★ANSWER KEY – CONFIDENTIAL★

UIL COMPUTER SCIENCE – 2017 DISTRICT

Questions (+6 points for each correct answer, -2 points for each incorrect answer)

1) C	11) A	21) C	31) B
2) A	12) A	22) B	32) C
3) C	13) D	23) E	33) D
4) B	14) C	24) B	34) B
5) B	15) B	25) D	35) C
6) A	16) E	26) D	36) B
7) D	17) D	27) A	37) E
8) E	18) B	28) D	38) E
9) E	19) C	29) E	*39) coffee
10) E	20) A	30) B	*40) 1 2 / b1 b2 + * h *

** See "Explanation" section below for alternate, acceptable answers.*

Note: Correct responses are based on **Java SE Development Kit 8 (JDK 8)** from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (e.g., "error" is an answer choice) and any necessary Java SE 8 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used.

Explanations:

1. C $A4_{16} = 164_{10}$ and $3E_{16} = 62_{10}$. 164 + 62 = 226. $226_{10} = E2_{16}$. $341_8 = 225_{10}$. $11100011_2 = 227_{10}$.
2. A 12/4.0*5/5 = 3.0*5/5 = 15.0/5 = 3.0.
3. C `\"` is the escape sequence to insert a quotation mark. `\n` inserts a new line.
4. B `indexOf("a")` returns the first occurrence of the letter a. The substring method with just one argument starts at the index value of a and goes to the end of the string.
5. B false^!(true||false) = false^!true = false^false = false
6. A Math.pow raises the first argument to the power of the second argument and returns the result as a double. $3^2 = 9.0$
7. D ASCII value of E is 69. 69 + 32 = 101.
8. E p-=10.5 is executed regardless of the results of the if/else statement. Identation does not affect execution of the code.
9. E After the 8 is printed within the loop, `a` gets 10. That terminates the loop and the 10 is printed by the last statement.
10. E a[3] stores 5. a[5] throws the out of bounds exception.
11. A The File class might throw an exception, for example, if the file referenced is not present. That exception must be handled either by catching it or by rethrowing it.
12. A `charAt` returns the character at the index number of the argument. So, concatenate d and c then o and a and finally g and t.
13. D Bitwise AND is done before bitwise OR.

	11	1011
AND	9	1001
		1001
OR	14	1110
	15	1111

14. C The largest value that can be stored in a variable of type `int` is 2147483647.
15. B `set` replaces the value at the value at the index value specified by the argument. It does not add any additional elements to the list.
16. E `this(f,l)` will call the constructor within this class with parameters that match the arguments in the call. `super(f,l)` would call a matching constructor in a parent class.
17. D The method `calculate` returns the results of a call to `Math.round` which returns a double value.
18. B `calculate` finds the average of all of the values in the ArrayList `grades`. The `toString` method returns the first and last name, the id number and a call to `calculate`.
19. C The two argument constructor leaves the id field unassigned. The default value for a String type variable is null.
20. A

T	e	x	a	s					
N	e	w		M	e	x	i	c	o
O	k	l	a	h	o	m	a		

21. C A TreeSet does not allow duplicates and stores elements in sorted order.
22. B `retainAll` returns the intersection of the two sets. Snake is the only element contained in both sets.
23. E `Integer.toString(x,y)` returns the value x in the radix (numbering system) y. In this case 8 in binary is 1000.
24. B Distributive property of AND over OR.
25. D Math.randon() returns a random value x such that 0.0 <= x < 1.0. Therefore, r * 10 will never be 10. Casting to an integer truncates so the largest value this expression will ever return is 29.
26. D When x = 2 both case 2 and case 3 are executed because case 2 does not include a `break` statement. When x = 4 both the case 4 statement and the default statement are executed for the same reason.
27. A A time complexity of O(n) means that search time is directly correlated to list size. Since 90,000 is three times larger than 30,000 then search time will be three times greater. 0.75 * 3 = 2.25.
28. D 23 + 24 + 6 + 0 = 53
29. E Overloaded methods must have either a different number of parameters or different type parameters. The return type does not make them different.
30. B You are working your way back through the list from position `i` looking for the first place that `x` is less than `list[j]`. When you find that spot you <u>insert</u> `x` at `j+1`.
31. B
32. Nested loops usually (but not always) have a BigO value of $O(n^2)$.

33. D Answer choice A incorrectly initializes p to false. Answer choice B terminates the while loop too soon. Answer choice C incorrectly shows that 2, 4, 6 and 9 are prime.
34. B Elements are arranged in a binary search tree so that every element in the left branch of a particular node is less than that node and every element in the right branch are greater than that node. The first element to be entered into the tree is the root node and in this case it is the largest so there is no right branch for the root.
35. C In line #3 the variable z is out of scope. Since z is declared within the for loop the scope of z is restricted to the body of the loop.
36. B

A	B	!A OR B
T	T	T
T	F	F
F	T	T
F	F	T

37. E  is OR,  is NOT, and  is AND.
38. E 54 in binary is 00110110. Take the complement (flip it) to get 11001001. Add one to get 11001010.
39. coffee Elements are removed from a PriorityQueue in order. In this case in alphabetical order. Apples, bread, and chips are removed from the queue which leaves coffee at the head of the queue.
40. ½(b1+b2)h = 1 / 2 * (b1 + b2) * h = 1 2 / b1 b2 + * h *