

**30** A beam of light of a single wavelength is incident normally on a diffraction grating.

The angle of diffraction  $\theta$  is measured for each order of diffraction  $n$ . The distance between adjacent slits in the diffraction grating is  $d$ .

A graph is plotted to determine the wavelength of the light.

Which graph should be plotted and how is the wavelength determined from the graph?

|          | $y$ -axis     | $x$ -axis       | wavelength   |
|----------|---------------|-----------------|--------------|
| <b>A</b> | $n$           | $d \sin \theta$ | gradient     |
| <b>B</b> | $n$           | $d \sin \theta$ | 1 / gradient |
| <b>C</b> | $\sin \theta$ | $d / n$         | gradient     |
| <b>D</b> | $\sin \theta$ | $d \times n$    | 1 / gradient |

**31** A parallel beam of light of wavelength  $600 \text{ nm}$  is incident normally on a diffraction grating. The distance between adjacent slits in the grating is  $2.0 \times 10^{-3} \text{ m}$ . Calculate the angle of diffraction for the first order maximum.