

Answer **all** the questions in the spaces provided.

For  
Examiner's  
Use

1 (a) Define what is meant by

(i) *work done*,

.....  
.....  
..... [2]

(ii) *power*.

.....  
..... [1]

(b) A force  $F$  is acting on a body that is moving with velocity  $v$  in the direction of the force.

Derive an expression relating the power  $P$  dissipated by the force to  $F$  and  $v$ .

[2]

(c) A car of mass 1900 kg accelerates from rest to a speed of  $27 \text{ m s}^{-1}$  in 8.1 s.

(i) Calculate the average rate at which kinetic energy is supplied to the car during the acceleration.

rate = ..... W [2]

- (ii) The car engine provides power at a constant rate. Suggest and explain why the acceleration of the car is **not** constant.

*For  
Examiner's  
Use*

.....

.....

..... [2]

- 8 (a) Explain the concept of *work*.

.....

.....

..... [2]

- (b) A table tennis ball falls vertically through air. Fig. 8.1 shows the variation of the kinetic energy  $E_K$  of the ball with distance  $h$  fallen. The ball reaches the ground after falling through a distance  $h_0$ .

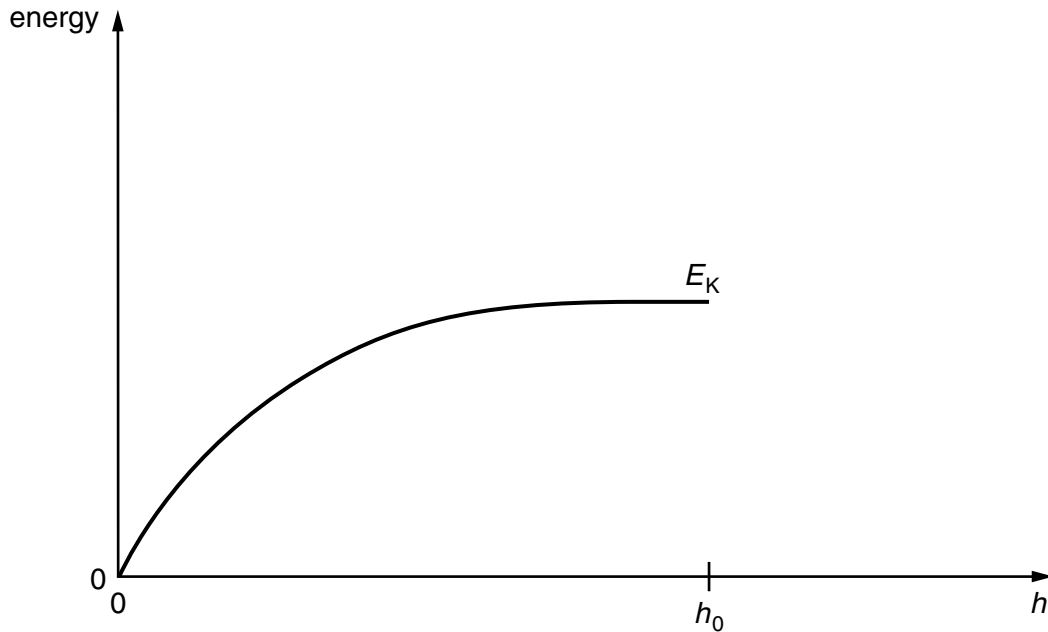


Fig. 8.1

- (i) Describe the motion of the ball.

.....

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.....

.....

..... [3]

- (ii) On Fig. 8.1, draw a line to show the variation with  $h$  of the gravitational potential energy  $E_P$  of the ball. At  $h = h_0$ , the potential energy is zero. [3]

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