Kinetic Energy: Energy possessed due to the motion of an object.

Formula=1/2mV^2

Potential Energy: Energy possessed due to the position of an object.

Formula=mass x gravitational force x height of the object.

Energy Transferred=Work done

The law of conservation of energy: Energy cannot be created nor destroyed.

Whenever energy is transferred to an object, the energy is stored in one of the object's energy stores.

Open system: A system that can lose or gain energy by interacting with the outside world.

Closed system: A system that only exchanges energy within itself.

Work Done:

Factors Determining Work Done:

- Force must be acting on the body.
- Force must cause displacement of some sort.
- Displacement must be in the direction of the application of force.

If any of the conditions above aren't satisfied, no work is done.

The energy of a system is calculated by adding the potential energy and the kinetic energy of the system.

Force = Acceleration • Mass (Newtons)

Weight = Mass • gravitational acceleration (Newtons)

Moment = force • perpendicular distance from the pivot

Newtons first law = an object remains at rest or in motion when the net force is 0, unless there is an unbalanced force.

Newtons second law = f=ma

Newtons third law = every action has an equal and opposite reaction

Kinetic energy: 1/2 x mv^2 (Joules)

Work done = energy transferred

Work Done= Force x Displacement (Joules)(Newton meter)

Power = energy transferred/time (Watts)

Efficiency = useful energy output/total energy input

Gravitational potential energy = mgh (mass • gravitational acceleration • height)

Conservation of energy:

Energy cannot be created nor destroyed, only dissipated or transferred.

All Types of Energy

1. Kinetic Energy: This is the energy an object possesses due to its motion. The faster an object moves, the more kinetic energy it has.
2. Potential Energy: This is the energy an object possesses due to its position or state. For example, a stretched spring has potential energy because of its position.
3. Thermal Energy: This is the energy that results from the movement of particles within a substance. The faster the particles move, the higher the thermal energy.
4. Chemical Energy: This is the energy that is stored within the bonds of atoms and molecules. When these bonds are broken, energy is released.
5. Electrical Energy: This is the energy that results from the movement of electrons through a conductor. This energy can be harnessed and used to power devices.
6. Nuclear Energy: This is the energy that is released when the nucleus of an atom is split or merged. Nuclear energy is used to generate electricity in nuclear power plants.
7. Light Energy: This is the energy that is carried by electromagnetic waves, such as visible light. Light energy is responsible for the sensation of vision.
8. Sound Energy: This is the energy that is carried by sound waves. Sound energy is responsible for the sensation of hearing.
9. Gravitational Potential Energy: This is the energy an object possesses due to its position in a gravitational field. The higher an object is in the field, the more gravitational potential energy it has.
10. Elastic Potential Energy: This is the energy stored in an object when it is deformed, such as a stretched rubber band or compressed spring. When the object returns to its original shape, the energy is released.

Friction: It is a force that opposes all objects in motion when an object is in contact with them.

Static Friction:

Static friction is a type of friction that occurs when two objects are in contact with each other but are not moving relative to each other. This type of friction prevents the objects from sliding against each other and keeps them stationary.

Static friction occurs because of the irregularities in the surfaces of the objects that are in contact with each other. The irregularities cause the objects to "stick" together, which makes it more difficult to move them. The amount of static friction between two objects depends on the force that is being applied to them and the coefficient of static friction, which is a measure of how rough or smooth the surfaces are.

The coefficient of static friction is determined by the materials that the objects are made of and their surface characteristics. If the coefficient of static friction between two objects is high, it means that they

will be more difficult to move, and a greater force will be required to overcome the static friction. The coefficient of friction will be given to you in the question and the formula for friction is.

Ƒ=μ•N

Ƒ=Friction

μ=Coefficient of Friction

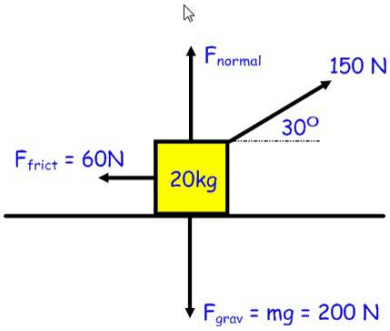
N=Normal Force

Normal Force: normal force is the force that acts on an object to prevent two solids from going through each other, for example, there is normal force working on my laptop to prevent it from goin through my table.

Force on Angle:

When an object is receiving force on an angle, you use trigonometry to calculate the amount of friction.

Forces (acting at an angle) and acceleration



Solve the Example Given Above

You will use Fcos(xº)

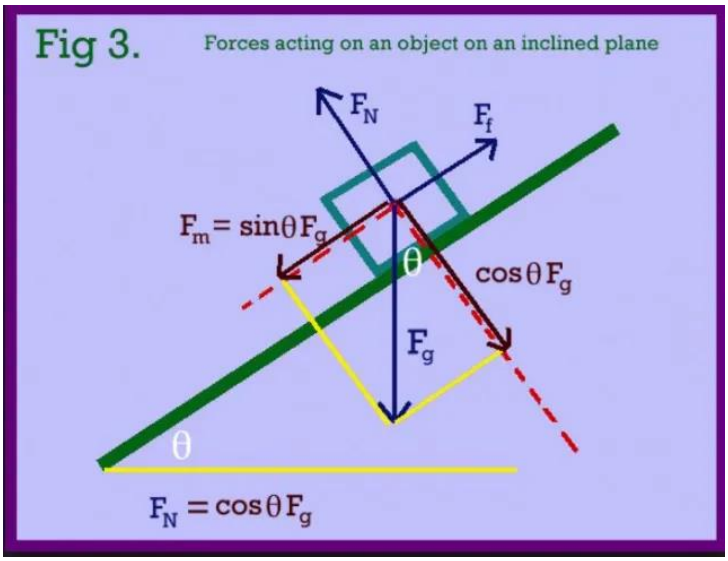
Example question If the force is 100N

The angle between the object and the force is 60º

You would use

100cos(60º)

For sliding friction down a slope



You would use Fsin(xº)

These two examples will not necessarily come in the exam; however, it is better to know them.

FCos(øº) is perpendicular force, which is essentially the force that perpendiculates the slope.

Fsin(øº) is the force that is applied in that direction, and fg is gravitational force so you just need to apply the object's mass by 10 or 9.81.

Practice Questions

1. Define work.
2. What is the unit of work done?
3. Name 2 types of potential energy.
4. Name the energy stored when a rubber band is stretched?
5. What is gravitational potential energy?
6. Differentiate between potential energy and kinetic energy.
7. How are work and energy related to each other?
8. What is potential energy? Explain different types of potential energy.

9. Explain the following:

(a) An object increases its energy when raised through a height.

(b) Energy is neither created nor destroyed then from where we get the energy.

(c) When we push the wall, the wall does not move, and no work is done.

10. State and explain one example where (i) Kinetic energy is present in a body and is used; and (ii) Potential energy is present in a body is used.