

Worshipful Company of Spectacle Makers

Level 4 Year 1 Diploma for Optical Technicians



Unit 3: Properties of Ophthalmic Lenses

Summer 2018

Duration: 2.5 hours

Candidate Number:

Date:

Answer ALL Questions

Number of Supplementary Sheets used (if any), including graph paper.

For office use only

| Question number | Questions | | | | | Total | |
|-----------------|-----------|---|---|---|---|-------|---|
| | 1 | 2 | 3 | 4 | 5 | Marks | % |
| Marks | | | | | | | |
| Moderated | | | | | | | |

Examiner's signature

Moderator's signature

This booklet is the property of the WCSM and **must not be removed** by the candidate from the examination room.

This page
has been
left blank.

Question 1

Examiner's
use only

| | |
|--|------------------|
| Q1a) How is the term Sagitta used in the optical industry? | (8 marks) |
|--|------------------|

| | |
|--|-------------------|
| Q1b) Given $n=1.6$, $F_1=+4.00D$ and a lens diameter of 60mm . Calculate the accurate sag . | (12 marks) |
|--|-------------------|

Question 2

| | | |
|-------------|---|------------------|
| Q2a) | State Prentice's rule and what the different parts of the formula are. | (4 marks) |
|-------------|---|------------------|

Question 3

Examiner's
use only

| | | |
|-------------|--|------------------|
| Q3a) | What handheld instrument can measure the surface power of a lens? | (2 marks) |
|-------------|--|------------------|

.....

.....

.....

| | | |
|-------------|------------------------------------|------------------|
| Q3b) | Briefly describe how this is used? | (8 marks) |
|-------------|------------------------------------|------------------|

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

| | | |
|-------------|---|------------------|
| Q3c) | What handheld tool can be used to measure lens thickness ? | (2 marks) |
|-------------|---|------------------|

.....

.....

.....

| | | |
|-------------|------------------------|------------------|
| Q3d) | How is this tool used? | (8 marks) |
|-------------|------------------------|------------------|

Examiner's
use only

Question 4

| | | |
|-------------|--|-------------------|
| Q4a) | Find the focal lengths (in cm) and the forms of the following thin lenses. i) $r_1 = +200\text{mm}$ $r_2 = -400\text{mm}$ $n=1.6$ ii) $r_1 = +240\text{mm}$ $r_2 = +100\text{mm}$ $n=1.5$ iii) $r_1 = +104.6\text{mm}$ $r_2 = +400\text{mm}$ $n=1.523$ | (15 marks) |
|-------------|--|-------------------|

Area for handwritten answers, consisting of numerous horizontal lines.

| | | |
|-------------|---|------------------|
| Q5b) | Which of these forms gives the principal powers of the lens? | (2 marks) |
|-------------|---|------------------|

Area for handwritten answers for question Q5b, consisting of several horizontal lines.

End of questions for this paper

This page
has been
left blank.

DO NOT TURN THIS PAPER OVER UNTIL ADVISED TO DO SO BY THE INVIGILATOR

Important Instructions for Candidates

Please read carefully and follow these instructions when told do so by the Examiner/Invigilator.

1. Before you start to answer any question, take a few minutes to read through the paper.
2. Please ensure your candidate number and date are in the boxes on the front cover of this booklet.
3. Please **DO NOT** write your name on this booklet. Candidates must remain anonymous for marking purposes.
4. Write your answers as clearly as you can, using a black/blue pen only. Do not use a pencil. If the examiner cannot read your writing or figures you may lose marks, or even receive no marks at all. **Pencils may only be used for graphs and diagrams.**
5. You should read each question carefully, and make sure that you know what you have to do before you start to answer.
6. You must write your answers in the space provided. Additional paper may be used if necessary, but you must show your candidate number and the question number at the top of each sheet; not your name. You must also annotate the box on the front cover of this booklet to show how many extra sheets you used.
7. Please do not write in the margins.
8. Make sure your diagrams are as clear and neat as possible; you will get marks for doing so. If you need to draw a graph, use as large a scale as practicable; this will give the most accurate answer.
9. When answering mathematical questions, write **ALL YOUR CALCULATIONS IN FULL**. Even if you get the final answer wrong, you may get credit for the parts of the calculation that are correct.
10. After you have completed each answer, re-read the question to make sure you have answered it fully.
11. Try to leave yourself enough time to check the completed paper through before handing it in.
12. Do not tear out any part of this booklet. All work must be handed in.
13. Before handing your paper in, ensure your Candidate number is entered clearly on the front of this booklet and on any extra sheets you may have used.
14. Attach any sheets to this booklet and annotate how many there are in the box on the front of this booklet.

When told to do so by the Invigilator, you may turn the paper over and begin