

**Exercise-set 11.**  
**Solutions**

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.  $k \leq \text{mindeg}(G)$ .
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.