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

End of Class-G

G4: ___ ___ ___ 145pts

Note. Write chromatic polys in ***chromatic form***.

G4: Show no work. Write **DNE** in a blank <u>if</u> the described object does not exist or if the indicated operation cannot be performed.

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

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

And H_N has ____________________ acyclic orientations.

b) Glue a vertex of C_5 to an endpoint of P_3, to form a 7-vertex graph D. The number of two-component spanning subgraphs of D is ____________________ .

c) Graph G has chromatic polynomial

$$x^9 - 10\,x^8 + 44\,x^7 - 112\,x^6 \\ + 182\,x^5 - 196\,x^4 + 139\,x^3 - 60\,x^2 + 12\,x\,.$$

Our G has ____________ spanning subgraphs. Of those that are connected, ten of them have oddly-many edges, and thus ________________ of them have evenly-many edges. [*Hint:* Chromatic-Polynomial Spanning Subgraph Thm]

d) Graph $S := W_5 \odot C_6$, the full-product of the 5-vertex wheel with the 6-cycle, has ____________________ edges.

And $\chi(S) =$ ______________ .

e) Full-product, $\odot$, is associative. T F

Graph $\left[K_2 \odot K_3\right] \odot K_4$ has chromatic polynomial

____ .

f) There are ______________ trees on vertex-set $[1..7]$.