ELE 4142 HW5 Name_____

1) Assuming a 2Tb/in^2 areal density on a HDD platter, with a 3 to 1 width to length ratio of a bit and 40% spacing on each side(40% of the width) – calculate the length and width of a bit in nm. 15pts

ELE 4142 HW5 Name_____

2) Your (2,7) RLL decoder generated the following data stream, provide the decoded bit stream in HEX 15 pts

NNNTNNNNTNNTNNNTNNTNNNTNNTNNNNNTNNNTNNTNNTNNNNNNTNNNTNNN

ELE 4142 HW5 Name_____

3a) Describe what Write-Wide, Read-Narrow means and why we would use it

5 pts

3b) Why do HDDs need to use RLL codes? 5 pts

3c) What mechanism prevents head slaps in normal rotating operation of a HDD

5 pts

ELE 4142 HW5 Name_____

4) Calculate the best case and worst case read delay for the following DVD player 20 pts

Sled radial speed – 1mm/ms
Total sled read travel distance - 7.5cm
Disk rotation speed 5600 rpm
Radius at inside track – 0.4inches
Read channel delay (electronics) – 150us

ELE 4142 HW5 Name_____

5) Search and Think 25 pts

Propose a circuit to measure the output of a GMR HDD sensor
Keep it simple – (if you use a Wheatstone Bridge you must document how you intend to determine the bit value and bias the sensor)

ELE 4142 HW5 Name_____

6) Search and Think 10pts

Provide a short description of HAMR as it applies to Hard Disk Drives