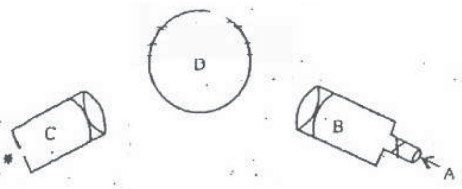
3. Figure shows a spectrometer arrangement where S is a source of monochromatic light.



(a) Label the components A, B, C and D.

A : B :

C : D :

(b) What are the adjustments which have to be made before using the spectrometer for any measurement ? (Detailed adjustment procedures are not required).

(one line each for A, B, C, D)

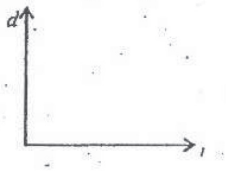
(c) State what experimental steps you would follow in order to measure the angle of deviation produced by a prism.

(1) *(one line)* (2) *(2 lines)*

(d) Describe briefly how you would experimentally identify the minimum deviation position produced by the prism. *(3 lines)*

(e) At the minimum deviation position, the scale reading of the spectrometer is $3^0\ 16'$. If the scale reading of the spectrometer when C and B are kept along the same line is $223^0\ 46'$, Calculate the angle of minimum deviation. *(2 lines)*

(f) Draw a rough sketch to show the variation of angle of deviation d with the angle of incidence i.



(g)

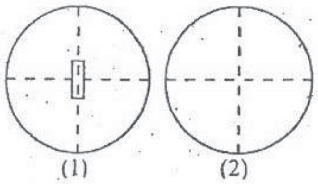


Figure (1) shows the image of the slit observed through the prism when the light source S is a sodium lamp emitting yellow light. If the light source is replaced by another source without changing the settings. four different images of the slit due to the colours yellow, blue red and green are observed.

(i) Draw the relative positions of the images due to the four colours on the figure (2) and label them.

(ii) If you use a white light source for S what would you observe through B ? *(one line)*