Design of A Digital Controller for
Hard Disk Drives

a) Grades obtained in this individual assignment shall contribute towards 10% of the total marks for the EE3304 exam

b) You should submit your report (in PDF) and source codes in a zipped folder via email latest by **4 March 2016** to:

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c) Note that plagiarism and copying are serious offences and students caught doing so will be severely punished. Late reports will also be penalized

1. A picture of commercial 3.5" Hard Disk Drive (HDD) is shown below in Fig. 1.

Fig. 1: Inside a commercial 3.5" HDD.

From frequency response measurements, the model of the voice coil motor (VCM) $P(s)$ in a HDD is obtained as:

$$P(s) = \frac{1 \times 10^8}{s^2}.$$

Assume that the sampling frequency is 30 kHz. Design a digital controller $C(z)$ for the VCM to meet the following specifications:

i)   10% settling time < 10 ms
ii) Less than 20 % overshoot
iii) Zero steady-state error

(10 marks)