EXERCISE

Select the correct answer of the following questions.

1) The expression for escape velocity is given by:

a. ngR^2 b. $\sqrt{2gR}$ c. $\frac{gR^2}{2}$ d. ngR

2) An example of non-conservative force is:

a. Electric force b. Gravitational Force

c. Frictional force d. Magnetic force

3) The energy stored in the spring of watch is:

a. K.E b. Electrical Energy

c. Elastic P.E d. Solar Energy

4) One horse power is given by:

a. 746 watts b. 746 Joules c. 746 KW d. 746 Foot Pounds

5) Work is said to be negative when $\bar{F}$ and $\bar{d}$ are:

a. Parallel b. Anti-parallel

c. Perpendicular d. None of these

6) Two bodies of masses m_1 and m_n have equal momentum, their kinetic energies E_1 and E_n are in the ratio

a. $\sqrt{m_1}\ \sqrt{m_2}$ b. $m_1\ m_n$ c. $m_n\ m_1$ d. $\sqrt{m_1^2}\ \sqrt{m_2^2}$

7) The atmosphere is held to the earth by

a. Wings b. Gravity c. Clouds d. The rotation of earth

8) If momentum is increased by 20% then K.E. increases by

a. 44% b. 5% c. 66% d. 77%

9) If the K.E of a body become four time of the initial value, then new momentum will

a. Become twice its initial value

b. Become three times, its initial value

c. Become four times; its initial value

d. Remain constant

10) Two bodies with kinetic energies in the ratio of 4:1 are moving with equal linear momentum. The ratio of their masses is

a. 1:2 b. 1:1 c. 4:1 d. 1:4

11) A body of mass 5kg is moving with a momentum of 10 kg ms^{-1}. A force of 0.2 N acts on it in the direction of motion of the body for 10 seconds. The increase in its kinetic energy is

a. 2.8 Joule b. 3.2 joule c. 3.8 joule d. 4.4 joule

12) If force and displacement of particle in the direction of force are doubled. Work would be

a. Double b. 4 times c. Half d. 1/4 times

Answers:

1.	(b)	**2.**	(c)	**3.**	(c)	**4.**	(a)	**5.**	(b)
6.	(c)	**7.**	(b)	**8.**	(a)	**9.**	(a)	**10.**	(d)
11.	(d)	**12.**	(b)	-	-	-		-	

Write the short answer of the following:

Q.1 A bucket is taken to the bottom of a well. Does the bucket possess any P.E. Explain?

Answer

The bucket does not possess any P.E. although according to work energy principle, work done on an object is equal to change in P.E. (In this case). But this work is done by gravitational force. Which always bring the object to lower potential energy also from stand point of energy. The bucket has not capacity to do any sort of work. That is why bucket at the bottom of the well does not possess any P.E.

Q.2 When an arrow is shot from its bow, it has K.E. from where does it get the K.E?

Answer

According to work energy principle, when work is done on the bow, its potential energy increases then this potential energy is converted into K.E. In this way arrow gets K.E.

Q.3 Does hydrogen filled balloon possess any P.E. Explain.

Answer

Since P.E. of an object is always measured from some reference point. If hydrogen filled balloon has some height from that reference position then this must possess G.P.E i.e. mgh.

Q.4 Is K.E. a vector quantity?

Answer

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

$\Rightarrow$ $K.E = \frac{1}{2}mv.v$ .....(1)

From equation (1) it is clear that K.E. is the dot product of velocities. So K.E. is not a vector quantity but a scalar quantity.

Q.5 What happened to K.E. of a bullet when it penetrates into a target?

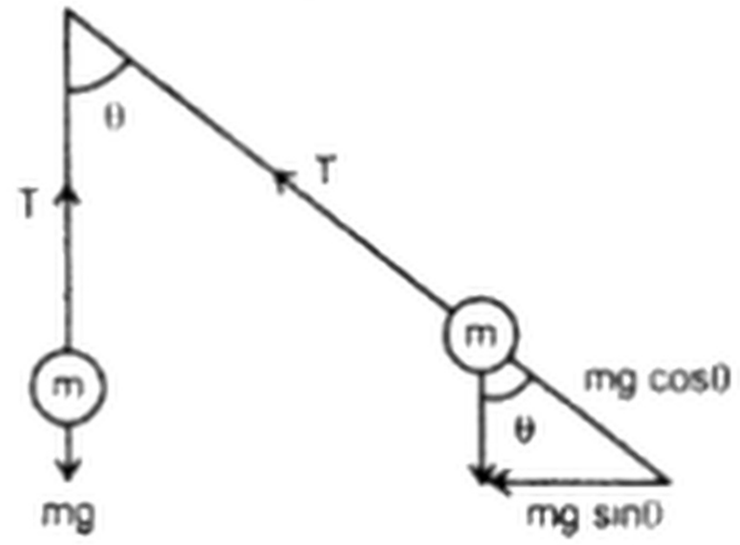
Answer

When bullet penetrates into the target some of K.E. of the bullet is utilized to distort the target material, remaining is converted into sound & heat energies.

Q.6 Does tension in the string of a swinging pendulum do any work? Explain.

Answer

Consider a swinging pendulum as shown in fig. let the bob of the pendulum is at extreme position



Resolving weight into components. From fig. it is clear that tension balances mg cosθ component

i.e.

$$T = mg\cos\theta$$

$$T - mg\cos\theta = 0 \qquad \text{.....(1)}$$

Since resulted force is zero so tension in the string of a swinging pendulum does not do any work at any point.

Q.7 A meteor when enters into the earth's atmosphere burns. What happens to its energy?

Answer

When a meteor enters into the earth's atmosphere. It burns, this increase the internal energy of the atmosphere.

Q.8 What type of energy is stored in the spring of watch?

Answer

If the spring of watch is in compressed state, then it possesses elastic potential energy which is given by

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

Where K is spring constant & x is the displacement from mean position.

Q.9 A man drops a cup from a certain height which breaks into pieces. What energy changes are involved?

Answer

At height it possesses gravitational potential energy, when he drops the cup, its potential energy is changing into K.E. is converted into heat & sound energies, remaining is utilized to break the cup into pieces.

Q.10 A man rowing boat upstream is at rest with respect to share, is he doing work?

Answer

When the man rowing boat upstream, certainly he is doing work against the flow force of water. But total work is zero because both forces (the force of man and water) balances each other. Also, boat is at rest, so from stand point of work i.e. W = Fd

Since

$$D = 0$$

So $W_1 = 0$

Q.11 Why energy savers are used instead of normal bulbs? Answer

- Energy savers use 25% to 80% less energy than normal bulbs.
- Energy savers can last 3-25 times longer.
- More save in money is possible in case of energy savers.