Closed everything. No calculator. If you need other (physics or math) formula, you may ask if it can be given. Please ask if any problem needs to be clarified further. **Good luck!!**

$$
\begin{aligned}
\sin(a \pm b) &= \sin a \cos b \pm \cos a \sin b \\
\cos(a \pm b) &= \cos a \cos b \mp \sin a \sin b \\
\sin(2a) &= 2 \sin a \cos a \\
\cos(2a) &= 2\cos^2 a - 1 \;=\; 1 - 2\sin^2 a \\
\sin\delta &= \delta + O(\delta^3) \\
\cos\delta &= 1 - \frac{1}{2}\delta^2 + O(\delta^4) \\
(1+\delta)^\alpha &= 1 + \alpha\delta + \frac{1}{2}\alpha(\alpha-1)\delta^2 + O(\delta^3) \\
\ln(1+\delta) &= \delta - \frac{1}{2}\delta^2 + O(\delta^3) \\
e^\delta &= 1 + \delta + \frac{1}{2}\delta^2 + O(\delta^3)
\end{aligned}
$$

Show all your work. Your name and page numbers must be clearly written on your solution sheets. Be neat in writing. Partial credit for an incorrect answer will be given whenever there is a good reason for it (e.g. correct logical steps from an incorrect previous answer). Very little credit may be given for a correct answer, if not properly derived/explained.

Do only one of problems 1-2 (40 points each), and two of problems 3-5 (50 points each). Problem 6 is mandatory (60 points). Extra credit may be given if, and only if, you do the third problem of problems 3-5.