A Level · OCR · Physics

6 mins 6 questions

Multiple Choice Questions

Thermal Properties of Materials

Thermal Equilibrium / Measurement of Temperature / Solids, Liquids & Gases / Brownian Motion / Internal Energy / Specific Heat Capacity / Specific Latent Heat

Easy (2 questions)	/2
Medium (4 questions)	/4
Total Marks	**/6**

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Easy Questions

1 The freezing point of ethanol is 159 K.

What is 159 K in °C?

A. – 432 °C

B. – 114 °C

C. 114 °C

D. 432 °C

(1 mark)

2 A solid molecular substance is supplied with energy and it starts to melt.

Which of the following pairs of quantities remains the same as the substance melts?

A. Kinetic energy of molecules and internal energy of molecules.

B. Potential energy of molecules and internal energy of molecules.

C. Kinetic energy of molecules and temperature of substance.

D. Potential energy of molecules and temperature of substance.

(1 mark)

Medium Questions

1 A metal block of mass 0.28 kg has an initial temperature of 82°C. It is dropped into cold water. The temperature of the block after 1.2 minutes is 20°C. The specific heat capacity of the metal is 130 J $kg^{-1}K^{-1}$.

What is the average thermal power transferred away from the metal block?

A. 31 W

B. 41 W

C. 1900 W

D. 2700 W

(1 mark)

2 The latent heat of vaporisation of a liquid is 2300 kJ kg^{-1} and it has a molar mass of 0.018 kg mol^{-1}. What is the energy required to change 30 moles of the liquid to gas?

A. 4.1×10^4 J

B. 1.2×10^6 J

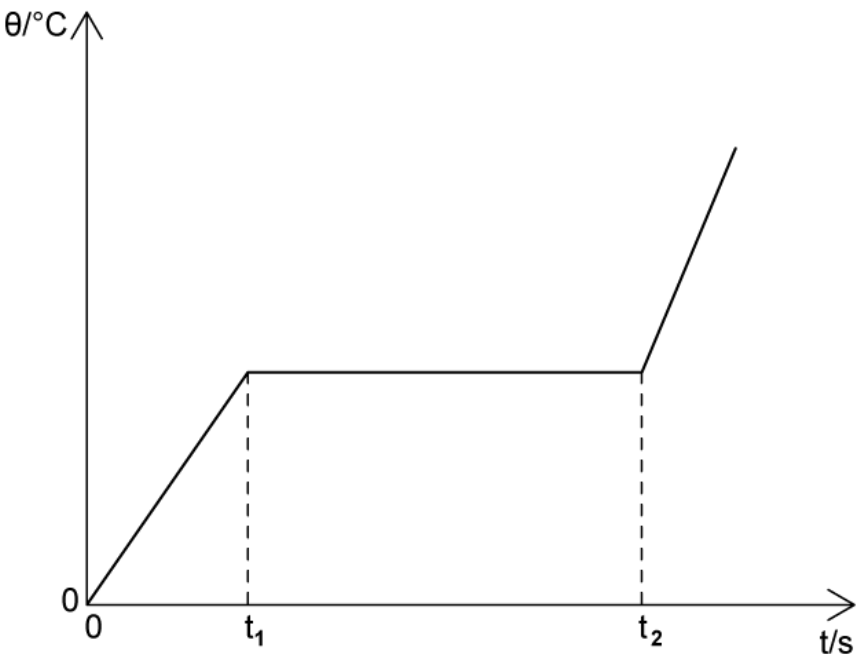
C. 6.9×10^7 J

D. 3.8×10^9 J

(1 mark)

3 A solid material is heated at a constant rate of *P* W.

The graph below shows how the temperature of the material θ varies with time t as the solid melts to become a liquid.



Which of the following statements is correct?

A. The internal energy is constant whilst the substance changes state.

B. The kinetic energy of the molecules increases whilst the substance changes state.

C. The specific heat capacity of the material in liquid state is higher than the specific heat capacity of the material in solid state.

D. The latent heat of fusion of the substance is given by $P(t_2 - t_1)$.

(1 mark)

4 A kettle of power 2.1 kW is filled with 3.0 kg water at a temperature of 25 ^{o}C

The kettle is switched on.

The specific heat capacity of water is 4200 $Jkg^{-1}K^{-1}$.

The specific latent heat of vaporisation of water is 2.3 x 10^{6} Jkg^{-1}.

What is the minimum time required to turn all the water into steam?

A. 55 minutes

B. 57 minutes

C. 62 minutes

D. 65 minutes

(1 mark)