Answer Key

1. **E**	9. **D**	17. **C**
2. **D**	10. **D**	18. **B**
3. **E**	11. **A**	19. **E**
4. **E**	12. **A**	20. **C**
5. **B**	13. **D**	21. **A**
6. **C**	14. **C**	22. **E**
7. **C**	15. **D**	
8. **A**	16. **D**	

Answer Explanations

1. **(E)** A programmer should never make unilateral decisions about a program specification. When in doubt, check with the person who wrote the specification.

2. **(D)** In I and II a three-digit number is the object being manipulated. For III, however, the object is a six-character string, suggesting a class other than a `ThreeDigitNumber`.

3. **(E)** Top-down programming consists of listing the methods for the main object and then using stepwise refinement to break each method into a list of subtasks. Eliminate choices A, C, and D: Top-down programming refers to the design and planning stage and does not involve any actual writing of code. Choice B is closer to the mark, but "top-down" implies a list of operations, not an essay describing the methods.

4. **(E)** All three considerations are valid when choosing an algorithm. III is especially important if your code will be part of a larger project created by several programmers. Yet even if you are the sole writer of a piece of software, be aware that your code may one day need to be modified by others.

5. **(B)** A process that causes excessive data movement is inefficient. Inserting an element into its correct (sorted) position involves moving elements to create a slot for this element. In the worst case, the new element must be inserted into the first slot, which involves moving every element up one slot. Similarly, deleting an element involves moving elements down a slot to close the "gap." In the worst case, where the first element is deleted, all elements in the array will need to be moved. Summing the five smallest elements in the list means summing the first five elements. This requires no testing of elements and no excessive data movement, so it is efficient. Finding the maximum value in a sorted list is very fast—just select the element at the appropriate end of the list.

6. **(C)** "Robustness" implies the ability to handle all data input by the user and to give correct answers even for extreme values of data. A program that is not robust may well run on another computer without modification, and a robust program may need modification before it can run on another computer.