Final Exam Part A

1. ❓ Which of the following **cannot** be derived from the following grammar?

   $S \rightarrow 0S \mid 0V$
   $V \rightarrow 0V1 \mid \epsilon$

   Select one:

   a. 001

   b. epsilon

   c. 000011

   d. 01

2. What is the asymptotic upper bound (Big O) of $f(n) = 7n + 10 \log n + n \log n + 8$?

   Select one:

   a. $O(n)$

   b. $O(n \log n)$

   c. $O(\log n)$

   d. $O(1)$

3. Which of the following can be derived from the following grammar?

   $S \rightarrow 0S \mid 0V$
   $V \rightarrow 0V1 \mid \epsilon$

   a. 00111

   b. 0011

   c. 0001

   d. 0101

4. Which of the following is not the language of R?

$$R = 0(01)^*$$

   Select one or more:

   a. 0

   b. epsilon

   c. 001

   d. 0001

5. What is the maximum **number of comparisons** needed to sort an array of 4 numbers, using the Bubble sort?

   Select one:

   a. 10

   b. 16

   c. 8

   d. 6

6. How many postcodes there are in the form of LLNNLL? Where L is for lower-case letters and N is for digits.

   Select one:

   a. 26x25x10x9x24x23

b. 26x26x10x10x26x26

c. None of these options are correct

d. 26x25x10x10x24x23

7. Which of the following is equivalent to $p \rightarrow \neg q$?

   Select one or more:

   a. $p \wedge q$

   b. $p \vee q$

   c. $\neg(p \wedge q)$

   d. $\neg p \vee \neg q$

8. What is $(p \wedge \neg p) \rightarrow p$?

   Select one:

   a. A contradiction

   b. A tautology

   c. inconsistent

9. How many hands of 4 can be dealt from a deck of 11 cards?

   Select one:

   a. 330

   b. 14641

   c. 7920

   d. 44

10. Which of the following is a proposition?

    Select one:

    a. Is 10 divisible by 5?

    b. 3 is an even number

    c. x>8

    d. Divide 5 by 2