CSN 460 - Artificial Intelligence

1) Which of the following would you be most likely to use to implement a chess-playing program?
   a) a neural network
   b) the minimax algorithm
   c) the British-Museum Algorithm
   d) the A* algorithm
   e) none of the above

2) One of the reasons HILL-CLIMBING might not produce a solution is that the problem state space resembles a:
   a) mountain
   b) dune
   c) plain with telephone poles
   d) valley adjacent a conic section
   e) none of the above (HILL-CLIMBING always succeeds)

3) 

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Shown above is the initial state of a tile puzzle. The object is to slide tiles, one at a time, until the numbers are in order. Using the A* algorithm and a "heuristic underestimate" based on the number of tiles currently not in their correct places (in the initial state, this is 8), what will be the next choice of a state to be expanded?

a) 

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b) 

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e) none of the above
4) (MOVE (X Y Z))

Current state of world:

PRECONDITIONS
(ON X Y) | A |
(CLEAR X) |----|
(CLEAR Z) | B |

ADD
(ON X Z) |----|------------------

Known Facts:
DELETE (ON B TABLE)
(ON X Y) (ON A B)
(CLEAR Z) (CLEAR A) (CLEAR TABLE)

If MOVE is the only operator available, and the goal stack is initially: ((ON B A)), which of the following will be the first UNMET precondition to be added to the goal stack?

a) (CLEAR TABLE) 
d) (CLEAR B)
b) (ON A TABLE) 
e) (MOVE A B TABLE)
c) (CLEAR A) 
f) none of the above

5) (defun mystery-search (list)
 (cond ((null list) nil)
    ((is-this-a-solution (car list)) (car list))
    (t (mystery-search (append
         (list-all-the-children-of (car list))
         (cdr list))
        )))))

The above function is an implementation of:

a) depth-first search
b) breadth-first search
c) best-first search
d) postorder traversal
e) none of the above

6) What is (car(cadr(car '((a (b c) d) (e (f g) h)))))?

a) a b) b c) c d) d e) e f) f g) g h) h i) none of the above

7) P ∨ Q
   ~Q ∨ R
   -------
   P ∨ R

The Rule of Inference shown above is:

a) modus ponens 
d) resolution
b) the hypothetical syllogism 
e) none of the above
c) modus tollens
8) For the question below:
   mother-in-law(X,Y) is read as: "X is Y’s mother-in-law."
   parent(X,Y) is read as: "X is Y’s parent."
   spouse(X,Y) is read as: "X is Y’s spouse."

   In a PROLOG database, a reasonable definition of "mother-in-law" might be:
   a) mother-in-law(X,Y) :- spouse(Y,Z), parent(X,Y), female(X).
   b) mother-in-law(X,Y) :- spouse(Y,Z), parent(X,Z), female(X).
   c) mother-in-law(X,Y) :- spouse(X,Z), parent(Y,Z), female(X).
   d) mother-in-law(X,Y) :- spouse(X,Z), parent(Y,Z), female(X).
   e) none of the above

9) 1. IF A and B and D
    THEN F
    cf. 99%

2. IF A and B and C
    THEN E, F
    cf. 92%

3. IF A
    THEN F
    cf. 98%

4. IF A and B
    THEN D, E
    cf. 93 %

Facts known at the beginning: A, B and C.

Running the simple, rule-based expert system above, under the assumption of FORWARD chaining and using CERTAINTY FACTORS to perform any needed conflict resolution, which rule would be the first to be fired?

   a) Rule #1    c) Rule #3    e) none of the rules can be fired
   b) Rule #2    d) Rule #4

10) Running the simple, rule-based expert system above, under the assumption of **BACKWARD** chaining, and using CERTAINTY FACTORS to perform any needed conflict resolution -- assuming it is desired to show that E is true, what will be the first rule to be fired?

   a) Rule #1    c) Rule #3    e) none of the rules can be fired
   b) Rule #2    d) Rule #4