OBJECT ORIENTED PROGRAMMING
(CSBS 3202)

Time Allotted : 2½ hrs   **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
<u>any 4 (four)</u> from Group B to E, taking <u>one</u> from each group.

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

Group – A

1. Answer any twelve: **12 × 1 = 12**

    Choose the correct alternative for the following

    (i)   Which among the following is not a primitive data type in Java?
           (a) char
           (b) String
           (c) byte
           (d) short

    (ii)   Which of the following is FALSE about arrays in Java?
           (a) java array is always an object
           (b) Length of array can be changed after creation of array
           (c) Arrays in Java are always allocated on heap
           (d) Creation of an array in java is a two step process

    (iii) Find the output of the following program:-
           ```
           public class Solution{
           public static void main(String[] args){
           int[]  x = {120, 200, 016};
           for(int i = 0; i < x.length; i++){
               System.out.print(x[i] + " ");
             }
            }
           }
           ```
           (a) 120 200 016
           (b) 120 200 16
           (c) 120 200 14
           (d) None

    (iv)   Java method overloading implements the OOPS concept of ___.
           (a) Inheritance
           (b) Polymorphism
           (c) Encapsulation
           (d) None

(v)   When is the object created with new keyword?
(a) At compile time
(b) At run time
(c) When constructor is called
(d) Depends on code

(vi)   Which of these keywords can be used to prevent inheritance of a class?
(a) super
(b) constant
(c) class
(d) final

(vii)   Which of these classes is related to all the exceptions that are explicitly thrown?
(a) Error
(b) Exception
(c) Throwable
(d) Throw

(viii)   When does method overriding is determined?
(a) At execution time
(b) At compile time
(c) At run time
(d) At coding time

(ix)   Which of these statements is incorrect about Thread?
(a) start() method is used to begin execution of the thread
(b) run() method is used to begin execution of a thread before start() method in special cases
(c) A thread can be formed by implementing Runnable interface
(d) A thread can be formed by a class that extends Thread class

(x)   What will be the output of the following code?
```
public static synchronized void main(String[] args) throws
InterruptedException {
Thread f = new Thread();
 f.start();
System.out.print("A");
f.wait(1000);
System.out.print("B");  }
```
(a) It prints A and B with a 1000 seconds delay between them
(b) It only prints A and exits
(c) A will be printed, and then an exception is thrown
(d) It only prints B and exits

Fill in the blanks with the correct word

(xi)   _____ keyword is used to reference to the current object.

(xii)   Bytecode is executed by _____.

(xiii) The thread will be in waiting state when it calls _____ method.

(xiv) If three threads trying to share a single object at the same time, _____ condition will arise in this scenario.

(xv) wait() method throws _____ exception.

Group - B

2. (a) How data hiding can be achieved through encapsulation? Explain with the help of java code. *[(CO1)(Apply/IOCQ)]*

(b) What are the advantages of Object Oriented Programming over Procedural Programming? Why Java is called platform independent? *[(CO1)(Understand/LOCQ)]*

6 + 4 + 2 = 12

3. (a) Why main method should be declared as public and static in Java? If we use default access specifier instead of public for main method, then what will happen? Support your answer with proper justification. *[(CO3)(Apply/IOCQ)]*

(b) Write a Java program to print all permutations of a given string. *[(CO4)(Apply/IOCQ)]*

6 + 6 = 12

Group - C

4. (a) How many objects will be created for the following codes, explain clearly.
```
(i)   String str1 = "abc";                        //Line1
      String str2 = new String("abc");            //Line2
(ii)  String str1 = "abc";                        //Line1
      String str2 = "abc";                        //Line2
(iii) String str1 = new String("abc");            //Line1
      String str2 = new String("abc");            //Line2
```
[(CO3)(Analyze/IOCQ)]

(b) Explain what are static variables, staic blocks and static methods in java? How they work, explain with a simple java program. *[(CO3)(Apply/IOCQ)]*

6 + 6 = 12

5. (a) Why an interface can't have a constructor? Why abstract class has constructor even though you cannot create object? *[(CO5)(Analyse/IOCQ)]*

(b) What are the differences between abstract class and interface? *[(CO5)(Analyse/HOCQ)]*

(4 + 2) + 6 = 12

Group - D

6. (a) What are the differences between exception and error? *[(CO5)(Remember/LOCQ)]*

(b) When an exception occurs in a java code, how JVM handles it internally, show step by step with the help of code. *[(CO5) (Understand/LOCQ)]*

(c) In Java, how do you convert a string to an integer and vice versa? Explain with the help of code. *[(CO2)(Understand/LOCQ)]*

4 + 6 + 2 = 12

7. (a) What are the differences between checked exception and unchecked exception.
[(CO5)(Analyse/IOCQ)]

(b) Create a user-defined exception called NegativeBalanceException, which extends Exception, as well as a class BankAccount, which includes a withdrawal method. If the balance is less than the amount withdrawn, an instance of NegativeBalanceException with an error message is thrown. The exception is then caught and the error message is printed in the main method.
[(CO5)(Create/HOCQ)]

4 + 8 = 12

Group - E

8. (a) What are the two major benefits of multithreading in java? What are the two different ways we can create threads in java? Explain with code.
[(CO6)(Remember/LOCQ)]

(b) Write a Java program that creates two threads to find and print even and odd numbers from 1 to 20.
[(CO6) (Create/HOCQ)]

(2 + 4) + 6 = 12

9. (a) Draw and describe Applet Life cycle. Can init() method be called more than once? Justify your answer.
[(CO6)(Remember/LOCQ)]

(b) Write an applet program which will take two numbers in text box and will display the summation result in third text box.
[(CO6)(Create/HOCQ)]

(4 + 2) + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	31.3	41.7	27

Course Outcome (CO):

After the completion of the course students will be able to
1. Recall the knowledge of procedural language and map it to paradigm of object oriented concept.
2. Relate the real world problem with object oriented approach.
3. Describe and illustrate the features of object-oriented programming.
4. Analyze any real world problem with object oriented approach and formulate a solution for the same.
5. Manage the complexity of procedural language by using the concept polymorphism, inheritance, abstraction, encapsulation.
6. Create and explain some GUI and thread-based applications.

LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.