homework 1

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Started: September 22, 2009 1:02 PM
Questions: 28

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1. Q1 (Points: 2)

This homework is primarily to provide us with a better understanding of your background knowledge and facility with math as you start this course. A second purpose is to have you review and practice some math and physics that you will need for this course.
To this end, questions 7 through 28 will be graded for participation.

Did you complete the CLASS survey?

You can find it at:
http://www.phas.ubc.ca/ugradsurveys/phys153/CLASS-Sum09-pre-phys250.html

1. Check for credit. (your participation will be verified)

Save Answer

2. Q2 (Points: 0.5)

What percentage of the course score is determined by in-class activities/homework/exams?

1. 35%/30%/35%
2. 40%/25%/35%
3. 30%/25%/35%
4. 25%/25%/40%
5. 20%/30%/40%

Save Answer

3. Q3 (Points: 0)

Given that the HW's are due each Wednesday (except for this first HW which is due on Fri, May 8th), when would you like to have a 1-2 hr long weekly problem solving session?

1. Monday 5pm
2. Monday 5:30pm
3. Monday 6pm
4. Monday 6:30pm
5. Tue 5pm
6. Tue 5:30pm
7. Tue 6pm
8. Tue 6:30pm

Save Answer

4. Q4 (Points: 0)

Do you plan to regularly attend the weekly problem solving session?

- 1. Yes
- 2. No

Save Answer

5. Q5 (Points: 0)

Presenting the work of others as your own is a serious offense in this course (meriting failure). While we encourage collaborative work and using many resources for this course, your write-ups must be your own and nobody else's.

- 1. I agree with this approach.

Save Answer

6. Question 6 (Points: 1)

You will have many online and long answer essay questions.

a) Why do we assign these?
b) What are the four key elements we are looking for when grading these questions?

New Insert equation

Save Answer

7. Q7 (Points: 1)

A slow freight train chugs along a straight track. The distance it has traveled after x hours is given by a function g(x). An engineer is walking along the top of the box cars at the rate of 6 km/hr in the same direction as the train is moving. The speed of the man (in km/hr) relative to the ground is:

- a. g(x)+6
- b. g'(x)+6
- c. g(x)=6
- d. g'(x)=6

Save Answer

8. Q8 (Points: 0)

In your opinion, what was the level of difficulty of the previous question (Q7)?

- 1. Very difficult
- 2. Somewhat difficult

- 3. Average difficulty
- 4. Somewhat easy
- 5. Very easy

Save Answer

9. Q9 (Points: 1)

If $u = ve^{w} + xy^{v}$, find $\frac{du}{dv} = ?$

1. $e^{w} + xy^{v} \ln y$
2. $ve^{w} + xy^{v} \ln y$
3. $e^{w} + xy^{v} \ln v$
4. $ve^{w} + xy^{v} \ln v$
5. Cannot be determined from what we know

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4
- e. Answer 5

Save Answer

10. Q10 (Points: 0)

In your opinion, what was the level of difficulty of the previous question (Q9)?

- 1. Very difficult
- 2. Somewhat difficult
- 3. Average difficulty
- 4. Somewhat easy
- 5. Very easy

Save Answer

11. Q11 (Points: 1)

$g(v)$ gives the fuel efficiency, in kilometers per liter, of a car going a speed of v kilometers per hour. What are the units of $g'(v) = \frac{dg}{dv}$?

1. $(km)^2/[(liter)(hour)]$
2. $hour/(liter)$
3. $(liter)/(hour)$
4. $(liter)(hour)/km^2$

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4

Save Answer

12. Q12 (Points: 0)

In your opinion, what was the level of difficulty of the previous question (Q11)?

- 1. very difficult
- 2. Somewhat difficult
- 3. Average difficulty
- 4. Somewhat easy
- 5. Very easy

Save Answer

13. Q13 (Points: 1)

A branch sways back and forth with position $s(t)$. Studying its motion you notice that its acceleration is proportional to its position s, so that when it is 8 cm to the right, it will accelerate to the left at a rate of 2 cm/s^2. Which differential equation describes the motion of the branch?

1. $\frac{d^2s}{dt^2} = 8s$

2. $\frac{d^2s}{dt^2} = -2$

3. $\frac{d^2s}{dt^2} = -2s$

4. $\frac{d^2s}{dt^2} = -4s$

5. $\frac{d^2s}{dt^2} = -\frac{s}{4}$

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4
- e. Answer 5

Save Answer

14. Q14 (Points: 0)

In your opinion, what was the level of difficulty of the previous question (Q13)?

- 1. Very difficult
- 2. Somewhat difficult
- 3. Average difficulty
- 4. Somewhat easy
- 5. Very easy

Save Answer

15. Q15 (Points: 1)

An ideal spring produces an acceleration that is proportional to the displacement, so $my'' = -kx$, for some positive constant k. In the lab, we find that a mass is held on an imperfect spring: As the mass gets farther from equilibrium, the spring produces a force stronger than an ideal spring. Which of the following equations could model this scenario?

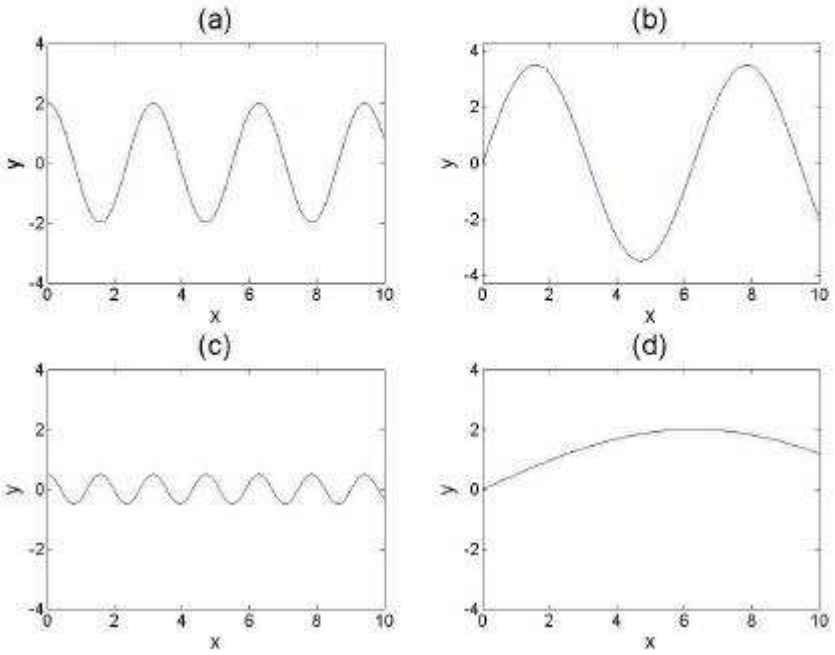
1. $my'' = ky^2$
2. $my'' = -k\sqrt{y}$
3. $my'' = -k|y|$
4. $my'' = -ky^3$
5. $my'' = -ke^{-y}$
6. None of the above

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4
- e. Answer 5
- f. Answer 6

Save Answer

16. Q16 (Points: 1)

The functions plotted below are solutions of $y'' = -cy$ for different values of c. Which case (below) corresponds to the largest value of c?

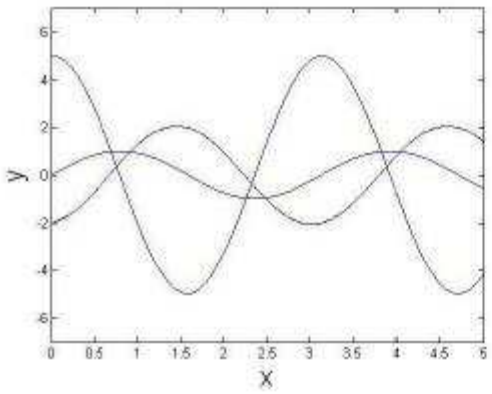


1. Answer A
2. Answer B
3. Answer C
4. Answer D

Save Answer

17. Q17 (Points: 1)

Three different functions are plotted below. Could these all be solutions to the SAME mass-spring second order differential equation: $my'' = -ky$?



1. YES
2. NO
3. Not enough information is given

- a. Answer 1
- b. Answer 2
- c. Answer 3

Save Answer

18. Q18 (Points: 1)

Each of the differential equations below represents the motion of a mass on a spring.
Which one has the largest maximum velocity?

1. $2x'' + 8x = 0$, where $x(0) = 5,\ x'(0) = 0$
2. $2x'' + 4x = 0$, where $x(0) = 7,\ x'(0) = 0$
3. $x'' + 4x = 0$, where $x(0) = 10, x'(0) = 0$
4. $8x'' + x = 0$, where $x(0) = 20, x'(0) = 0$

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4

Save Answer

19. Q19 (Points: 1)

A differential equation is solved by the function $y(t) = 3\ sin\ 2t$, where y is in meters and t is in seconds. What units do the numbers 3 and 2 have?

1. 3 is in meters, 2 is in seconds
2. 3 is in meters, 2 is in per second
3. 3 is in meters per second, 2 has no units
4. 3 is in meters per second, 2 is in seconds
5. Not enough information is given

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4
- e. Answer 5

Save Answer

20. Q20 (Points: 1)

The wave equation $\frac{\partial^2 f}{\partial x^2} = \frac{1}{C^2}\frac{\partial^2 f}{\partial t^2}$ provides a quantitative description for the motion of waves such as water waves, sound waves, and electromagnetic waves. If the function f gives us the strength of the electric field of the electromagnetic wave in Volt/meters as a function of position x in meters, and time t in seconds, what are the units of the constant C?

1. meters squared per second squared
2. seconds per meter
3. meters per second
4. Volt/meters per second
5. meters per (Volt seconds)
6. None of the above

- a. Answer 1
- b. Answer 2
- c. Answer 3
- d. Answer 4
- e. Answer 5
- f. Answer 6

Save Answer

21. Q21 (Points: 1)

The function $f(x,t) = Asin(kx + \omega t)$ is a solution to the wave equation $\frac{\partial^2 f}{\partial x^2} = \frac{1}{C^2}\frac{\partial^2 f}{\partial t^2}$. If $A = 10$, $k = 3$, and $C = 5$, what value could ω have?

1. 15
2. 150
3. 3/5
4. 9/25
5. 225

- a. Answer 1
- b. Answer 2
- c. Answer 3

- d. Answer 4
- e. Answer 5

Save Answer

22. Q22 (Points: 1)

The function $f(x,t) = Asin(kx + \omega t)$ is a solution to the wave equation $\frac{\partial^2 f}{\partial x^2} = \frac{1}{C^2}\frac{\partial^2 f}{\partial t^2}$. If $A = 10$, $k = 3$ and $\omega = -5$, what direction is the wave traveling?

1. In the positive x-direction
2. In the negative x-direction
3. Not enough information is given

- a. Answer 1
- b. Answer 2
- c. Answer 3

Save Answer

23. Q23 (Points: 2)

What evidence do you have (or know of) that atoms DO exist?
(For this question, please write an answer w/o looking it up. This question will not be graded on correctness, instead it will be graded on your participation)

Short answer:

New Insert equation

Save Answer

24. Q24 (Points: 2)

What are atoms made of, and how are the parts of the atoms configured?

Short answer:

New Insert equation

Save Answer

25. Q25 (Points: 1)

You push an electron through a uniform electric field E from point A to point B. the total distance from A to B is a distance "d". The potential at point A is V and the potential at point B is 0. The charge of the electron is -q. How much work do you do on the electron?

New Insert equation

Save Answer

26. Q26 (Points: 1)

Is it possible to obtain energy from atoms? If yes, briefly explain how.

Short Answer:

New Insert equation

Save Answer

27. Q27 (Points: 0)

What is your best estimate for the amount of time you spent working on this homework?

1. <1hr
2. 1-2 hr
3. 2-3 hr
4. 3-4 hr
5. 4-5 hr
6. 5-6 hr
7. 6-7 hr

- 8. 7-8 hr
- 9. >8 hr

Save Answer

28. Q28 (Points: 0)

In your opinion, what was the level of difficulty for this homework?

- 1. Very difficult
- 2. Somewhat difficult
- 3. Average difficulty
- 4. Somewhat easy
- 5. Very easy

Save Answer

Finish **Save All** **Help**