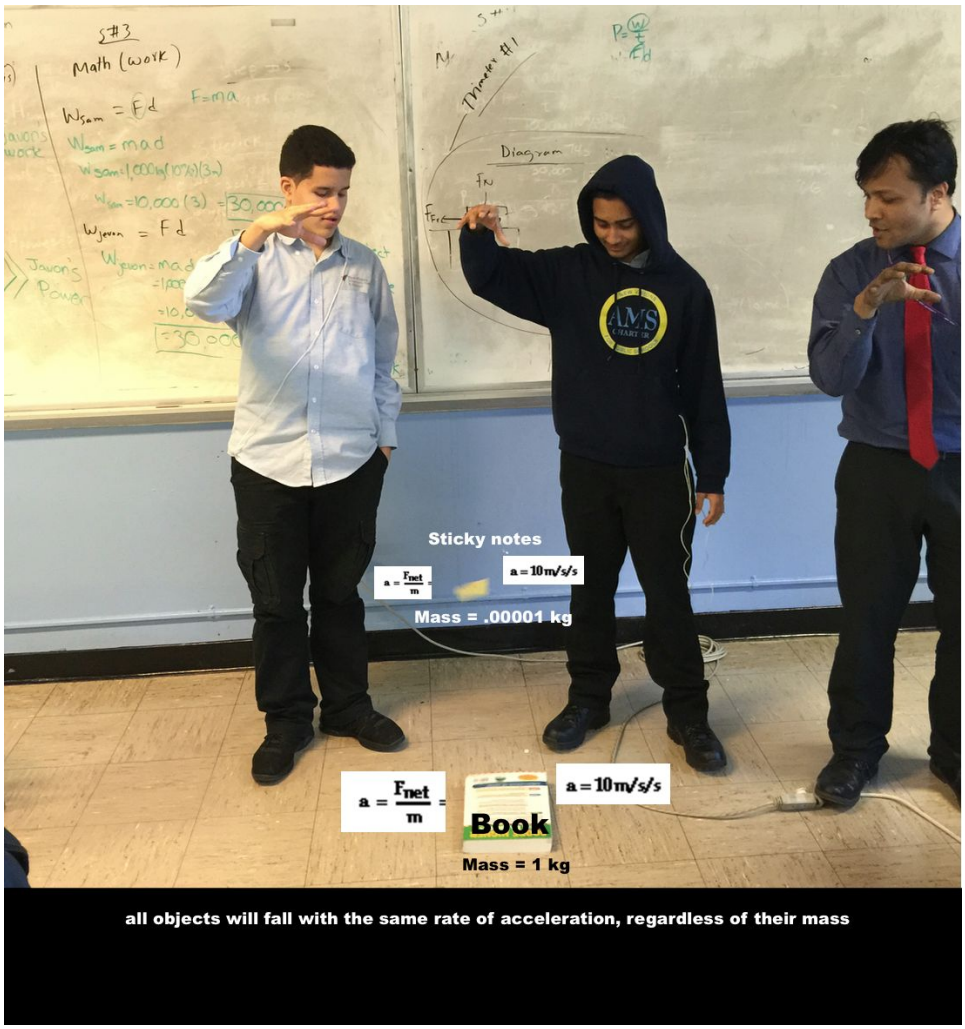
Booklet # 62 (Regents)

Exam #3



NAME: (I will collect the Booklet 5 minutes before the end of the period)

Note: There are 20 questions each of which worth 5 points (20 X 5) = 100 points. Number 21 is a lab question, which is extra credit (20 points). I will grade both the In-Class, and take-home test, and whichever one you do better on, will be submitted onto the grade-book. Total possible points = 120. Thank you.

1

How much work is required to lift a 2 kg ball 3.5 m vertically from its starting point?

- 7 J
- 68.6 J
- 0 J
- −68.6 J

2

How much work does gravity do as a 2 kg ball is lifted 3.5 m above its starting point?

- −7J
- 68.6 J
- 0 J
- −68.6 J

3

Which of the following statements about gravitational potential energy is **not** true?

- Its magnitude is related to the work done by liftin an object.
- It depends on the choice of a coordinate system.
- It is equal to the force required to move an object times the distance it is moved.
- It is equal to the kinetic energy of the falling obje at $y = 0$.

4

A 4-N force is used to move an object 2 m in 10 s. Which of the following is the power generated while moving the object?

- 0.4 W
- 0.8 W
- 1.2 W
- 80.0 W

5

A 50 kg girl runs up a staircase in 20 s, and a 60 kg boy runs up the same staircase in 15 s. Which of the following is the ratio of the power generated by the girl to the power generated by the boy?

- 5 : 6
- 5 : 8
- 8 : 5
- 2 : 1

6

An Olympic athlete with a mass of 65 kg runs up a large hill that is 0.6 km high. The total distance the athlete runs to get to the top of the hill is 3.0 km. If it takes the runner 30 minutes to do this, which of the following is the average power generated in both watts and horsepower?

- 0.21 W, 0.00028 hp
- 21 W, 0.028 hp
- 210 W, 0.28 hp
- 1060 W, 1.42 hp

7

An object at rest on a table is given an initial push. The object starts moving and has some initial kinetic energy. The object slows down and eventually comes to rest. According to the work-kinetic energy theorem, work done on the object causes change in its kinetic energy, ΔK. In this case, the work is done by the force of friction. Which of the following is the nature of the work done by friction on the object?

- Friction does positive work on the object.
- Friction does negative work on the object.
- Friction is not responsible for changing the kinetic energy.

8

In kinematics, the final velocity v_f of an object undergoing constant acceleration is given by which of the following equations?

- $v_f^2 = v_i^2 + 2a_x\Delta v$
- $v_f^2 = v_i^2 - 2a_x\Delta x$
- $v_f^2 = v_i^2 + a_x\Delta x$
- $v_f^2 = v_i^2 + 2a_x\Delta x$

9

Evaluate the following as true or false.
A force F does positive work on two objects A and B along the displacement Δx. Suppose both F and Δx are the same for the two objects. Therefore, for both A and B the changes in velocity Δv_A and Δv_B are necessarily equal.

- true
- false

10

Which of the following expresses the work-kinetic energy theorem?

- $W_{net} = K_f - K_i$
- $\Sigma W = \Delta K$
- $W_{net} = K_f + K_i$
- Answers A and B

11. A 1000 watts motor lifts an elevator 1o meter in 10 seconds. Find the mass of the elevator.

a. 20 kg b. 10 kg c. 12 kg d. none the above	Show the work

12. Divaughn, who has 20 watts, raises a mass of 20 kg to the top of Mr. Bari's closet in 20 seconds. Find the height of Mr. Bari closet.

a. 4 meter b. 2 meter c. 3 meter d. None the above	show the work:

13. A rock that has a mass of 10 kg is raised 10 meters above the ground. How much potential energy does it have at that point?

a. 100 J b. 200 J c. 1000 J d. None the above	Show work

14. When an object is 10 meters above the ground, it's potential energy is 1000 J. What is its mass?

a. 11 Kg b. 10 kg c. 20 kg d. None the above	Show work

15. A 10 kg rock will be pushed up a hill along a path that is 20 meter long. At the top of the hill rock will be elevated a vertical distance of 5 meters. How much work must be done?

a. 500 J b. 500 J c. 1000 J d. None the above	Show work

16. A cart whose mass is 10 kg is moving with a speed of 10 m/s. Find KE?

a. 100 J b. 200 J c. 500 J d. None the above	Show work

17. When a lab cart has a speed of a 10 m/s, its KE is 1, 000 joules. Find mass.

a. 10 kg b. 20 kg c. 30 kg d. None the above	Show work

18. A cart whose mass is 10 kg slows down from a speed of 20 m/s to 10 m/s, find change of KE?

a. 1500 J b. 2000 J c. 3000 J d. None the above	Show work

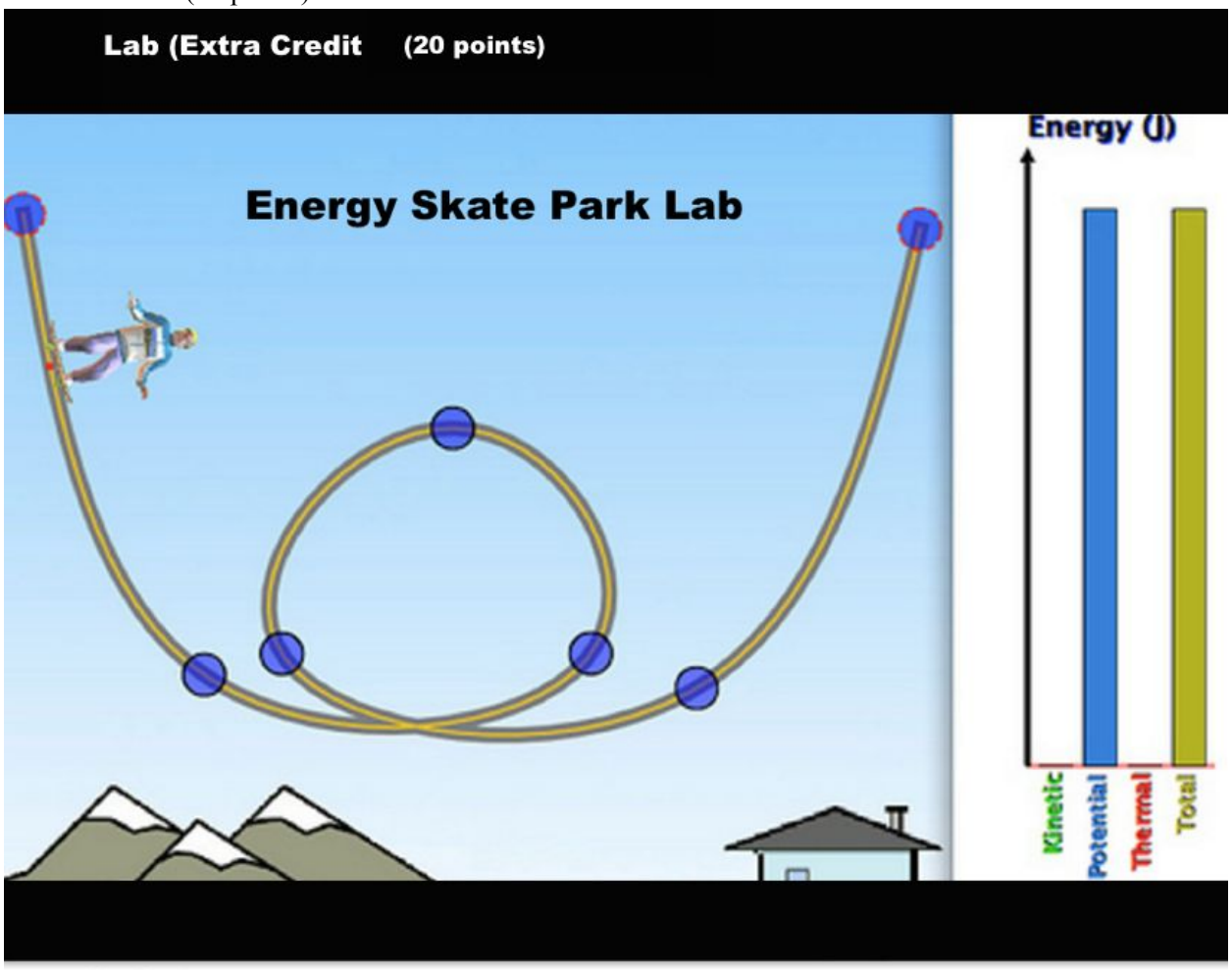
19. A Cart has a Kinetic Energy of 100 Joules, its mass is 10 kg. Find its speed.

a. 20 m/s b. 10 m/s c. 30 m/s d. None the above	Show work

20. A bullet has a mass of 0.05 kg and is moving with a speed of 300 m/s. A bowling ball has a mass of 8 kg and moving with 2 m/s. Which one has more KE?

1. Ball 2. Bullet 3. None the above	Show work to earn the points

21. Extra credit (20 points)



1 How does increasing skater's **mass** change the skater's....
Kinetic Energy? _____ Potential Energy? _____ Total Energy? _____

2 How does the skater's **kinetic energy** change as he moves **down** the ramp? _____

3 How does the skater's **kinetic energy** change as he moves **up** the ramp? _____

4 How does the skater's **potential energy** change as he moves **down** the ramp? _____

5 How does the skater's **potential energy** change as he moves **up** the ramp? _____

6 How does the skater's **total energy** change as he moves **down** the ramp? _____

7 How does the skater's **total energy** change as he moves **up** the ramp? _____

8 Describe the skater's **kinetic** energy at the bottom of the ramp. _____

9 Describe the skater's **potential** energy at the bottom of the ramp. _____

10 What happens when the skater is dropped onto the ramp from above the ramp? _____

Reference Table for Physical Setting

Work, Power & Energy

$F_s = kx$

$PE_s = \frac{1}{2}kx^2$

$F_c = ma_c$

$a_c = \frac{v^2}{r}$

$\Delta PE = mg\Delta h$

$KE = \frac{1}{2}mv^2$

$W = Fd = \Delta E_T$

$E_T = PE + KE + Q$

$P = \frac{W}{t} = \frac{Fd}{t} = F\bar{v}$

PE = potential energy

PE_s = potential energy stored in a spring

Q = internal energy

r = radius or distance between centers

t = time interval

v = velocity or speed

$\bar{v}$ = average velocity or average speed

W = work

x = change in spring length from the equilibrium position

Δ = change

θ = angle

μ = coefficient of friction