SECTION 2 — 110 marks

Attempt ALL questions

1. A student is on a stationary train.

The train now accelerates along a straight level track.

The student uses an app on a phone to measure the acceleration of the train.

(a) The train accelerates uniformly at $0{\cdot}32\ m\ s^{-2}$ for 25 seconds.

(i) State what is meant by *an acceleration of $0{\cdot}32\ m\ s^{-2}$*. **1**

(ii) Calculate the distance travelled by the train in the 25 seconds. **3**

Space for working and answer

MARKS

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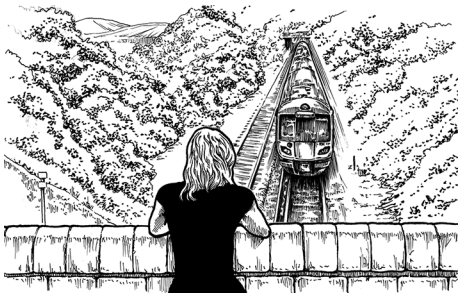
(b) Later in the journey, the train is travelling at a constant speed as it approaches a bridge.



A horn on the train emits sound of frequency 270 Hz.

The frequency of the sound heard by a person standing on the bridge is 290 Hz.

The speed of sound in air is 340 m s^{-1}.

(i) Calculate the speed of the train. **3**

Space for working and answer

(ii) The train continues to sound its horn as it passes under the bridge.

Explain why the frequency of the sound heard by the person standing on the bridge decreases as the train passes under the bridge and then moves away.

You may wish to use a diagram. **1**