Ochirgarid Chinzorig, Assignment 11A

1. No, there exists a not connected dense graphs. Let us take an example of graph with 2N vertices that composes from 2 fully connected components of N vertices. The graph will have total of N*(N-1) edges. Since each component has a N*(N - 1)/2 edges. Hence, N^2-N is a O(N^2) and the graph we chosen was not a connected graph it is proven.
2. On this question we can create A map in the first question to answer the both of them.

   1. A={V=0, U=∞, W=∞, X=∞, Y=∞}. Q=[(V,0), (U, ∞), (W, ∞), (X, ∞), (Y, ∞)], M={V,U,W,X,Y}, B={}

   2. A={V=0,U=1,W=3, X=2, Y=∞}. Q=[(U,1), (W,3), (X,2), (Y, ∞)], M={U,W,X,Y}, B={(V->V), (U->V), (W->V),(X->V)}

   3. A={V=0,U=1,W=3, X=2, Y=3}. Q=[(X,2), (W,3), (Y,3)], M={W,X,Y}, B={(V->V), (U->V), (W->V),(X->V),(Y->X)}

   4. A={V=0,U=1,W=3, X=2, Y=3}. Q=[(W,3), (Y,3)], M={W,Y}, B={(V->V), (U->V), (W->V),(X->V),(Y->X)}

   5. A={V=0,U=1,W=3, X=2, Y=3}. Q=[(Y,3)], M={Y}, B={(V->V), (U->V), (W->V),(X->V),(Y->X)}

   6. A={V=0,U=1,W=3, X=2, Y=3}. Q=[], M={}, B={(V->V), (U->V), (W->V),(X->V),(Y->X)}

   a. The answer is **A[Y]=3**
   b. A[V]=0, A[U]=1, A[W]=3, A[X]=2, A[Y]=3
3. A. It is A-B-C with length of -1

   B. (i). It will work without a problem on this certain graph. Since it does not contain any cycle.

   B. (ii). Step-1: D={A=0, B=∞, C=∞} P={A=null, B=null, C=null}

   Step-2: D={A=0, B=1, C=-2} P={A=null, B=A, C=A}
   D={A=0, B=1, C=-4} P={A=null, B=A, C=B}
   D={A=0, B=1, C=-4} P={A=null, B=A, C=B}

   Step-3: Graph doesn't contain negative cycle

   The answer is -4 and it is correct