## Section A

1. A wave travels at 5 $ms^{-1}$ for 2 s.
   What distance does the wave travel?

## Section B

1. What is the wave equation?

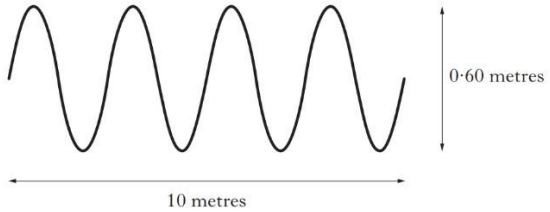
2. State what each letter stands for and the units of each letter.

3. Rearrange the equation for frequency.

4. Rearrange the equation for wavelength.

## Section C

1. A wave is shown below.

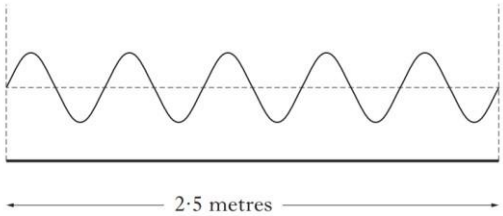



The wave is observed to travel this distance in 5s.
Which row of the table correctly shows the velocity, frequency and wavelength of the wave?

| | Velocity ($ms^{-1}$) | Frequency (Hz) | Wavelength (m) |
|---|---|---|---|
| A. | 2·0 | 1·25 | 1·25 |
| B. | 0·5 | 0·8 | 0·3 |
| C. | 2·0 | 0·8 | 2·5 |
| D. | 0·5 | 1·25 | 2·5 |
| E. | 2·0 | 0·8 | 1·25 |

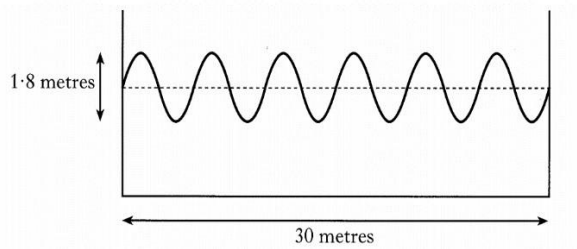
2. A wave travels at 15 $ms^{-1}$ with an amplitude of 0.25m and a frequency of 3 Hz.
   The wavelength of this wave is
   A. 0.5 m
   B. 3.75 m
   C. 5 m
   D. 45 m
   E. 60 m

3. A 2·5 metre section of the pond is shown.
   Water waves are produced on the pond.




The frequency of the waves is 2 Hz.
The velocity of the wave is
   A. 1.25 $ms^{-1}$
   B. 1 $ms^{-1}$ C. 4 $ms^{-1}$
   D. 5 $ms^{-1}$
   E. 10 $ms^{-1}$

4. A wave from a lab wave tank is shown below.
   The wave travels at 2·5 $ms^{-1}$.



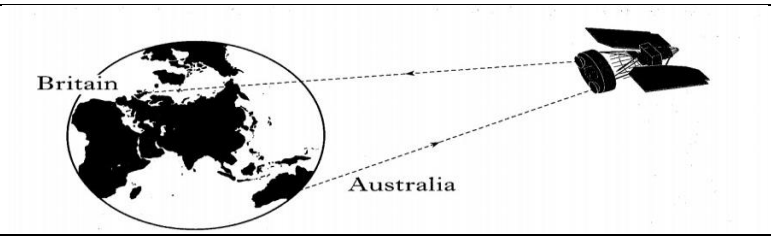
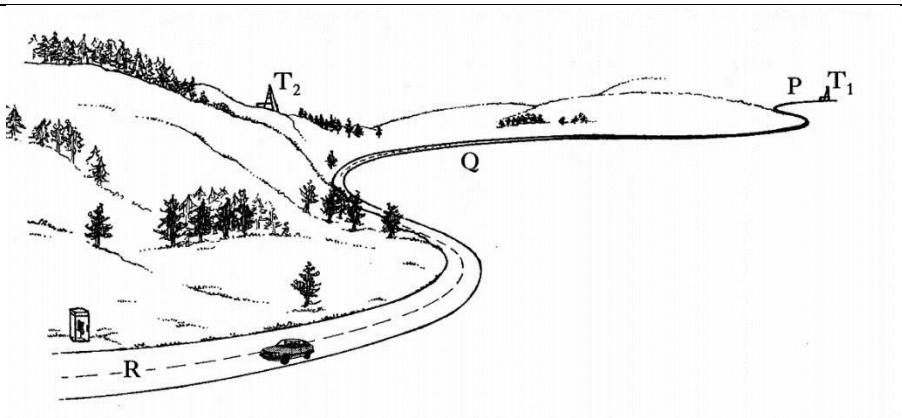

The frequency of the wave is
   A. 0.25 Hz
   B. 0.5 Hz
   C. 1 Hz
   D. 6 Hz
   E. 12 Hz

5. Electrical signals are sent at a speed of $2.8 \times 10^8$ $ms^{-1}$ and with a frequency of 50 Hz.

   The UK mains supply is 230 V.

   A. 100 m
   B. $11.5 \times 10^3$ m
   C. $5.6 \times 10^6$ m
   D. $14 \times 10^9$ m
   E. $64.4 \times 10^9$ m

## Section D

| | | |
|---|---|---|
| 1. | Radio signals from Australia are transmitted to Britain. The signals ae sent at a frequency of 6 GHz to a satellite which is in geostationary orbit.<br>Radio signals travel at the speed of light ( $3 \times 10^8$ $ms^{-1}$ ). | |
| |  | |
| | Calculate the wavelength of the signals which are sent to the satellite. | **3** |
| | | |
| 2. | A car with inbuilt calling receives a phone call while travelling along a road.<br>When the car is at point P in the diagram below, the call is sent from a nearby transmitter $T_1$. Microwaves are sent at the speed of light ( $3 \times 10^8$ $ms^{-1}$ ). | |
| |  | |
| | a) Calculate the wavelength of the microwave which is used to transmit the call. | **3** |
| | b) Further along the road at position R, there is a complete loss of signal to and the call cuts out.<br>Using your knowledge of Physics suggest why this could have happened. | **3** |