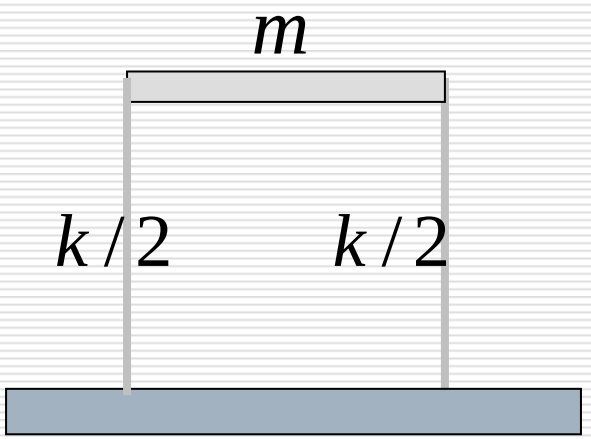
Assignment 2012-1 Evaluate responses of a SDOF system subjected to a harmonic lateral load p(t) (May 15, Submit by May 29)

1) Using a software given in the form of EXCEL sheet (download the program from http://seismic.cv.titech.ac.jp/ja/lecture/Structural%20Dynamics/), compute response of the following SDOF system under a harmonic lateral load p(t) for 0<t<10 T, where T represents the natural period of the SDOF system.

$$m = 150kN / g = 150/9.8$$

$$\xi_r = 0.05$$

$$k = 3050.9kN / m$$



2) Loading condition
p(t) is given by

$$p(t) = p_0 \sin\left(\frac{2\pi}{T_p}\right)$$

where,

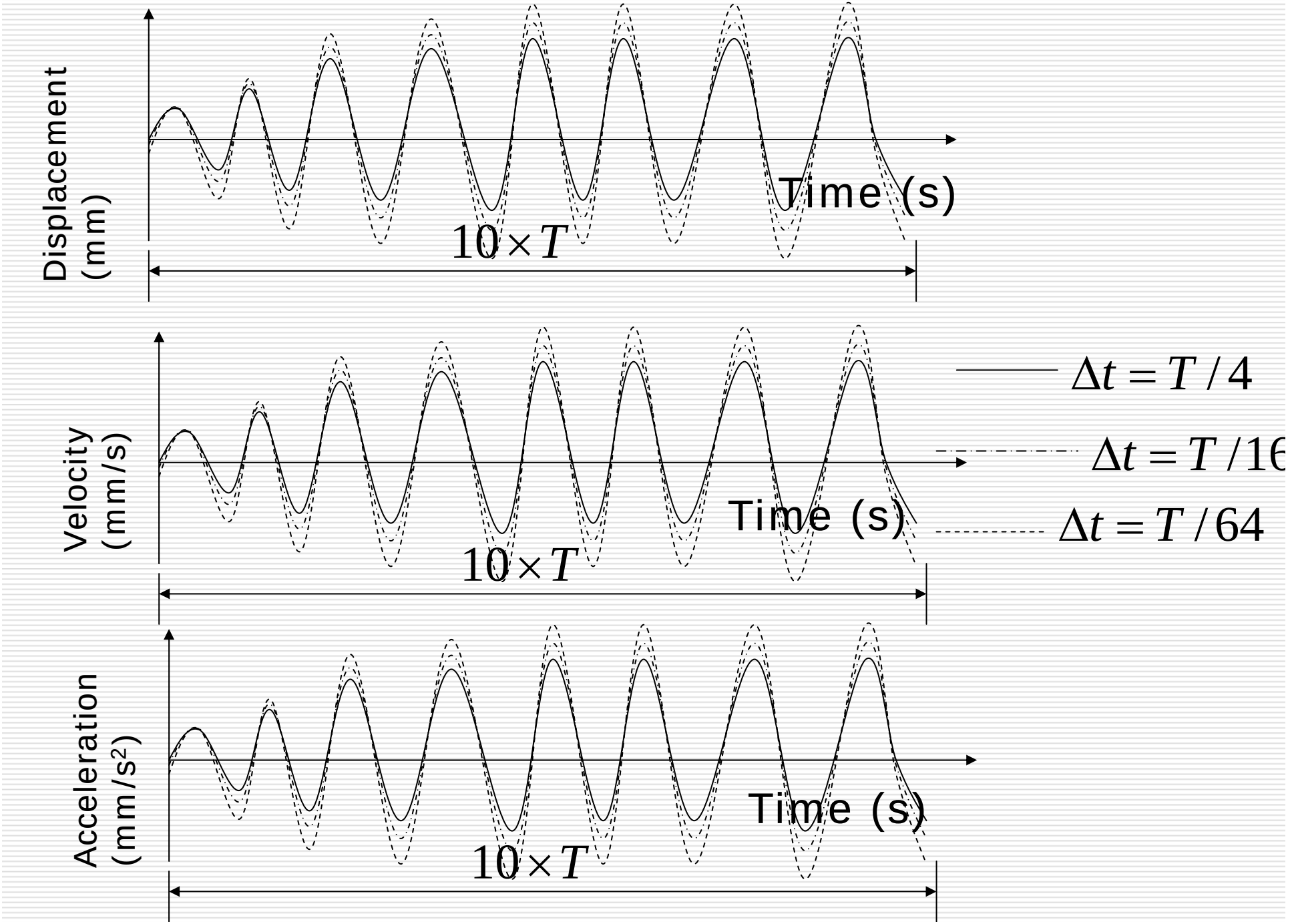
$$p_0 = 200kN$$

$$T_p = T$$

3) Compute the response with the time interval Δt of

$$\Delta t = \frac{T}{4}, \frac{T}{16}, and\ \frac{T}{64}$$

4) Plot the response as shown in the following page


Displacement (mm)
Time (s)
$10 \times T$
Velocity (mm/s)
Time (s)
$10 \times T$
$\Delta t = T / 4$
$\Delta t = T / 16$
$\Delta t = T / 64$
Acceleration (mm/s²)
Time (s)
$10 \times T$