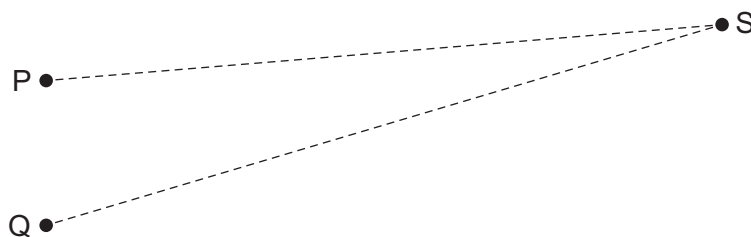**28** Two sources of microwaves P and Q produce coherent waves with a phase difference of 180°. The waves have the same wavelength λ.

At the point S there is a minimum in the interference pattern produced by waves from the two sources. The distance (QS – PS) is called the path difference.

Which expression could represent the path difference?

A $\dfrac{\lambda}{4}$ **B** $\dfrac{\lambda}{2}$ **C** λ **D** $\dfrac{3\lambda}{2}$

29 A beam of red laser light of wavelength 633 nm is incident normally on a diffraction grating with 600 lines per mm.
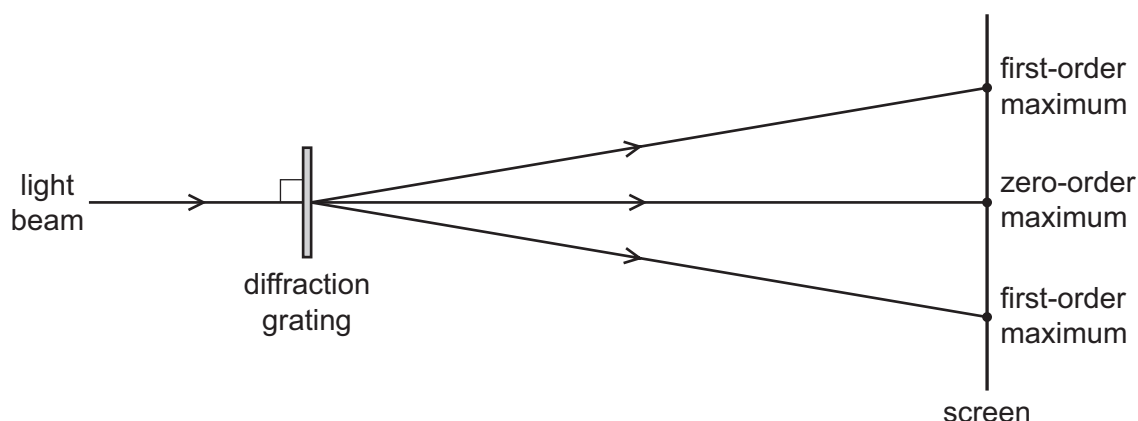
The beam of red light is now replaced by a beam of blue laser light of wavelength 445 nm. A replacement diffraction grating is used so that the first-order maximum of the blue light appears at the same position on the screen as the first-order maximum of the red light from the original laser.

How many lines per mm are there in the replacement diffraction grating?

A 420 mm^{-1} **B** 470 mm^{-1} **C** 600 mm^{-1} **D** 850 mm^{-1}