

Physics 1 Term 2 Periodic 1 Answer Sheet

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Physics 1 Equations

$$v_x = v_{x0} + a_x t$$

$$x = x_0 + v_{x0} t + \frac{1}{2} a_x t^2$$

$$v_x^2 = v_{x0}^2 + 2a_x (x - x_0)$$

$$\vec{a} = \frac{\sum \vec{F}}{m} = \frac{\vec{F}_{net}}{m}$$

$$|\vec{F}_f| \leq \mu |\vec{F}_n|$$

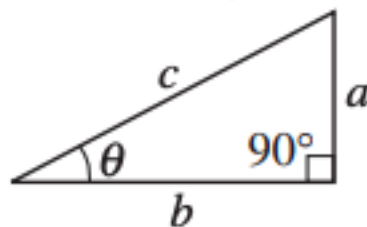
Right triangle

$$c^2 = a^2 + b^2$$

$$\sin \theta = \frac{a}{c}$$

$$\cos \theta = \frac{b}{c}$$

$$\tan \theta = \frac{a}{b}$$



Name _____

Please use 10 m/s/s for g .

1. A 50 kg sprinter starts a race with an acceleration of 4 m/s/s . What is the net external force on her?
a. 100 N b. 200 N c. 400 N d. 600 N e. 800 N
2. A cleaner pushes a 20 kg laundry cart in such a way that the net external force on it is 10 N . Calculate the magnitude of its acceleration.
a. $.5 \text{ m/s/s}$ b. 1 m/s/s c. 2 m/s/s d. 4 m/s/s e. none of these

Questions 3 – 5

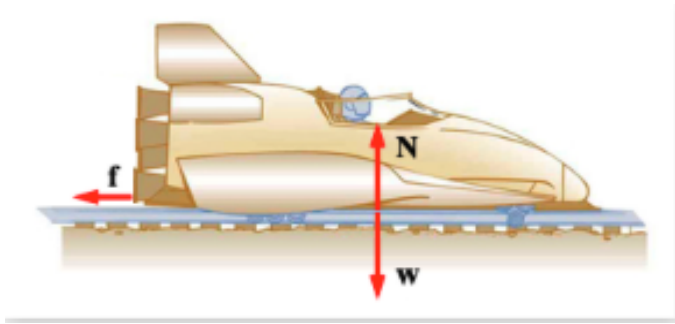
In the figure below, the net external force on the 50 kg mower is 25 N .



3. What is the acceleration of the mower?
a. $.5 \text{ m/s/s}$ b. 1 m/s/s c. 2 m/s/s d. 4 m/s/s e. none of these
4. If the lawn mower man is pushing with a force $F = 30 \text{ N}$, what is the magnitude of the friction force f ?
a. 5 N b. 10 N c. 15 N d. 25 N e. 30 N
5. If the friction force remains constant, what force would the lawn mower man have to exert so the mower moves with constant velocity?
a. 5 N b. 10 N c. 15 N d. 25 N e. 30 N

Questions 6 – 10

The rocket sled in the figure below has an initial speed of 200 m/s and is decelerated at a rate of 100 m/s/s. Assume that the rockets are off. The total mass of the system (person + rocket sled) is 1000 kg.



6. What is the weight of the system?
a. 1000 N b. 4000 c. 5000 N d. 10,000N e. 15,000 N

7. What is the normal force acting on the system?
a. 1000 N b. 4000 c. 5000 N d. 10,000N e. 15,000 N

8. What is the magnitude of the resistive force, f , acting on the system?
a. 100 N b. 1000 N c. 10,000 N d. 100,000 N e. 1,000,000 N

9. How long does it take the rocket sled to stop?
a. 1 s b. 2 s c. 4 s d. 5 s e. 10 s

10. How far does the rocket sled travel during this time?
a. 100 m b. 200 m c. 400 m d. 500 m e. 1000 m

Questions 11 – 15

A 2 kg block is suspended by a vertical string.



11. What is the tension in the string if the block is motionless?
a. 2 N b. 5 N c. 10 N d. 15 N e. 20 N
12. What is the tension in the string if the block is moving up with constant speed?
a. 2 N b. 5 N c. 10 N d. 15 N e. 20 N
13. What is the tension in the string if the block is moving down with constant speed?
a. 2 N b. 5 N c. 10 N d. 16 N e. 20 N
14. What is the tension in the string if the block is accelerated up at 2 m/s^2 ?
a. 2 N b. 5 N c. 8 N d. 16 N e. 24 N
15. What is the tension in the string if the block is accelerated down at 2 m/s^2 ?
a. 2 N b. 5 N c. 8 N d. 16 N e. 24 N

Questions 16 - 18

In the picture below. The block has a mass of 2 kg and the weight on the end of the string has a mass of $\frac{1}{2}$ kg. The system is released from rest and remains motionless.

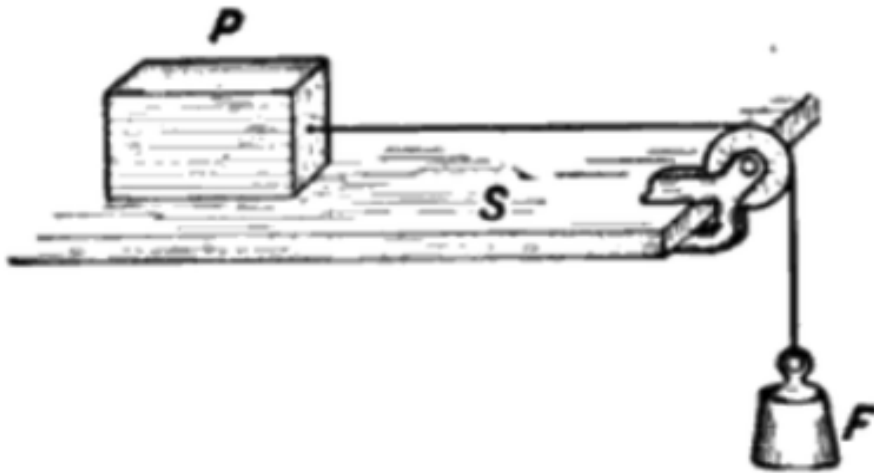
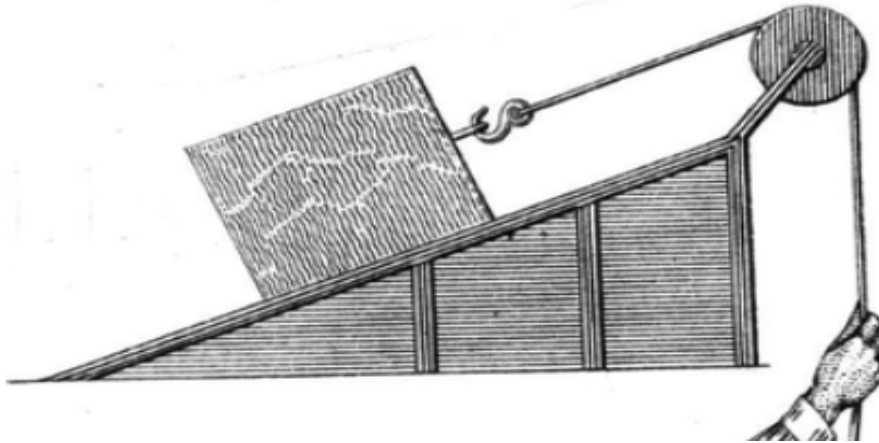


FIG. 34.

16. What is the tension in the string?
a. Zero N b. 2 N c. 5 N d. 10 N e. 20 N
17. What is the magnitude of the frictional force acting on the block?
a. Zero N b. 2 N c. 5 N d. 10 N e. 20 N
18. The block is given a push and it slides with constant velocity. What is the coefficient of friction between the block and surface?
a. .25 b. .40 c. .50 d. .86 e. 1.0

Questions 19 – 21

A 5 kg box is held motionless on a 30 degree very low friction incline as shown below.



19. What is the tension in the rope attached to the block?

- a. 5 N b. 8.6 N c. 20 N d. 25 N e. 43 N

20. How large is the normal force acting on the block?

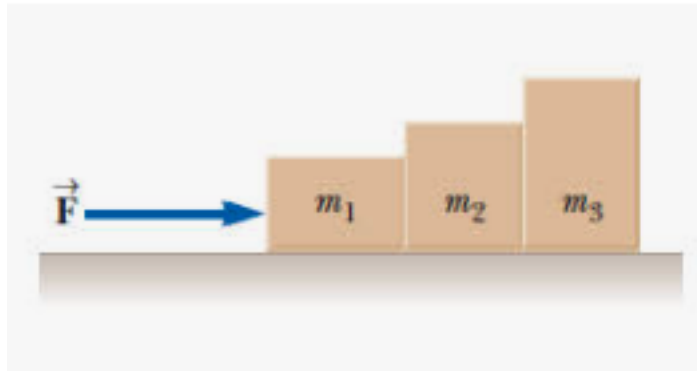
- a. 5 N b. 8.6 N c. 20 N d. 25 N e. 43 N

21. If the rope is released, what will be the acceleration of the block?

- a. 4.3 m/s/s b. 5 m/s/s c. 8.6 m/s/s d. 10 m/s/s e. 12 m/s/s

Questions 22 – 25

Three blocks are on a level frictionless surface, as shown below. $M_1 = 1 \text{ kg}$, $m_2 = 2 \text{ kg}$ and $m_3 = 3 \text{ kg}$. A force $F = 12 \text{ N}$ is applied horizontally to M_1 .



22. What is the acceleration of the blocks?
a. 1 m/s/s b. 2 m/s/s c. 4 m/s/s d. 12 m/s/s
23. What is the magnitude of the force m_2 exerts on M_1 ?
a. 2 N b. 6 N c. 8 N d. 10 N e. 12 N
24. What is the magnitude of the force m_2 exerts on m_3 ?
a. 2 N b. 6 N c. 8 N d. 10 N e. 12 N
25. What is the magnitude of the force m_3 exerts on m_2 ?
a. 2 N b. 6 N c. 8 N d. 10 N e. 12 N