Practice Worksheet — Grade 11 Physics

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Net force and Newton's laws

1. A net force of 3600 N acts on a 1200 kg car. What is its acceleration?

   Answer: _____ (m/s²)

2. What is the weight of a 65 kg student on Earth? Take g = 9.81 m/s².

   Answer: _____ (N)

3. The floor pushes up on a sliding crate with a normal force of 500 N. The coefficient of kinetic friction between the crate and the floor is 0.30. What friction force acts on the crate?

   Answer: _____ (N)

4. A 10 kg box sits on a frictionless ramp inclined at 30°. What is the component of gravity acting down the slope? Take g = 9.81 m/s².

   Answer: _____ (N)

5. A 5.0 kg cart is pushed right with 40 N while friction pushes left with 15 N. What is its acceleration?

   Answer: _____ (m/s²)

Uniform acceleration equations

6. A car starts from rest and accelerates uniformly at 3.0 m/s² for 5.0 s. What is its final velocity?

   Answer: _____ (m/s)

7. That same car accelerates from rest at 3.0 m/s². How far does it travel in those 5.0 s?

   Answer: _____ (m)

8. A ball is dropped from rest and falls 45 m. Taking g = 9.81 m/s², how long is it falling?

   Answer: _____ (s)

9. A car travelling at 25 m/s brakes uniformly to a stop in 4.0 s. What is its acceleration?

   Answer: _____ (m/s²)

10. A ball rolls horizontally off an 80 m cliff at 20 m/s. Taking g = 9.81 m/s², how long before it lands?

Answer: _____ (s)

Wave speed and period

11. A tuning fork vibrates at 250 Hz. What is its period?

Answer: _____ (s)

12. Pushing a child on a swing at just the right moments makes the swing go much higher. What is this an example of?
a) the swing storing extra mass with every push it receives
b) diffraction of the motion around the edges of the swing seat
c) resonance, because the pushes match the natural frequency
d) reflection of the wave off the support bar at the top

13. A wave has a frequency of 250 Hz and a wavelength of 1.36 m. What is its speed?

Answer: _____ (m/s)

14. A sound wave travels at 340 m/s with a frequency of 170 Hz. What is its wavelength?

Answer: _____ (m)

15. A wave travels from one medium into another where its speed is higher. The frequency does not change. What happens to the wavelength?
a) it increases
b) it decreases
c) it drops to zero
d) it stays the same

Work energy transfer

16. A car rounds a bend of radius 25 m at a steady 10 m/s. What is its centripetal acceleration?

Answer: _____ (m/s²)

17. In an isolated system with no friction, which statements are true? Select all that apply.
a) the total mechanical energy stays constant
b) energy can change form without any being lost
c) kinetic energy alone is always constant
d) potential energy can be converted into kinetic energy

18. An object moves in a circle of radius 4.0 m, completing one revolution every 2.0 s. What is its speed?

Answer: _____ (m/s)

19. A 1200 kg car takes a curve of radius 45 m at 15 m/s. What centripetal force is needed to keep it on the road?

Answer: _____ (N)

20. A ball is whirled on a string at constant speed in a horizontal circle. Which statement is correct?
a) its velocity is changing because its direction is changing
b) the centripetal force points outwards, away from the centre
c) its velocity is constant because its speed is constant
d) it has no acceleration because its speed is constant