St John Baptist De La Salle Catholic School, Addis Ababa

Grade 11 Physics Final Examination Prep Questions

1st Quarter

November, 2023

Problems

1. What are some sources we can read previous researches from?
2. List some scientific collaborations found in your text book and state what they are famous for.
3. Show the sum and difference of two vectors using the triangle and parallelogram methods.
4. What is a vector? How different is it from a scalar? What are the different types of vectors?
5. Consider two vectors $\vec{A}$ and $\vec{B}$. When is their sum maximum? When is it minimum? What happens to their sum when they are perpendicular? When are the cross/dot products maximum and when are they minimum? When is the scalar triple product maximum/minimum?
6. What is the easiest way you can find the angle between two vectors?
7. What is the easiest way you can find a vector perpendicular to two different vectors?
8. What is the easiest way you can show two vectors are perpendicular to each other?
9. What are the parametric equations for polar coordinates?
10. How can you convert polar equations to Cartesian ones?
11. Which of the 4 interactions do quarks feel? What about leptons?
12. What do the 4 interactions govern? What are their force carriers?
13. During lepton decays, how can we check if a decay is possible?
14. What is the difference between a particle and an anti particle?
15. An object traveling in a straight line travels half of its distance with an average velocity of v_1 and the second half with v_2. Show that the average velocity of the whole path is given by $\dfrac{v_1 v_2}{v_1 + v_2}$
16. What is the difference between instantaneous and average velocity/acceleration?
17. Is it possible to have acceleration and velocity that are opposite signs(one negative and other positive)? Explain.
18. The position of a particle moving along a straight line depends on the time t according to the equation $S(t) = at^4 - bt^3 + ct^2 + dt + e$. Give the velocity and acceleration as functions of time. What are the dimensions of a, b, c, d, e, and f.

19. Why do we always add a constant after integrating a function?

20. (1 point) Out of the 4 fundamental interactions, state which ones neutrinos interact through. Explain why neutrinos are ironically perfect for astronomy.

21. How find the volume of a parallelepiped?

22. Find the triple product of the basis vectors of Cartesian space.