ESE 406/505 & MEAM 513 – 2012-Feb-1 – Quiz – Name:_____

- Choose only one answer (A through D) for each question by circling the letter.
- A correct answer is worth 2 points.
- No answer is worth 0 points.
- An incorrect answer is worth -1 point. Random guessing will hurt you.

1. We use Laplace Transforms because they...
   A. ...convert Fredholm Equations of the second kind into integers.
   B. ...none of the other answers.
   C. ...convert nonlinear equations into linear equations.
   D. ...convert linear constant-coefficient ODEs into algebraic equations.

2. Which of the following is the correct expression for the Laplace Transform of $\tau \frac{dy}{dt} + 2y$?
   A. $(\tau s + 2)Y(s) - \tau y(0)$
   B. None of the other answers.
   C. $(\tau + 2s)Y(s) - \frac{dy}{dt}(0)$
   D. $(\tau + 2)Y(s) - 2sy(0)$

3. Which of the following is the correct partial-fraction expansion of $Y(s) = \frac{6}{(s+1)(s-2)}$?
   A. $Y(s) = \frac{6}{(s+1)} + \frac{3}{(s-2)}$
   B. $Y(s) = \frac{-2}{(s+1)} + \frac{2}{(s-2)}$
   C. None of the other answers.
   D. $Y(s) = \frac{-1}{(s+1)} + \frac{2}{(s-2)}$

4. Which of the following is a trim (or equilibrium) condition for the system $\frac{dx}{dt} = -\sqrt{x} + \cos u$?
   A. $\sqrt{x_o} = \sin u_o$
   B. $\frac{dx_o}{dt} = -\sqrt{x_o}$
   C. $\frac{dx_o}{dt} = -\sin u_o$
   D. None of the other answers.

5. Which of the following statements is NOT correct concerning the linearization $\Delta\dot{\underline{x}} \approx A\Delta\underline{x} + B\Delta u$ of the non-linear system $\dot{\underline{x}} = \underline{f}(\underline{x}, u)$:
   A. A is a row (1-by-n) vector.
   B. B is a column (n-by-1) vector (because we are considering only one control input).
   C. A and B depend on the trim (equilibrium) condition.
   D. $\Delta\underline{x}$ and Δu are small perturbations, measured from the trim condition.