Exam Graph Theory (191520751)

Tuesday, july 9, 2019, 8.45 – 11.45 hrs

All graphs are simple.
Motivate your answers.

1. Is $(7, 6, 5, 4, 3, 2, 1, 1)$ the degree sequence of a simple graph?
2. Let $G = (V, E)$ be a graph with minimum degree $\delta \geq 2$. Show that either ~~either~~ both G or its complement G^c must be 2-connected.
3. Let $M \subseteq E$ be a matching in $G = (V, E)$. Show that M is a maximum matching if and only if G contains no M-augmenting path.
4. Assume G is k-regular on an odd number of nodes. Show that $\chi'(G) = k + 1$.
5. Assume $\chi(G) = k$. Show that G has at least k nodes of degree $\geq k - 1$.
6. Compute the chromatic polynomial $\pi_k(G)$ for the graph G obtained from K_n by removing two edges.
7. Let G be planar with minimum degree $\delta \geq 3$ and at most 11 faces. Conclude that G must have a face of degree at most 4.

Points (36+4=40):

1:	5	2:	6	3:	5	4:	5	5:	5	5:	5	7:	5