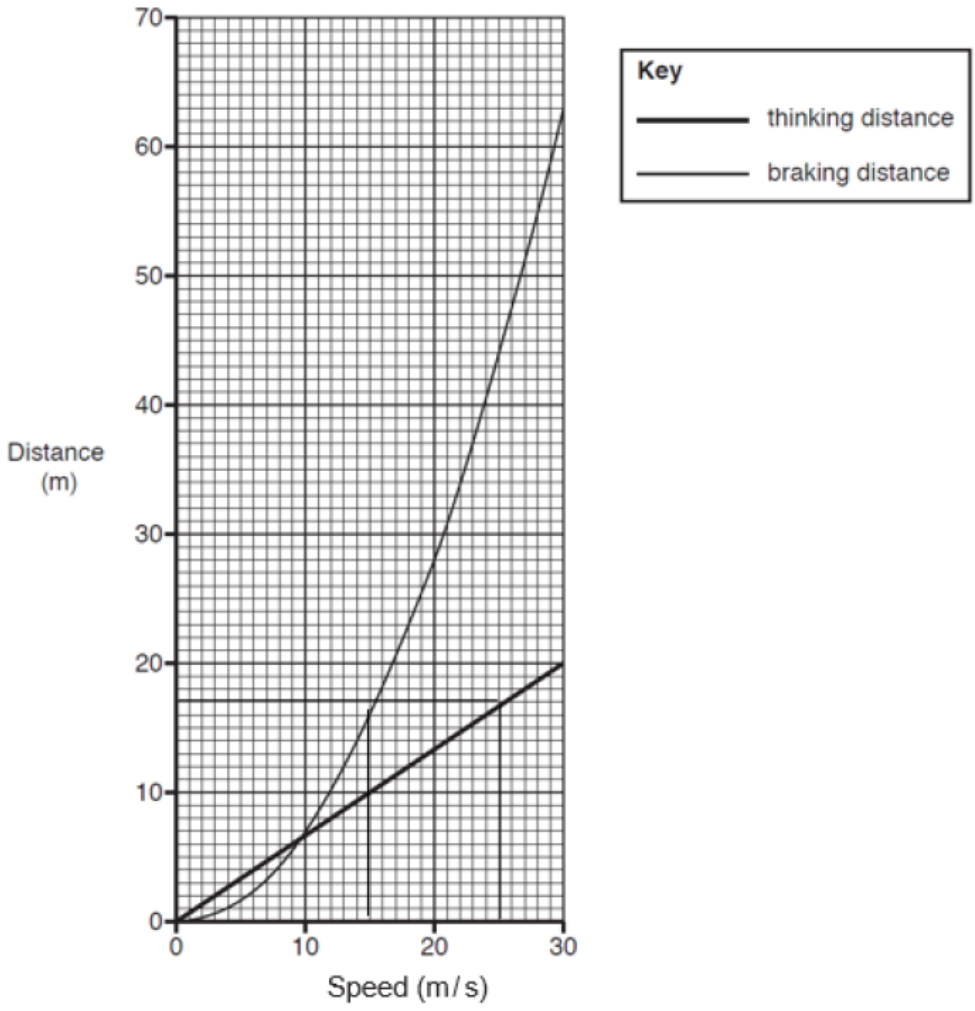
Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/02 Physics A P5-P8 and P9 (Foundation Tier)

Question Set 18

1 The graph shows thinking and braking distances for a car at different speeds.



(a) Describe how **thinking distance** varies with increasing speed.

Use data from the graph in your answer. **[2]**

Thinking distance and speed are directly proportional, For every increase in speed of 1 m/s the thinking distance increases by $\frac{2}{3}$ m

(b) **(i)** Use the graph to find the **thinking distance** at 24 m/s.

Thinking distance = 17 m

[1]

(ii) Calculate the **thinking time** at 24 m/s.

Use your answer to **(b)(i)** and the equation: distance travelled = speed × time

Give your answer to **2** decimal places.

$s = d/t$

$t = d/s = \frac{17}{24} = 0.71$

Thinking time = 0.71 s

[3]

(c) **(i)** State **one** factor that could **increase** thinking distance.

Alcohol consumption.

[1]

(ii) Calculate the **stopping distance** at 15 m / s.

Use the graph to help you.

10 + 16 = 26

Stopping distance = ...26..... m

[2]

(d) How does the speed affect the **kinetic energy** and **braking distance** of the car?

Use the graph in your answer.

Doubling speed, quadruples the kinetic energy and quadruples the braking distance. because $KE = \frac{1}{2}mv^2$

At speed = 15 m/s, braking distance = 16 m, at speed = 30 m/s braking distance = 63 m

[3]

Total Marks for Question Set 18: 12

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