

2010 A/L Structured Essay Question No (03)

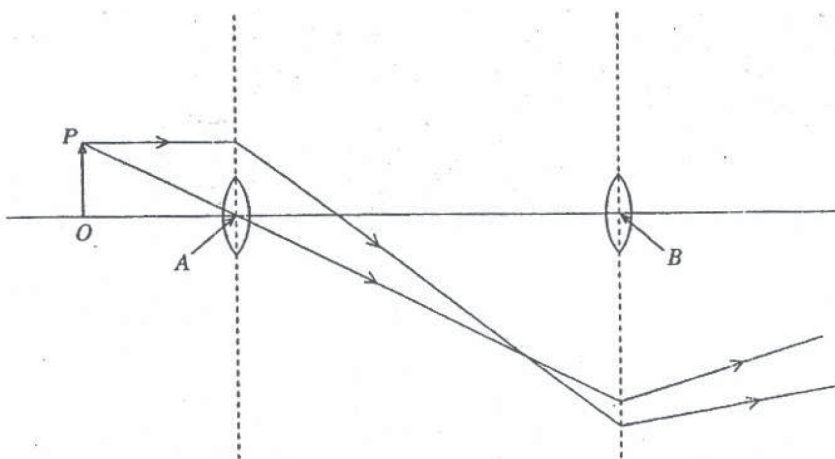


Figure 1

Figure 1 shows the paths of two rays from the object  $OP$  placed in front of a compound microscope at normal adjustment. The least distance of distinct vision of the observer is 25 cm.

- (a) Draw the image formed by the objective lens on the diagram and label it as  $O'P'$ .
- (b) Draw the final image formed by the microscope and label it as  $O''P''$ .
- (c) (i) Mark the location ( $F_1$ ) of the focus of the objective lens on the object side.
- (ii) What is the reason for selecting the object distance in such a way as shown in the figure?

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(d) Assume that the eye is kept very close to the eyepiece. The focal length of the eyepiece is 5 cm.

- (i) What should be the distance to the final image from the eyepiece ( $BO''$ )?
- (ii) Calculate the object distance ( $BO'$ ) to the eyepiece.

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(iii) A student argues that, if the eyepiece is moved together with the eye towards  $O'P'$  the final image should be closer to the observer and larger. But the student says that when he does that, the image gets blurred.

- (1) Why does the image get blurred?

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- (2) Is the student's argument correct?

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(e) Give a reason for selecting an objective lens of short focal length in the compound microscope.

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- (f) Figure 2 shows the way a square ruled paper can be seen when a **simple microscope** is placed close to it. What is the magnifying power of the lens?

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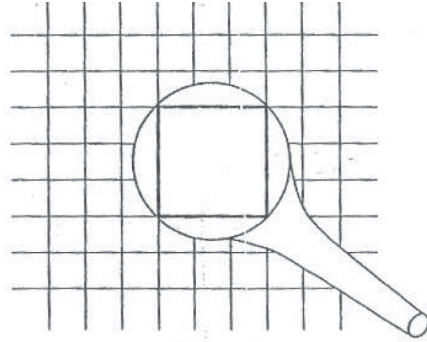


Figure 2