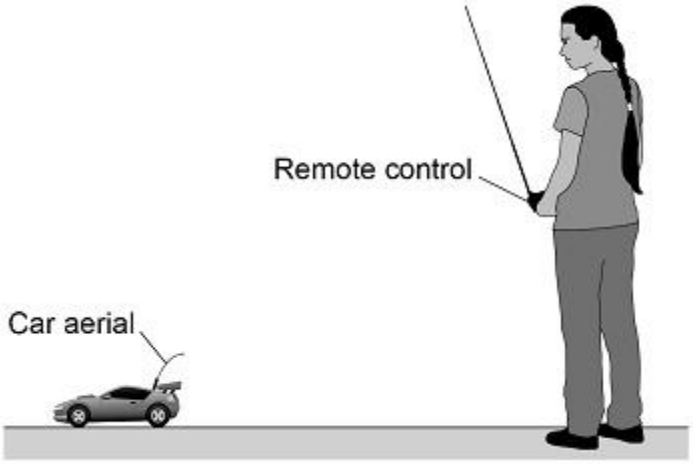
Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

The image below shows a student playing with a remote-controlled car.



(a) The remote control transmits radio waves to the car aerial.

The transmitted radio waves have a frequency of 320 MHz.

speed of radio waves = 3.0×10^8 m/s

Calculate the wavelength of the radio waves.

Give the unit.

_____

_____

_____

_____

_____

_____

_____

_____

Wavelength = _____ Unit _____

(5)

(b) The car aerial is connected to an electrical circuit in the car.

Describe what happens in the electrical circuit when the car aerial absorbs radio waves.

_____

_____

_____

_____

_____

(2)

(c) The car produces sound waves.

Give **two** ways in which radio waves are different to sound waves.

1 _____

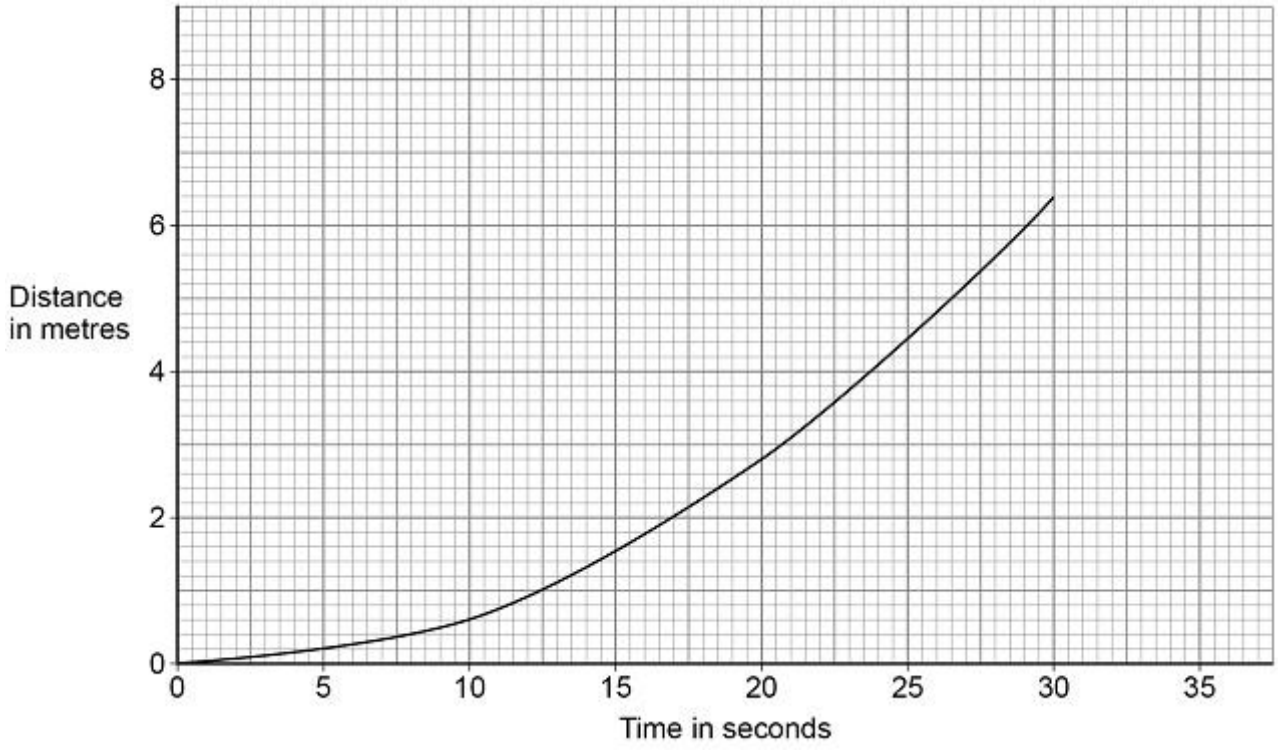
_____

2 _____

_____

(2)

The graph below shows the distance-time graph for the first 30 seconds of the car's motion.



(d) Describe the motion of the car during the first 30 seconds.

_____

(1)

(e) Determine the speed of the car 20 seconds after it started to move.

Speed = _____ m/s

(4)

(f) A different car accelerated from 0.12 m/s to 0.52 m/s.

The acceleration of the car was 0.040 m/s^2.

The work done to accelerate the car was 0.48 J.

Calculate the resultant force needed to accelerate the car.

Resultant force = _____ N

(6)

(g) Explain why the car has a maximum speed.

_____

_____

(4)
(Total 24 marks)