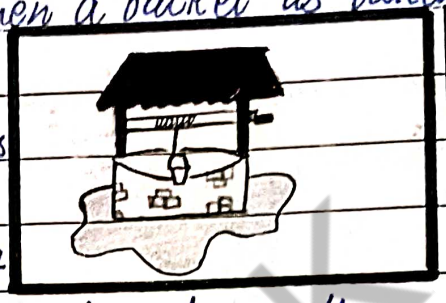
Q. No. 2 (i) **Reason:-** Yes bucket possess P.E when a bucket is taken to the bottom of a well.

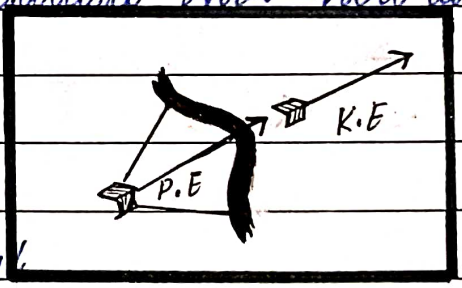


P.E with respect to upthrust:- Bucket possess P.E when its taken to the bottom of a well because some work is done against the upthrust of water. This work done is stored in the form of potential energy in the bucket.

P.E with respect to ground level:- We can also say that the bucket possesses some negative potential energy with reference to the ground level.

Conclusion:- This we can also say that bucket has potential energy with respect to the center of earth.

Q. No. 2 (ii) **Reason:-** When bow is stretched backward with arrow in it then elastic potential energy stores in the bow and arrow.

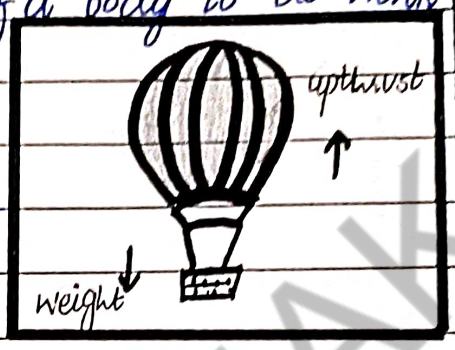


Source of gain in P.E:- Elastic potential energy stored in bow and arrow is equal to the work done to stretch the bow.

Conversion into K.E:- When arrow is shot then its stored elastic potential energy converts into its Kinetic energy of arrow due to which arrow moves in the forward direction.

Conclusion:- So when an arrow is shot from its bow, it gain Potential energy which is then converted into kinetic energy.

Q. No. 2 (iii) **Reason:-** Yes a hydrogen filled balloon possesses potential energy. Because the capacity of a body to do work is called energy.



Density of hydrogen:- Hydrogen is the lightest gas and its density is less than air. So upthrust on balloon is greater than the weight of balloon and net force acting on it.

Mathematically:-

$$F_{net} = F_{th} - W$$
$$F_{net} = F_{th} - mg$$

Effect of net force:- The net force acting on hydrogen filled balloon moves it upward and its P.E increases.

Conclusion:- So, a hydrogen filled balloon has P.E.

Q. No. 2 (iv) No, K.E. is a scalar quantity.

Reason:- K.E energy is a scalar quantity as it can be expressed in terms of scalar product.

Mathematically:-

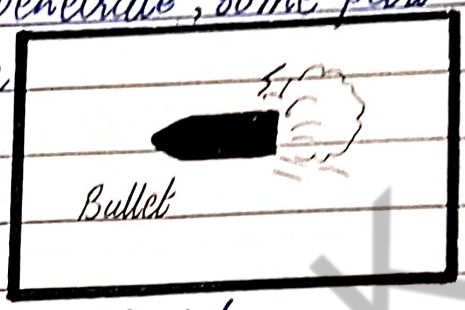
$$K.E = \frac{1}{2} mv^2$$

$$K.E = \frac{1}{2} m(\vec{v}.\vec{v}) \qquad \therefore v^2 = \vec{v}.\vec{v}$$

Conclusion:- As mass of a body is scalar and $(\vec{v}.\vec{v}) = v^2$ also provide scalar, K.E of a body is scalar quantity.

Q. No. 2 (v) Moving bullet possess K.E.

Reason:- When it hits the target and penetrate, some part of its K.E is used against the friction provided by target material and it also dissipates energy in form of heat and sound.



Mathematically:- According to work energy principle

$$W = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 \qquad (\text{At rest } v_f = 0)$$

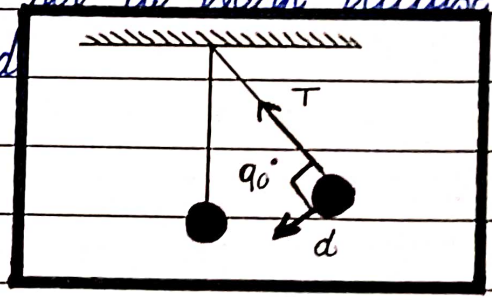
$$W = \frac{1}{2}m(0)^2 - \frac{1}{2}mv_i^2$$

$$W = -\frac{1}{2}mv_i^2 \quad (\text{-ive sign shows that K.E lost})$$

Conclusion:- This loss of K.E is equal to work done to penetrate the bullet in to target.

Q. No. 2 (vi) No, it does not do any work.

Reason:- The tension in the string does not do work because it is always perpendicular to the curved path. (i.e instantaneous displacement).



Mathematically:-

$$W = Fd\cos 90^\circ$$
$$W = Fd\,(0)$$
$$W = 0$$

Conclusion:- So the tension in the string of a swinging pendulum does not do any work.

Q. No. 2 (vii) **Reason:** When meteor enters the earth atmosphere then air friction acts on it. The huge amount of energy is lost due to frictional force of the atmosphere.

Burining meteor

Tutes convestion of energy: → The loss of kinetic energy is equal to work done against friction which converts into heat energy.

→ The loss of kinetic energy appears in form of heat energy which burns the meteor to ashes.

Conclusion: So, some of the energy converts into light energy, forming the appearence of a shooting star.

Q. No. 2 (viii) **Reason:** A compressed spring of watch stores elastic potential energy in it. This potential energy stored in the spring is equal to work done to compress the spring.

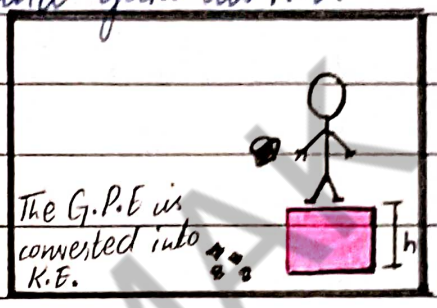
Mathematically:

$$E.P.E = \frac{1}{2} Kx^2$$

Conclusion: This elastic potential energy stored in the spring again converts into mechanical energy to move the arms of the watch.

Q. No. 2 (ix) **Energy changes:-** A cup thrown from certain height losses its gravitational potential energy and gain its K.E.

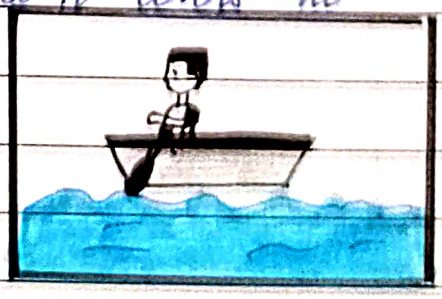
→ When its strike the ground then a part of this kinetic energy is used to break the cup and rest of the energy converts into;



i) Sound energy.
ii) K.E of scattered moving pieces.
iii) Heat energy dissipated against friction.

Conclusion:- Thus when we drop a cup from certain height energy changes from one state to another.

Q. No. 2 (x) **Reason:-** No work is done as boat is at rest with respect to the shore. As boat is at rest so it covers no displacement.

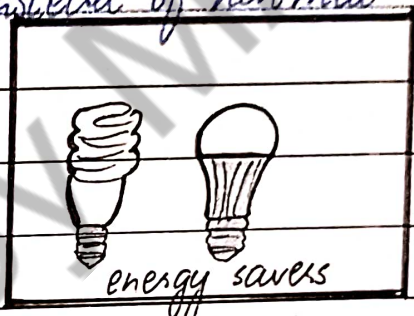


Mathematically:-

$$d = 0$$
$$W = Fd\cos\theta$$
$$W = F(0)\cos\theta$$
$$W = 0$$

Conclusion:- So no work is done as boat is at rest with respect to the shore.

Q. No. 2 (xi) **Reasons:** Energy savers are used instead of normal bulb due to following seasons:-



i) The energy consumption is far less than normal bulbs.

ii) Energy savers produces light of high power and intensity as compared to normal light bulbs.

iii) Energy savers produce very little amount of heat, while 98% of input is converted into heat in light bulbs.

iv) LED light produces very little waste heat so, they need far less energy to produce same amount of energy as an incandescent bulb.

Conclusion: Because of above benefits they are more commonly used.