

Of course. Here are 30 practice questions covering the "Energy, Work, and Power" chapter, tailored to a 9th-grade standard.

Numerical Questions

Instructions: Show your working for all calculations. Use $g = 9.8\text{ N/kg}$ where necessary.

1. Calculate the kinetic energy of a 1200 kg car traveling at 20 m/s. [2]
2. A 5 kg mass is lifted vertically by 3 m. Calculate the gravitational potential energy it gains.
[cite_start] [2] [cite: 609]
3. A 0.4 kg football rolls off a 30 m high cliff. Neglecting air resistance, calculate the speed of the football when it lands. [cite_start] [3] [cite: 548]
4. A man does 150 J of work lifting a box to a height of 1.5 m. Calculate the weight of the box.
[2]
5. An electric motor lifts a 200 N load through a vertical distance of 3 m in 10 seconds. What is the power output of the motor? [3]
6. A compact fluorescent lamp has a power input of 20 W and a useful light output power of 9 W. Calculate its efficiency. [cite_start] [2] [cite: 871, 872]
7. How much work is done when a force of 60 N moves an object a distance of 5 m in the direction of the force? [2]
8. A 1 kg trolley has 200 J of kinetic energy. What is its velocity? [cite_start] [3] [cite: 606, 608]
9. A robot lifts a 500 N load through 12 m. If the energy input to the robot is 8000 J, what is its efficiency? [cite_start] [3] [cite: 863]
10. A boy with a weight of 600 N runs up a flight of stairs 10 m high in 12 s. What is his average power? [cite_start] [3] [cite: 899, 900]

Multiple Choice Questions

Instructions: Choose the one correct answer (A, B, C, or D) for each question.

1. **Which of these is a non-renewable energy source?**
 - A. Wind
 - B. Solar
 - C. Coal
 - D. Geothermal
2. **The principle of conservation of energy states that energy...**
 - A. is mostly lost as heat.

B. is the same as power.

[cite_start]C. cannot be created or destroyed. [cite: 407]

D. is only useful in its kinetic form.

3. **Power is defined as...**

A. the total work done.

B. the force used to move an object.

[cite_start]C. the rate at which work is done. [cite: 884]

D. the efficiency of an energy transfer.

4. **A drawn bowstring is an example of what type of energy store?**

A. Kinetic energy

B. Chemical energy

C. Gravitational potential energy

[cite_start]D. Elastic strain energy [cite: 355]

5. **A hydroelectric power station primarily converts which energy store into electrical energy?**

A. Chemical energy

B. Nuclear energy

[cite_start]C. Gravitational potential energy [cite: 395]

D. Elastic energy

6. **Which statement about the efficiency of a thermal power station is correct?**

A. It is typically very high, around 90%.

B. Most of the input energy becomes useful electrical energy.

[cite_start]C. It is typically low, around 30%, with much energy lost as heat. [cite: 784, 785]

D. Its efficiency is not affected by wasted energy.

7. **The ultimate source for most of the world's energy resources, except geothermal, nuclear, and tidal, is...**

A. the Earth's core.

B. fossil fuels.

[cite_start]C. the Sun. [cite: 662]

D. gravity.

8. **If the speed of a car is doubled, its kinetic energy is...**

A. halved.

B. doubled.

[cite_start]C. quadrupled. [cite: 570]

D. unchanged.

9. **Which of the following is an advantage of fossil fuels?**

A. They are renewable.

[cite_start]B. They have a high energy density. [cite: 671]

C. They do not produce greenhouse gases.

D. They do not cause acid rain.

10. **In which of these scenarios is no mechanical work being done?**

A. Pushing a crate across a floor.

B. Lifting a box onto a shelf.

C. A car accelerating along a road.

[cite_start]D. A person holding a heavy pile of books still. [cite: 627]

Subjective Theory Questions

Instructions: Write your answers in complete sentences.

1. [cite_start]State the principle of conservation of energy. [cite: 407]

2. [cite_start]Define power and state its SI unit. [cite: 884, 894]

3. Describe the main energy transfer that occurs when a ball falls from a height and hits the ground, ignoring air resistance.

4. [cite_start]Give two advantages and two disadvantages of using nuclear fuels to generate electricity. [cite: 685, 686]

5. [cite_start]What is meant by the efficiency of a device? [cite: 835]

6. [cite_start]Explain why car crumple zones are an important safety feature. [cite: 563, 564]

7. [cite_start]What is the difference between a renewable and a non-renewable energy source? [cite: 671, 689]

8. [cite_start]How is energy stored in fossil fuels? [cite: 674, 675]

9. [cite_start]Describe how a hydroelectric power station generates electricity. [cite: 433]

10. If energy is always conserved, explain why we need to develop new energy sources.