There are only 4 Questions. Every one gets full credit for #5.

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1. A spring attached to the ceiling is stretched 2.45 meters by a four kilogram mass. The value of the Hooke's Law spring constant, k is

   Select the correct answer.

   (a) 1/4 meter-Newton
   (b) 4 meter-Newtons
   (c) 1/4 Newton per meter
   (d) 16 Newtons per meter
   (e) none of the above

2. In the previous problem, if the mass is set in motion, the natural frequency, ω, is

   Select the correct answer.

   (a) 2sec
   (b) 2sec^{-1}
   (c) 4 sec
   (d) $4\ \text{sec}^{-1}$
   (e) $16\ \text{sec}^{-1}$

3. In the previous two problems, if the mass is set into motion in a medium that imparts a damping force numerically equal to 16 times the velocity, the correct differential equation for the position, $x(t)$, of the mass at a function of time, t, is

   Select the correct answer.

   (a) $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + x/4 = 0$
   (b) $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 2x = 0$
   (c) $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 4x = 0$
   (d) $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 8x = 0$
   (e) $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 32x = 0$

4. If the mass in the previous problem is pulled down two centimeters and released, the solution for the position is

   Select the correct answer.

   (a) $x = 0.02e^{-2t} + 0.04te^{-2t}$
   (b) $x = 2e^{-2t} + 4te^{-2t}$
   (c) $x = 0.02e^{2t} - 0.04te^{2t}$
   (d) $x = e^{-2t}\sin t$
   (e) $x = 0.02e^{-2t}\cos t$

ANSWER KEY

1. d
2. b
3. c
4. a
5. d
6. e
7. b
8. a
9. c
10. e
11. a
12. b
13. e
14. b
15. d
16. e
17. d
18. e
19. c
20. d