★ANSWER KEY – CONFIDENTIAL★

UIL COMPUTER SCIENCE – 2020 DISTRICT

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

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

KEY

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

Note: Correct responses are based on **Java SE Development Kit 12 (JDK 12)** 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 12 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used.

Explanations:

1.	E	$1A_{16} = 26_{10}$ $23_{16} = 35_{10}$ 26 + 35 = 61 Answer choices A, B, C and D are all equal to 61_{10}.
2.	C	19 + 33 – 6 * 3 / 25 = 19 + 33 – 18 / 25 = 19 + 33 – 0 = 19 + 33 = 52
3.	A	print leaves the cursor on the line, println moves the cursor to the next line.
4.	B	lastIndexOf('e',6) finds the last occurrence of 'e' before index value 6.
5.	B	!T && !F = F && T = F
6.	D	3^2 + 3 = 9 + 3 = 12.0 Both of the methods return a double value.
7.	A	53 + 6.25 / 10 = 53 + 0.625 = 53.625
8.	D	x < 30 || x % 2 == 0 evaluates as true whenever x is less than 30 or an even number. 30 and 54 are both even and 14 is less than 30 and even.
9.	C	x takes the values 5 8 11 14 17 20 23 26 29 32 and 35 and prints each time.
10.	E	The third line in the segment throws an IndexOutOfBoundsException because num[1] is 5. The last index in the array is 4.
11.	B	To associate a file with a Scanner object a new File object must be constructed and passed to the Scanner class constructor.
12.	E	x = 0 y = 34 x = 18 y = 16 x = 15 y = 1 x = 12 y = -11 x = 9 y = -20 x = 6 y = -26 x = 3 y = -29 x = 0 y = -29
13.	A	Order of precedence is % then && then ||.
14.	C	~ is the complement operator. Add one to the operand and take the opposite sign.
15.	D	Original list - [5, 1, 3, 4, 9, 7, 2, 8] nums.set(3, 3); - [5, 1, 3, 3, 9, 7, 2, 8] nums.add(2, 5); - [5, 1, 5, 3, 3, 9, 7, 2, 8] nums.remove(0); - [1, 5, 3, 3, 9, 7, 2, 8] nums.get(5); - [1, 5, 3, 3, 9, 7, 2, 8]
16.	B	!(A&&!B) can be simplified to !A||B A B !A || B T T T T F F F T T F F T
17.	B	"static".compareTo("public") returns 3. 3 is less than 4 so "main" is printed.
18.	E	nextDouble() returns a double value between 0 (inclusive) and 1 (exclusive). Multiplying by 10 gets a double value between 0 (inclusive) and 10 (exclusive). This number is cast to a whole number using (int). Then add 50 to get a range of 50 (inclusive) to 60 (exclusive).
19.	C	s, i and d are all local to the District constructor and are therefore not instance variables.
20.	A	The default constructor does not assign values to the instance variables so the default values for each are printed by the toString method.
21.	D	var1 and var2 are private.
22.	A	All classes automatically extend the Object class.
23.	B	No values are added to the first row or column. The remaining cells are assigned the product of the row and column. | | 0 | 1 | 2 | 3 | 4 | | 0 | 0 | 0 | 0 | 0 | 0 | | 1 | 0 | 1 | 2 | 3 | 4 | | 2 | 0 | 2 | 4 | 6 | 8 | | 3 | 0 | 3 | 6 | 9 | 12 |

24.	E	In answer choice A the type String is explicitly stated. In answer choice C the type is inferred from the variable s. Both are legal declarations.
25.	A	push adds an element to the top of the stack. add adds an element to the top of the stack. add(1, "Friday") places the element at index 1 within the stack. All of the elements in s are popped into the queue q. All of the elements in q are pushed back into the stack s until q is empty. s.peek() returns the element at the top of the stack s which is "Monday"
26.	D	q is empty. q.peek() returns null.
27.	C	78 is 01001110_2 Take the complement to get 10110001 Add one to get 10110010
28.	B	The while loop is working backwards searching for the first element that comes before current alphabetically.
29.	D	Shift each element to the right until the correct location for current is found.
30.	E	i = 1 [mouse, panda, aardvark, dog, zebra, cat] i = 2 [aardvark, mouse, panda, dog, zebra, cat] i = 3 [aardvark, dog, mouse, panda, zebra, cat] i = 4 [aardvark, dog, mouse, panda, zebra, cat] i = 5 [aardvark, cat, dog, mouse, panda, zebra]
31.	A	The run time efficiency for an insertion sort is $O(n^2)$. 6 million is 2 times greater than 3 million. $2^2 = 4$. 4 X 4 = 16.
32.	A	\\d is the regex character for any digit. \\w{3} means any three word characters. Each call to next() (including in the if statement) move the pointer to the next token.
33.	B	A re-declares num as a functional type. C The interface Function requires two types. D Missing the lambda operator. E Does not have a return statement.
34.	D	The formal parameter of the compareTo method must match the type to which the class has been parameterized.
35.	E	WeirdString objects are first compared by length where shorter strings come before longer ones and then alphabetically.
36.	C	Integer.toString(8,8) returns the string representation of the decimal value 8 in base 8.
37.	A	A pre-order traversal visits the root, then left node, then right node.
38.	C	rec(4) = rec(3) + 2 * rec(2) = 44 + 2 * 20 = 84 rec(3) = rec(2) + 2 * rec(1) = 20 + 2 * 12 = 44 rec(2) = rec(1) + 2 * rec(0) = 12 + 2 * 4 = 20 rec(1) = 12 rec(0) = 4
39.	4	<< is the same as multiplying by that power of 2. &= is the compound assignment operator for bitwise AND. a b c d 5 3 2 4 2 1 12 4 1 0 ***4***
40.	28	The formula is ½ n(n-1) = ½ 8(8-1) = 28