**44-542 Object Oriented Programming Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Exam 03 Part 1 (40 points) KEY** *please print*

**Multiple choice (2 points each).**  Write the letter corresponding to the BEST correct answer.

***Select only ONE answer for each question. If you select more than one answer, the entire question will be counted as wrong.***

1. The root interface in the Java Collections Framework is the \_\_\_\_\_ interface.
   1. **Collection**
   2. **Collections**
   3. **Root**
   4. **System**
2. If two threads have shared resources and the effect of the two threads depends on the order in which the threads are scheduled, this is called \_\_\_\_\_.
   1. deadlock
   2. a conditional lock
   3. a race condition
   4. a lock condition
3. Which of the following is/are true of stacks?
   1. it is a FIFO data structure
   2. it is a LIFO data structure
   3. elements are accessed from one end, called the top
   4. both a) and c)
   5. both b) and c)
4. Assuming you have a good hash function, hashing provides O(1) search time.
   1. true
   2. false
5. Which of the following is/are true about maps in Java?
   1. the **Map** interface is implemented by the **TreeSet** class
   2. the **Map** interface extends the **Collection** interface
   3. to enter a key-value mapping into a **Map** object, use the **insert** method
   4. duplicate keys are not allowed
6. Which of the following is/are true about binary search trees?
   1. no two nodes contain the same data value
   2. nodes are comparable
   3. for each node in the tree, the value stored in the node is greater than any value stored in its left subtree
   4. all of the above are true
7. A linked list allows movement only in the forward direction.
   1. true
   2. false
8. A tree that has every level completely filled out is \_\_\_\_\_.
   1. balanced
   2. full
   3. complete
   4. all of the above
   5. b) and c) only
9. In JUnit testing, to determine if the expected result (**expResult**) is the same as the actual result (**result**), use the statement
   1. **expResult == result**
   2. **expResult.assertEquals(result)**
   3. **expResult.equals(result)**
   4. **assertEquals(expResult, result);**
10. To run a thread in Java, define a class that implements the \_\_\_\_\_ interface.
    1. **Run**
    2. **Runnable**
    3. **Serializable**
    4. **Thread**
11. One category of trees that are balanced or almost balanced is red-black trees.
    1. true
    2. false
12. A \_\_\_\_\_ is a binary tree which is either empty, or every node (except for leaf nodes) has two branches.
    1. binary search tree
    2. complete tree
    3. full tree
    4. two-tree
13. In a heap, the contents of the nodes must be comparable.
    1. true
    2. false
14. When using JUnit testing, if you have code that you want to run exactly once before any of the test cases are run, place it in the method with annotation \_\_\_\_\_.
    1. **@BeforeClass**
    2. **@AfterClass**
    3. **@BeforeTestCase**
    4. **@AfterTestCase**
15. If you want to terminate a thread manually, you should use the **stop** method.
    1. true
    2. false
16. A complete tree is also a two-tree.
    1. true
    2. false
17. A tree that has every level completely filled out has height \_\_\_\_\_, where n is the number of elements in the tree
    1. **floor(log2n)**
    2. **ceil(log2n)**
    3. **log2n**
    4. **logn2**
18. Assume you are using the **Lock** and **Condition** objects introduced in Java 5.0. To make a thread release a lock temporarily so that another thread can acquire the lock object, use the \_\_\_\_\_ method.
    1. **signalAll**
    2. **notifyAll**
    3. **await**
    4. **wait**
19. If you attempt to add a duplicate element to a **TreeSet**,
    1. a **DuplicateElementException** is thrown
    2. an **IllegalArgumentException** is thrown
    3. false is returned
    4. a) and c)
20. The only element you can remove from a heap is the last element.
    1. true
    2. false