



8 (a) State the meaning of the following terms associated with wave motion, using labelled diagrams where useful.

(i) *frequency* of a wave

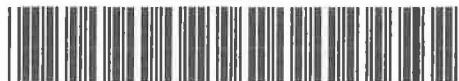
.....
.....[1]

(ii) *diffraction* of a wave

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

(iii) *superposition* of two waves

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.....[2]



(iv) *stationary waves*

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.....

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..... [3]



- [8]



(c) The speed of sound in air varies with temperature. It is given by the equation

$$c = \sqrt{\frac{kT}{M}}$$

where c is the speed of sound in air,
 k is a constant which has the value $11.6 \text{ J mol}^{-1} \text{ K}^{-1}$,
 T is the absolute temperature and
 M is the molar mass and for air is $0.0288 \text{ kg mol}^{-1}$.

(i) Calculate the value of c for air at a temperature of 25°C .

(Absolute temperature $T = \text{temperature in Celsius} + 273$)

$c = \dots\dots\dots \text{ms}^{-1}$ [2]

(ii) Show that the unit of c is the same as the unit of $\sqrt{\frac{kT}{M}}$.

[2]

[Total: 20]

