrams procedure to insert a node into singly link list at the beginning, in between & at the end of the list.

**6. Attempt any TWO of the following :****12**

- (a) Write a C++ program to declare a class 'staff' having data members as staff\_name & post. Accept this data for 5 staffs & display the names of staff who are H.O.D.
  - (b) Write a C++ program to overload the '-' unary operator to negate the values.
  - (c) Show the effect of INSERT & DELETE operation on the linear queue of size 10. The linear queue sequentially contains 10, 20, 30, 40 & 50. Where 10 is at front of the queue. Show diagrammatically the effect of –
    - (1) INSERT (12)
    - (2) INSERT (34)
    - (3) DELETE
    - (4) INSERT (56)
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