4 **(a)** State what is meant by the frequency of the oscillations of an oscillating object.

.....

..... [1]

(b) An object is oscillating.

Fig. 4.1 shows the variation of the acceleration a of the object with its displacement x from the equilibrium position.

Fig. 4.2 shows the variation of the kinetic energy E_K of the object with time t.

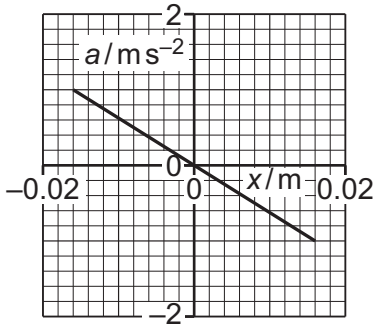

Fig. 4.1

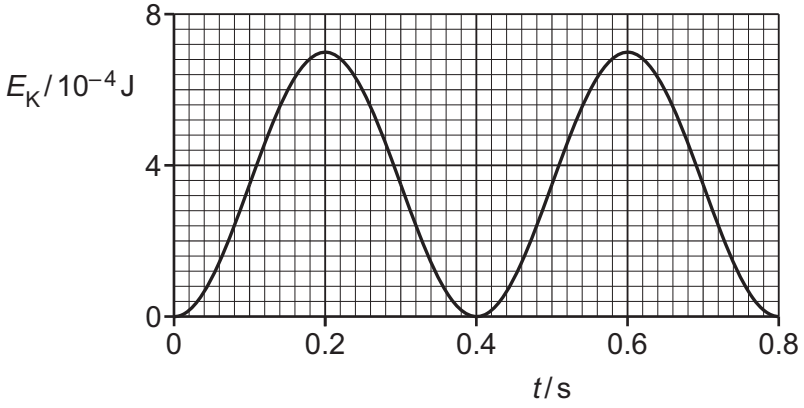

Fig. 4.2

(i) Explain how Fig. 4.2 shows that the period of the oscillations is 0.80 s.

.....

.....

..... [1]

(ii) Calculate the angular frequency ω of the oscillations.

ω = ... rad s^{-1} [2]

(iii) Apart from the period, frequency and angular frequency of the oscillations, determine **three** other conclusions about the object and its oscillations that may be drawn from Fig. 4.1 and Fig. 4.2. The conclusions may be qualitative or quantitative. Use the space below for any working.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(iv) Describe the interchange between kinetic energy and potential energy during the oscillations. Numerical values are **not** required.

.....

.....

.....

.....

..... [3]

[Total: 10]