method showing all details of Bus and Car respectively with content of the super class's showData ( ) method.

(2 + 2) + 8 = 12

7. (a) Create a package containing a class that defines all input/output methods. Use this package for input/output operations in question 7(b).

(b) Create a general class ThreeDObject and derive the classes Box, Cube and Cone from it. The class ThreeDObject has methods wholeSurfaceArea ( ) and volume ( ). Override these two methods in each of the derived classes to calculate the volume and whole surface area of each type of three-dimensional objects. The dimensions of the objects are to be taken from the users and passed through the respective constructors of each derived class. Write a main method to test these classes.

6 + 6 = 12

Group - E

8. (a) Explain the usage of a green thread.

(b) Explain object cloning with an example.

(c) What happens if no delimiter is specified in the StringTokenizer constructor? Illustrate with an example.

4 + 4 + 4 = 12

9. (a) Write a program called Factorial.java that computes factorial of a number, say x, entered by the user and stores the result in a long variable. The long type of variable has its own range. For example 20! is as high as the range of long type. So check the user input and "throw an exception", if it is too big or too small.
If x is less than 0 throw an IllegalArgumentException with a message "Value of x must be positive".
If x is above the range throw an IllegalArgumentException with a message "Result will overflow".

(b) Write multithreaded program that continuously prints the strings "HIT" and "MCA" on the console at random distances at intervals of one second.

7 + 5 = 12

OBJECT ORIENTED PROGRAMMING WITH JAVA
(MCAP 1201)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) if (check4Biz (storeNum) != null) { }
Referring to the above, what datatype could be returned by method check4Biz( )?
(a) boolean   (b) int   (c) String   (d) char.

(ii) Which one of the following is NOT a valid java.lang.String declaration?
(a) String myString = new String("Hello")
(b) String myString = new String(5)
(c) String cde = "cde"
(d) String myString = new String( )

(iii) Local variables are stored in
(a) heap   (b) native area   (c) method area   (d) stack.

(iv) Which of these is correct way of calling a constructor having no parameters, of superclass A by subclass B?
(a) super(void)   (b) superclass.()
(c) super.A()   (d) super().

(v) Which of the following is not true about an interface?
(a) It can be partially implemented by a class
(b) It can be implemented by an interface
(c) It can be implemented by several classes
(d) A particular class can implement several interfaces.

(vi)　double x = 0, y = 5.4324;
　　　try {
　　　System.out.println((y/x));
　　　}
　　　catch (Exception e) {
　　　System.out.println("Exception");
　　　}
　　　catch (IOException ie) {
　　　System.out.println("Error");
　　　}
　　　What is the output of the above code?
　　　(a) -1　　　(b) 0　　　(c) Compiler Error　　　(d) Infinity.

(vii)　Which one of the following statements is FALSE?
　　　(a) Java supports multi-threaded programming.
　　　(b) Threads in a single program can have different priorities.
　　　(c) Multiple threads can manipulate files and get user input at the same time.
　　　(d) Two threads can never act on the same object at the same time.

(viii)　Which one of the following is a limitation of subclassing the Thread class?
　　　(a) You must catch the ThreadDeath exception.
　　　(b) You must implement the Threadable interface.
　　　(c) You cannot have any static methods in the class.
　　　(d) You cannot subclass any other class.

(ix)　Which of the following is incorrect form of StringBuffer class constructor?
　　　(a) StringBuffer()　　　　　(b) StringBuffer(int size)
　　　(c) StringBuffer(String str)　　　(d) StringBuffer(int size , String str).

(x)　class Test {
　　　public static void main(String args[]) {
　　　　　　int x = -4;
　　　　　　System.out.print(x>>1);
　　　　　　int y = 4;
　　　　　　System.out.println(y>>1);
　　　　}
　　　}
　　　what is the output of above code?
　　　(a)　Error: cannot be applied to negative numbers　　　(b) -2 2
　　　(c)　2 2　　　　　　　　　　　　　　　　　　　　　(d) 0 2.

Group - B

2. (a)　How is aggregation different from association? Elucidate with proper example(s).

(b)　What are the typical responsibilities of JVM? Illustrate with a figure.

(c)　"Java is a strongly typed and block structured programming language" – Comment on the statement. Is Java truly object oriented?
4 + 4 + (2 + 2) = 12

3. (a)　What do you mean by dynamic initialization of variables? What is scope of a variable?

(b)　Write a program that randomly fills a 3 by 4 by 6 array, and then prints the largest and smallest values in the array.
(2 + 2) + 8 = 12

Group - C

4. (a)　When do we declare a member of class static? State the three restrictions that are to be followed by a static method.

(b)　Create a class Queue that declares a queue and methods to perform insert (), delete () and display () operations on the queue.
(1 + 3) + 8 = 12

5. (a)　What is the difference between inner class and nested class? Give example of both.

(b)　What are the functions of a constructor? What are its special properties? How do we invoke a constructor?
(3 + 3) + (2 + 2 + 2) = 12

Group - D

6. (a)　What is the use of the keyword super? Is it absolutely necessary to use super?

(b)　Write a program to create a class named Vehicle having protected instance variables regnNumber, speed, color, ownerName and a method showData () to show "This is a vehicle class". Inherit the Vehicle class and create two subclasses named Bus and Car having individual private instance variables routeNumber in Bus and manufacturerName in Car and both of them having showData ()