

St John Baptist De La Salle Catholic School, Addis
Ababa

Grade 11 Physics Second Take-Home Examination
3rd Quarter

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April, 2022

Notes, and use of other aids is allowed. Read all directions carefully and write your answers in the space provided. To receive full credit, you must show all of your work. **Cheating or indications of cheating and similar answers will be punished accordingly.**

Information

- The Take-Home Exam is due on **Wednesday, April 27**.
- You should Work on it **individually** and consult me if you have any questions. As I have reiterated multiple times, cheating will have a serious consequence.
- For purposes of neatness and simplicity of grading, you should do the assignment on an **A-4 paper**.

Name: _____ Roll Number: _____ Section: _____

1. (3 points) A pendulum bob of mass 2kg is attached to a cord of length $L = 0.8$ is pulled sideways until it makes angle of $\theta = 60^\circ$.
 - (i) What is the change in potential energy of the bob?
 - (ii) What is the change in kinetic energy of the object? What is the maximum speed of the bob?
2. (1 point) A block of mass 3 kg moves from initial position at $x = 1$ to a final position $x = -1$ m under the influence of the force given as a function of position(x), $f(x) = x^3 + 2x - 1$ if the speed at the initial point is 2m/s then what is the velocity when it pass through $x = 12$ m.
3. (2 points) A ball of mass 2 kg is thrown onto a spring of a spring constant, $k=2800\text{N/m}$, from a height of 3m starting from rest.

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- (i) Find the maximum compression of the spring.
 - (ii) Find the maximum speed the ball can theoretically achieve.
4. (2 points) An inclined plane of angle θ has a spring of force constant 1200 N/m fastened securely at the bottom so that the spring is parallel to the surface. A block of mass 50 kg is placed on the plane at a distance of 0.800 m from the spring. From this position, the block is projected downward toward the spring with speed 2 m/s . If the coefficient of kinetic friction is 0.09 , determine
- (i) Find the maximum compression of the spring.
 - (ii) Find the speed the instant before striking the spring.
5. (2 points) Show the speed of a simple pendulum as a function of its length and the gravitational field it is in. Does the mass at the end affect the speed?