Exercises

(6) No, the method doesn't violate the law of conserwation of energy. This is because once the body falls from a height, then, its mechanical energy changes into kinetic energy increasingly. A decrease within the mechanical energy is capable a rise in the kinetic energy of the body. Throughout, the method,

total energy of the body remains conserved. Therefore, the law of conservation of energy isn't deserved.

(a) 1 unit of energy is up to 1 B.T.U. (KWh).
1 unit = one kWh
1 KWH = 3.6×10^6 J
Therefore, 250 units of energy = $250 \times 3.6 \times 10^6$
$= 9 \times 10^8$ J.

(12) Yes, consider a uniformly moving object, Suppose an object is moving with constant rate. The web force performing on it is 0. But, there is a displacement on the motion of the article. Hence, there will be a displacement while not a force.

(14) With the help of the expression, energy consumed by an electric heater will be obtained,
P = T
Where,
Power rating of the heater,
P = 500 W = 0.5 power unit Time that the heater has operated,
T = Work done = Energy consumed by the heater.
Therefore, Energy consumed = Power × Time

$= 1.5 \times 10 = 15$ KWH.

Hence, the energy consumed by the heater in 10 h is 15 KWh.

(15) When an apparatus moves from its mean position P to either of its extreme positions A or B, it rises through a height h on top of the mean level P. At this time, the K.E. of the bob changes fully into P.E. The K.E. becomes 0, & also the bob posseses solely P.E. Because it moves towards purpose P, its P.E. decreases increasingly. Consequently, the K.E. will increase, because the bob reaches purpose P, its P.E. becomes 0 & also the bob possesses solely K.E. This method is perennial as long because the apparatus oscillates. The bob doesn't oscillate forever. It involves rest as a result of air resistance resists its motion. The apparatus loses its K.E. to beat this friction & stops once a while. The law of conservation of energy isn't decreased as a result of the energy lost by the apparatus to beat friction is gained by its surroundings. Hence, the overall energy of the apparatus & also the encompassing system stay preserved.

(16) An object with mass 'm' moving with velocity 'v' has kinetic energy of $\frac{1}{2}mv^2$. In order to bring it to rest, its velocity has to be reduced to 0, & in order to accomplish that, the K.E. has to be drained off & sent somewhere else. An external force has to absorb

energy from the object, i.e., do -ve work on it, equal to its K.E., or $-\frac{1}{2}mv^2$.

(19) Acceleration in associate object might be 0 even once many forces are working on it. This happens once all the forces get rid of one another, i.e., the online force working on the thing is 0. Hence, the acceleration of the thing is 0. Hence, Soni is correct.

(21) When the object falls freely towards the bottom, its mechanical energy decreases & K.E. will increase, because the object touches the bottom, all its mechanical energy gets reborn into K.E. Because the object hits the laborious ground, all its K.E. gets reborn into heat & sound energy. It may also deform the bottom relying upon the character of the ground & therefore, the quantity of K.E. possessed by the thing.