Group No: Name: Marks:

Energy, Power and Efficiency Worksheet

Q1.

An object of 2.0 kg mass is pulled by a force of 25 N. If the object is moved over a distance of 3 m, what is the work done?

Q2.

The figure shows a boy using a force of 300 N to move a sofa. How far did he move the object if the work done by the boy is 600 J?

Q3.

An object of 2.0 kg mass is pulled by a force of 25 N at an angle of 30^{o} from a horizontal surface. If the object is moved over a distance of 3 m, what is the work done?

Q4.

The figure shows a boy of mass 40 kg pushing a book downwards with a force of 200N. Calculate the work done by the boy.

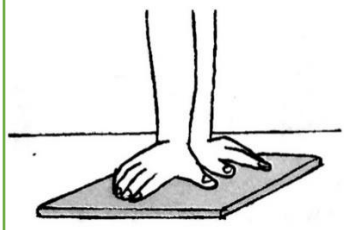

Figure 1

Q5.

Two students Lee and Bong run up a hill. Lee is 1.5 times heavier than Bong and yet both Lee and Bong manage to ascent the peak of the hill at the same time.

a) Who did the most work?
b) Who delivered the most power?

Q6.

Calculate the kinetic energy of a 20 g tennis ball travelling at 40 ms^{-1}

Q7.

A car of mass 1500 kg is travelling at a velocity of 50 ms^{-1}. Calculate the kinetic energy of the car.

Q8.

A coin of mass 20 g falls from a height of 20 m to the ground. Calculate the gain of kinetic energy when the coin is 5 m above the ground. ($g = 9.8\ ms^{-2}$)

Q9.

A boy throws a pebble vertically upwards with a speed of 15 ms^{-1}. What is the maximum height reached by the pebble? [2 potential methods of solving]

Q10.

An object of 200 g mass is thrown upwards with a velocity if 5 ms^{-1}. What is the maximum height gained by the object? (g = 10 ms^{-2})

Q11.

Find the elastic potential energy of spring if the spring constant is 2kNm^{-1}.

Q12.

The figure shows a load attached to a spring. The original length of the spring is 7 cm. Find the EPE of the spring if the spring constant is 2 kNm^{-1}.

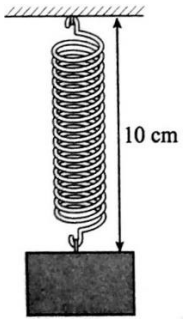

Figure 2

Q13.

A motor lifts a 3.0 kg load to a height of 2.5 m in 5s. Calculate the power output of the motor. ($g = 10\ ms^{-2}$)

Q14.

A boy of mass 50 kg climbed up a staircase of height 4 m in 5s. What is the power delivered by the boy?

Q15.

A motor rated 100 W has been operating for 150 s. If the efficiency of the motor is 75%, how much work is done by the motor?

Q16.

The cheetah is the fastest creature on land and has a output power of 800 W and an efficiency of 20%. Calculate

a) The word done by the cheetah in 10s
b) The energy input of the cheetah

Q17.

A machine with rated power 40 W operates for 15 minutes. If the efficiency of the machine is 45%, how much work is done?

Q18.

The figure shows an apple of mass 100 g hanging on a branch of a tree. The height of the apple to the ground is 4m [g = 9.8 ms^{-1}]

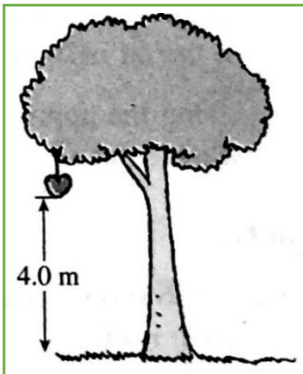

Figure 3

a) i) What kind of energy does the apple possess when hanging on the branch of the tree?
   ii) State the energy conversion that take place when the apple fall to the ground.
b) i) Calculate the KE of the apple just before it hits the ground.
   ii) What is the velocity of the apple just before it hits the ground?
c) Find the impulsive force on the apple if the apple takes 0.1 s to come to a rest completely.