1. a) $\max m(f) = 27$,  
b) $\max m(f) = 16$, min cut: $X = \{S, A, C', E\}$.

2. a) 3, 3,  
b) 3, 3,  
c) 4, 4.

3. a) 5.  
b) 7.

4. a) $\kappa(G) = 3, \ \lambda(G) = 3$,  
b) $\kappa(G) = n, \ \lambda(G) = n$,  
c) $\kappa(G) = 3, \ \lambda(G) = 3$.

5. $\kappa(G) = 12, \ \lambda(G) = 12$.

6. $k \leq \min \deg(G)$.

7. Use Dirac's theorem.

8.

9. a) No (counterexample),  
b) True (check cases of the definition).

10. The graph is $K_{10}$ minus 5 edges. At least 4-vertex-connected.

11. Use Menger's theorem. Of the 3 cycles obtained from the 3 paths between two vertices one must be even.

12. Use Menger's theorem. One of the 3 paths cannot be longer than 33.