

QUESTION 26 (4 marks)

The bright and dark bands are due to interference between the two sources of light, which are created as the laser travels and diffracts through the two narrow slits.

[1 mark]

When the path difference between the slits is an integer multiple of the wavelength, constructive interference results and a bright band is formed

(maximum-intensity antinode).

[1 mark]

When the path difference between the slits is a half-integer multiple (for example, 0.5λ , 1.5λ , ...) of the wavelength, destructive interference results and a dark band is formed (minimum-intensity node).

[1 mark]

Diffraction, interference and superposition are all wave-only in nature.

[1 mark]

QUESTION 27 (3 marks)

$$F_{\text{net}} = ma$$

$$mg \sin \theta - f = ma$$

[1 mark]

$$100.0 \times 9.8 \sin 25.0 - 140.0 = 100.0a$$

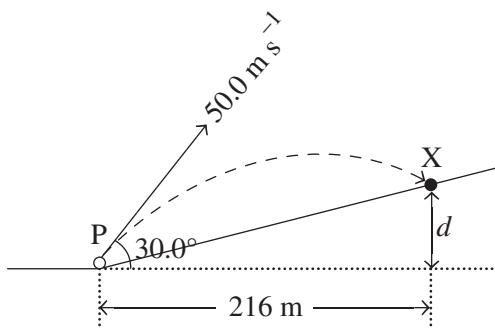
[1 mark]

$$a = 2.7 \text{ m s}^{-2}$$

[1 mark]

QUESTION 2 (8 marks)

A golfer hits a golf ball at point P as shown on the diagram below, which is on a fairway that is sloping upwards away from the golfer. The golfer hits the ball at a speed of 50.0 m s^{-1} and at an angle of 30.0° to the horizontal. The ball lands at point X, a horizontal launch plane 216 m away from point P. Point X is a distance (d) vertically above the launch plane. Air resistance is negligible.



- a) Calculate the time taken by the golf ball to reach point X. Show your working. [2 marks]

Time taken = _____ s (to 2 decimal places)
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