

AP Physics 1 – Algebra-Based: Unit 4 Energy Practice Test

Question 1:

A system can be defined as

- A. an object or a collection of objects that are treated as having no internal structure
- B. a group that individually does work
- C. a piece of a whole
- D. a biological community of interacting organisms and their physical environment

Question 2:

What is an open system?

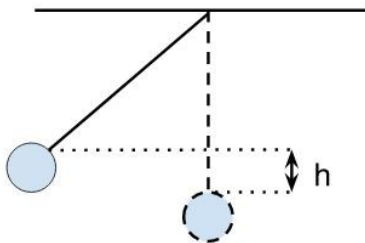
- A. none of the answers are correct
- B. any system where a person can escape
- C. one that exchanges any conserved quantity with its surroundings
- D. one where nothing can enter nor leave the system

Question 3:

What is a closed system?

- A. none of the answers are correct
- B. a system where at least one quantity can leave
- C. a system where every quantity can leave
- D. where conserved quantities are constant

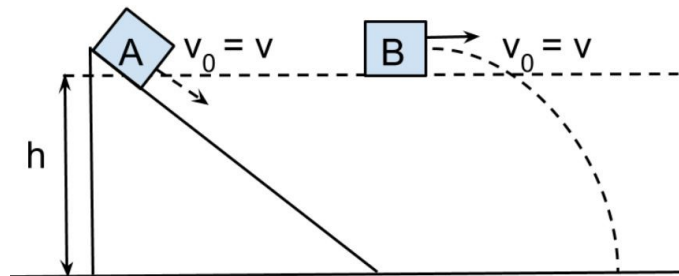
Question 4:



A pendulum reaches a maximum height h relative to the lowest height while it swings. We can ignore friction and air resistance. Where is the pendulum when it has a minimum potential energy?

- A. at the minimum height
- B. at the maximum height
- C. it is the same throughout the motion
- D. not enough information

Question 5:



Block A starts with initial speed v and slides down a frictionless incline of height h . Block B is thrown horizontally with speed v from height h . The blocks are identical. Which block hits the ground with the greatest speed?

- A. Block A
- B. Block B
- C. They reach the ground with the same speed.
- D. Not enough information

Question 6:



A boy drops a 5 kg ball from a height of 2 m . Just before it reaches the ground, what type of energy does it have?

- A. Potential Energy
- B. Nuclear Energy
- C. Kinetic Energy

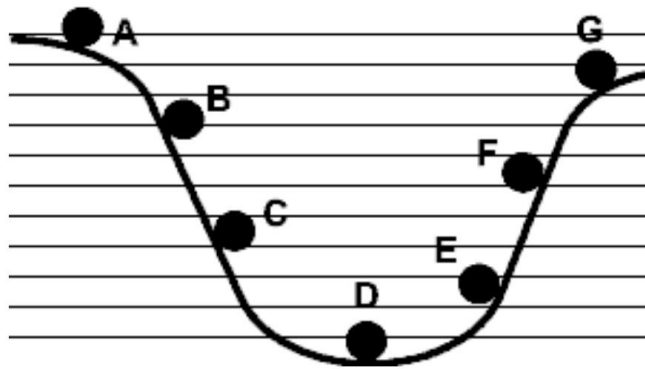
D. Chemical Energy

Question 7:

The law of conservation states that

- A.** every action has an equal and opposite reaction
- B.** energy cannot be created nor destroyed, only changes form
- C.** all matter has thermal energy
- D.** heat moves from an object of higher temperature to an object of lower temperature

Question 8:



Which position has the most kinetic energy?

- A.** A
- B.** G
- C.** D
- D.** B

Question 9:

Which of the following is an example of a transformation of potential energy to kinetic energy?

- A.** a truck slowing down
- B.** a car climbing up a hill
- C.** an airplane traveling at constant speed
- D.** falling object

Question 10:

A 40 kg crate is picked up by a crane to a height of 50 m . The crate falls. What is the velocity of the crate just before it hits the ground?

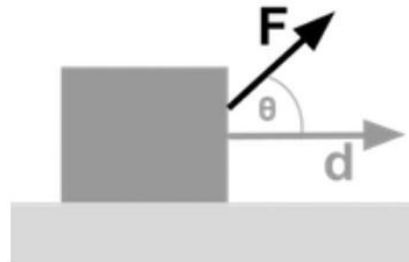
- A. 2000 Joules
- B. $19,600\text{ Joules}$
- C. $19,600\frac{\text{m}}{\text{s}}$
- D. $31\frac{\text{m}}{\text{s}}$

Question 11:

A ball has a 17 J of kinetic energy and its mechanical energy is 25 J . If the ball has a mass of 3.2 kg , what is its height above the ground?

- A. 0.26 m
- B. 5.2 m
- C. 0.52 m
- D. 25 m

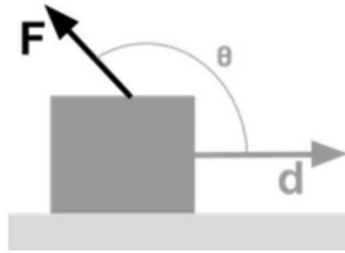
Question 12:



A box moves 5 m horizontally when force $F=10\text{ N}$ is applied at an angle $\theta=60^\circ$. What is the work done on the box by F during the displacement?

- A. -25 J
- B. 25 J
- C. -50 J
- D. 50 J

Question 13:



A box moves 10 m horizontally when force $F=20\text{ N}$ is applied at an angle $\theta=120^\circ$. What is the work done on the box by F during the displacement?

- A. -100 J
- B. 200 J
- C. -200 J
- D. 100 J

Question 14:

Jamie lifts a heavy weight in Olympics with power output of P_J . Tywin lifts the same weight in thrice the time with half the power output. How does Jamie's total change in energy, ΔE_J compare with Tywin's, ΔE_T ?

- A. Not enough information
- B. $\Delta E_T=6\Delta E_J$
- C. $\Delta E_T=\frac{3}{2}\Delta E_J$
- D. $\Delta E_T=\frac{2}{3}\Delta E_J$

Question 15:

Danish lifts a heavy weight in Olympics with a total change in energy of ΔE_D . Anita exerts the same amount of energy in one-third the time. How does Danish's power output, P_D compare with Anita's power output, P_A ?

- A. $P_D=3P_A$
- B. $P_D=\frac{1}{9}P_A$
- C. $P_D=P_A$
- D. $P_D=\frac{1}{3}P_A$

Question 16:

The ability to do work is called

- A. energy
- B. kinetic
- C. thermal
- D. potential

Question 17:

Renatta Gass is out with her friends. Misfortune occurs and Renatta and her friends find themselves getting a workout. They apply a cumulative force of $1,080\text{ N}$ to push the car 218 m to the nearest fuels station. Determine the work done on the car.

- A. $1.35 \times 10^5\text{ J}$
- B. $2.35 \times 10^5\text{ J}$
- C. $2.05 \times 10^5\text{ J}$
- D. $3.25 \times 10^5\text{ J}$

Question 18:

Two carts connected by a 0.50 m spring hit a wall, compressing the spring to 0.25 m . The spring constant k is $200\frac{\text{N}}{\text{m}}$. What is the elastic potential energy stored from the spring's compression?

- A. -50.0 J
- B. -6.25 J
- C. 6.25 J
- D. 12.5 J

Question 19:

A 5 kg ball is lifted 12 m above the ground. Its gravitational potential energy is

- A. 600 J
- B. 60 J
- C. 17 J
- D. 2.4 J

Answer Key:

1. A
2. C
3. D
4. A
5. C
6. C
7. B
8. C
9. D
10. D
11. A
12. B
13. A
14. C
15. D
16. A
17. B
18. C
19. A