★ANSWER KEY – CONFIDENTIAL★

UIL COMPUTER SCIENCE – 2020 INVITATIONAL A

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

1) B	11) D	21) E	31) B
2) C	12) D	22) B	32) C
3) E	13) E	23) D	33) D
4) A	14) E	24) A	34) E
5) A	15) C	25) C	35) D
6) A	16) A	26) D	36) C
7) C	17) D	27) B	37) A
8) E	18) B	28) C	38) B
9) B	19) C	29) E	*39) 56
10) A	20) E	30) A	*40) 10011011

** 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. B

128	64	32	16	8	4	2	1
1	1	1	1	1	1	0	1

128 + 64 + 32 + 16 + 8 + 4 + 0 + 1 = 253

2. C

8+5-9*2/4=
8+5-18/4=
8+5-4=
13-4=
9

3. E

\n is the escape sequence for a new line
println places the cursor on a new line after printing the argument. print does not.

4. A

indexOf returns the first occurrence of the argument 'i'.

5. A

true && !false || false =
true && true || false =
true || false =
true

6. A

3 * 1.25 = 3.75 -> Math.round(3.75) returns 4. Math.round returns a long type value.

7. C

3.5*3+2.75-4=
10.5+2.75-4=
13.25-4=
9.25

8. E

12/5 > 2.0 8 > 8 is false Neither of the if statements are executed.
2 > 2.0 is false

9. B

C	C > 0	Print
6	T	6
5	T	5
4	T	4
3	T	3
2	T	2
1	T	1
0	F	

10. A

index value	0	1	2	3	4
original list	1	2	3	4	5
list[3]="6"	1	2	3	6	5
list[2]=list[1]	1	2	2	6	5

11. D

The default delimiter for the next method is a space. There are no spaces in the single data item "abcdef" therefore that string is read all at once and the loop terminates.

12. D

x	t
	0
0	0
1	1
2	3
3	6
4	10
5	15
6	21
7	28
8	36
9	45

13. E

The correct order is ! * + && +=

14. E

The range for byte is -128 to 127

15. C

0	1	2	3	4	5
5.0	5.8	4.0	3.5	6.1	5.25
5.0	5.8	3.5	6.1	5.25	
5.0	5.8	3.5	1.3	6.1	5.25
5.0	5.8	3.5	1.3	6.1	5.8

16. A

ASCII values for 'k' and 'e' are 107 and 101. 101 – 107 = -6.

17.	D	The string being parsed cannot contain a space. Code will compile but then throws a NumberFormatException because of the space.
18.	B	Answer choices A and D divide by 2 and multiply by a before adding -b. Answer choice C raises 2 to the power of b rather than b^2. Answer choice E divides by 2a then adds -b.
19.	C	public Uil() and public Uil(int x,String s) are the two constructors.
20.	E	Each call to a constructor prints. The default constructor does not assign values to a or b so they have default values of 0 and null.
21.	E	Private fields cannot be accessed from outside the class they are in.
22.	B	Answer choices A and C search in the wrong half of the list with each pass of the while loop. Answer choice D doesn't find the target if it is the first or last element in the list.
23.	D	In one step, we do a constant amount of work to cut the number of elements under consideration in half. There are O(log n) such steps until we're left with a trivial array.
24.	A	$58_{10} = 111010_2$ $35_{10} = 100011_2$ 1 1 1 0 1 0 1 0 0 0 1 1 XOR 0 1 1 0 0 1 $011001_2 = 25_{10}$
25.	C	First row is array z, second row is array x and third row is array y. 9 0 1 2 1 2 3 4 5 6 7 8 Then rows 0 and 1 are swapped. 1 2 3 4 9 0 1 2 5 6 7 8
26.	D	".{10}" any character exactly 10 times is false. 10 digits plus two dashes. "\\d+-\\d+-\\d+-" is any digit one or more times plus a dash repeated three times is true. "325\\W555\\S1234" is 325 followed by a non-word character followed by 555 followed by a non-whitespace character followed by 1234 is true.
27.	B	The definition of a functional interface is that it may contain only one abstract method.
28.	C	This is a TreeSet so the elements will be alphabetized. The original set is: **beef cheese ham lettuce mustard turkey** Sets can not contain duplicates so, when the ArrayList is added, only onion and tomato are added to set. This results in **beef cheese ham lettuce mustard onion tomato turkey**
29.	E	The largest value that might be generated by nextDouble is approximately 0.999. Multiply 0.999 time 10 to get approximately 9.99. Add 0.5 to get approximately 10.49 then cast to an integer to get 10.
30.	A	The string "aeiou" is the delimiter for the split method. That exact string does not occur in "homecoming" so the next method returns "homecoming".
31.	B	x is passed by value. y and z are passed by reference, however, both Integer and Double are immutable. Since the objects are immutable, when the assignment statements within the method are made, brand new objects are created that then autobox the primitive values, however, no changes are made to the original x and y objects.
32.	C	Each iteration of the inner loop begins one spot beyond the elements that have already been placed into the sorted portion of the array.
33.	D	The inner loop is searching for the smallest value left in the unsorted portion of the list.
34.	E	i = 0 [0, 7, 1, 8, 2, 9, 6, 5, 4, 3] i = 1 [0, 1, 7, 8, 2, 9, 6, 5, 4, 3] i = 2 [0, 1, 2, 8, 7, 9, 6, 5, 4, 3] i = 3 [0, 1, 2, 3, 7, 9, 6, 5, 4, 8]

35.	D	r p s for loop 0 0 while loop 0 5 0 while loop 0 4 1 while loop 0 3 2 while loop 0 2 3 while loop 0 1 4 for loop 1 4 for loop 2 -5 for loop 3 4 for loop 4 -5 5 1 4
36.	C	The if statement determines if each character's ASCII value is divisible by 2. Those that are divisible by 2 are converted to upper case and printed.
37.	A	Pre-order traversal visits each node in a root – left – right order.
38.	B	DeMorgan's law says that $\overline{A + B}$ is equal to $\bar{A} * \bar{B}$.
39.	56	rec(3) = 2 * rec(2) = 2 * 28 = 56 rec(2) = 2 * rec(1) = 2 * 14 = 28 rec(1) = 2 * rec(0) = 2 * 7 = 14 rec(0) = 7
40.	10011011	$101_{10} = 01100101_2$ ~01100101 = 10011010 10011010 + 1 = 10011011