

A Level Physics A
H556/01 Modelling physics

Question Set 26

1

A substance can exist as a crystalline solid, a liquid or a gas.
A solid sample of the substance is placed in a sealed container and heated at a constant rate until it changes into a gas.

Fig. 21 shows the variation with time t of the temperature θ for the substance.

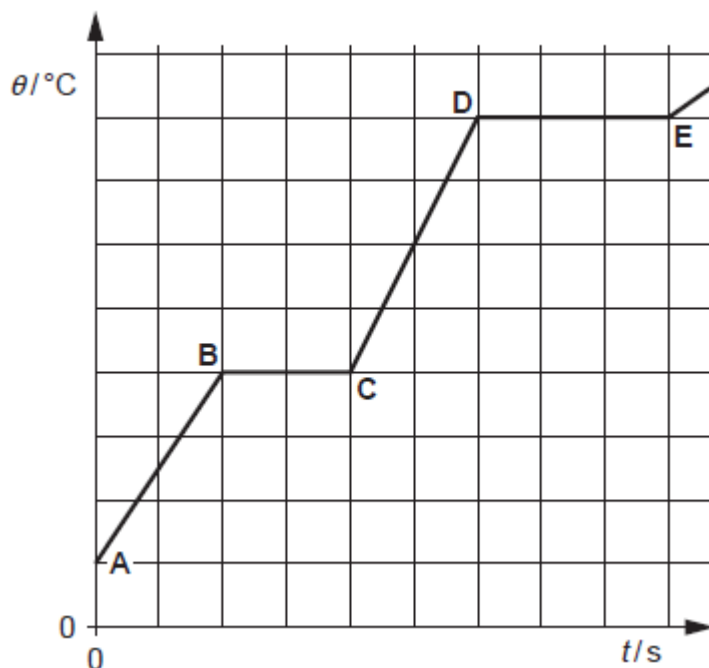


Fig. 21

- (a) Use the kinetic theory of matter to describe the solid phase (section **AB**) and the liquid phase (section **CD**) in terms of the motion and arrangement of the molecules of the substance.

Section **AB**:

.....

Section **CD**:

.....

[4]

- (b) Use Fig. 21 to explain how the specific heat capacity of the liquid compares with the specific heat capacity of the solid.

[2]

- (c) State what is meant by the **internal energy** of the substance.

[1]

(d) Beyond the point **E** in Fig. 21, the substance behaves as an ideal gas.

(i) The mass of a gas molecule is 4.8×10^{-26} kg.
Calculate the root mean square speed of the gas molecules at a temperature of 250°C .

root mean square speed = m s^{-1} [3]

(ii) Calculate the internal energy of 1.3 moles of the gas at 250°C .

internal energy = J [3]

Total Marks for Question Set 26: 13

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