★ANSWER KEY – CONFIDENTIAL★

UIL COMPUTER SCIENCE – 2017 INVITATIONAL B

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

1) E	11) E	21) C	31) A
2) D	12) D	22) A	32) C
3) B	13) E	23) E	33) E
4) D	14) A	24) B	34) D
5) A	15) B	25) C	35) B
6) C	16) E	26) E	36) D
7) D	17) C	27) D	37) E
8) D	18) D	28) B	38) A
9) A	19) A	29) A	*39) -82
10) D	20) C	30) A	*40) 19

** 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. E $01101001_2 = 105_{10}$ and $00101011_2 = 43_{10}$. 105 + 43 = 148. $148_{10} = 10010100_2$.
2. D (9+2)/22*4 = 11/22*4 = 0*4 = 0
3. B The escape sequence `\"` places a quote into the string. `\r` is for a return (same as `\n`).
4. D Index numbers start at zero (0). So, the substring begins at r and continues to one less than the second parameter, which is the second s.
5. A true&&!false&&true = true&&true&&true = true
6. C abs(x) returns a double value that is the absolute value of x.
7. D r = -2.25 – (4.5 + 3)
8. D ASCII value of U is 85 and i is 105. Therefore U is less than i.
9. A For each iteration of the outer loop the inner loop iterates one fewer times.
10. D a[0] = -3+2. a[3] = 1.
11. E
12. D 1 X 2 X 2 X 2 = 8
13. E
14. A The byte data type requires 8 bits of memory.
15. B [dog] then [dog, cat] then [dog, bird, cat] then [dog, bird, cat, turtle] then [dog, bird, cat]. Trying to remove an element that is not in the list does not cause an error.
16. E Both the interface List and the class LinkedList can serve as the data type for the variable list.
17. C The values in the array nums are placed in the linked list in the order shown. 30 is added to the end of the list. 35 becomes the 3rd item in the list. 20 is the element located at index number 4 and get(x) does not remove the element that it returns.
18. D [abc] is the same as a OR b OR c. Delimiters are not printed.
19. A 10,000 is 5 times greater than 2,000. $5^2 = 25$.
20. C Identifiers may not begin with a number. Underscores and dollar signs are allowed.
21. C We are searching for the smallest element left in the unsorted portion of the list.
22. A `list[i]<y {x=i; y=list[x];}` is the salient feature of a selection sort.
23. E $O(n^2)$ for all cases.
24. B `this` reserved word indicates that the fields named a and b should be used and not the parameters of the same name.
25. C All methods that are not `void` must return a value matching the methods return type.
26. E The call to the default constructor SomeClass() does not assign values to a and b. The default value of int type fields is 0.
27. D
28. B x and y are private and cannot be access from class B so a call to super.add() is required.
29. A The code shifts all of the columns to the left and moves column 0 to the far right.
30. A `continue` skips any remaining code in the loop body.
31. A The call stack would look like this when the base case is reached.

print 1
print 2
print 4
print 9

The result of each method call is then popped off the stack and printed.

32. C Not A because ½ = 0, Not B because parenthesis are missing.
33. E `final` creates a constant. The value of a constant cannot be reassigned.
34. D The ASCII value of each corresponding character is compared until a difference is found. In this case, e=101 and a=97. 101 – 97 = 4.
35. B A. Parameters don't have a type. C. Method does not have a return type. D. Parameters aren't named. E. Method does not have a name.
36. D * = && = AND, + = || = OR, ⊕ = ^ = XOR
37. E It is weighted because each edge is labeled with a value and it is undirected because none of the edges indicate a direction.
38. A No iteration of any kind is required to add an element to the end of a linked list.
39. -82 Start with the original two's complement number. 10101110. We know the decimal equivalent will be negative because the left most sign bit is 1. Flip the bits to get 01010001. Add 1 to that to get 01010010. Convert to decimal to get 82 and it has to be negative so the answer is -82.
40. 19 Same as 12/4*3+10 = 3*3+10 = 9+10 = 19.