Combinatorics 2 MAD4204 | **Home-G** | Prof. JLF King *Touch*: 2Apr2017

Notes. Pamphlet *Chromatic polynomial of a graph* on our TEACHING PAGE has definitions. If possible, please use the notation from that pamphlet.

Here, use **u**—**v** to mean that vertices **u** and **v** have an edge between them.

G1: Show no work. Write **DNE** in a blank if the described object does not exist or if the indicated operation cannot be performed.

a The vertex set of H_N is $\mathbb{V} := [1..3N]$. For $\mathbf{u} \in \mathbb{V}$, *when possible*: **u**—[**u**+3]. *If* **u** $\equiv_3 1$, *then* **u**—[**u**+1] *and* **u**—[**u**+2]. *If* **u** $\equiv_3 2$, *then* **u**—[**u**+1]. Then

$\mathcal{P}_{H_N}(x)=$ ....

b For $N \geqslant 4$, let D_N be K_N but with an edge (but no vertices) deleted. Then $\mathcal{P}_{D_N}(x)$ equals

....

c The number of spanning-paths in wheel W_8 is ....

OYOP: Your 2 essay(s) must be TYPESET, and Double or Triple spaced. Use the *Print/Revise* cycle to produce good, well thought out, essays. Start each essay on a *new* sheet of paper.

Do **not** restate the problem; just solve it.

G2: Graph G has N vertices, L edges and chrom-poly

$$x^N + B_{N-1}x^{N-1} + B_{N-2}x^{N-2} + \ldots + B_1 x\,.$$

Prove that $B_{N-1} = -L$.

G3: i Produce [with proof, naturally] an infinite family of connected graphs which are gluing-good.

ii Produce an infinite family of connected graphs which are gluing-*bad*.

iii Can you characterize the family of gluing-good graphs? Conjectures? Numerical evidence? Proofs?

End of Home-G

G1:	___ ___	85pts
G2:	___ ___	95pts
G3:	___ ___ ___	115pts
Total:	___ ___ ___	295pts