Dear Colleague

Thank you for your enquiry concerning the College's Part 1 Fellowship (FRCOphth) Examination.

Please find enclosed information concerning:

Registration Information
Admission Procedure
Guidance for diagnostic assessment candidates with additional requirements and specific learning difficulties
Candidate code of conduct
Policy on Allegations of Cheating in Examinations
Appeals Procedure
Language Requirements
Preparing for Examinations
Examination Timetable
Examination Structure
Standard Setting
Examination Syllabus
Reading List

Candidates must hold a medical qualification approved by the General Medical Council of the United Kingdom (GMC) or of Ireland for the purpose of registration.

Please note candidates are required to submit an attested copy of their medical degree in evidence of their eligibility to sit this examination. Medical degree certificates may be attested by a Fellow of *this* College or your embassy, a solicitor or the university issuing the certificate. Candidates who are registered with the General Medical Council (GMC) are not required to submit an attested copy of their medical degree but should include their GMC number in the appropriate place on the application form for verification and candidates with the Irish Medical Council (IMC) should do the same with their IMC number.

No previous experience in ophthalmology is necessary for candidates to sit the Part 1 FRCOphth, but trainees in ophthalmic specialist training are required to pass this examination before they enter into the **third** year specialist training. Please note that as of 1 August 2013, candidates are permitted a maximum of six attempts in which to pass this examination. Examination attempts prior to August 2013 do not count towards the number of attempts available.

The structure of this examination is based on learning outcomes from the first two years of training of the Curriculum for Ophthalmic Specialist Training. This curriculum is only available in web-based format at: http://curriculum.rcophth.ac.uk. The syllabus is assessed by written examination.

The above information has been agreed by the Council of The Royal College of Ophthalmologists.

This information is subject to variation at the discretion of the Council.

Yours sincerely

Dylan Costello
Head of the Examinations Department

REGISTRATION INFORMATION

Candidates wishing to confirm the eligibility of their medical degree for the purpose of registration with the General Medical Council may do so by the following means:

You can access the World Directory of Medical Schools at the below link:

https://search.wdoms.org/

Candidates are required to submit an attested copy of their medical degree or details of their GMC registration in evidence of their eligibility to sit this examination.

How do I book the exam?

Booking the exam will depend on whether you are already an RCOphth member or previous exam applicant - or whether you are a first-time exam applicant:

- If you are already an RCOphth member with an online log in, you can book your exam here.
- If you have not registered with us previously, are sitting one of our exams for the very first time or are an overseas candidate you must instead use this Online Part 1 Exam Application Form

All candidates must hold a medical qualification approved by the General Medical Council of the United Kingdom (GMC) or Ireland (IMC) before registering.

Once the closing date for entries has passed, the candidate will receive a confirmation email from the College which will contain the following information:

- Confirmation of their exam place
- Their candidate ID number
- Their exam date and time slot based on their location in the world
- ID requirements and computer requirements in order to take the exam
- A link to practice questions on the RCOphth exams website
- Notes on what candidates can expect on the examination day
- The examination rules and regulations

Overseas Candidates

If you have an overseas medical qualification and you are not registered with the GMC already, you must register for the exam via this Online Part 1 Exam Application Form.

You must do this the first time you want to book an exam. As part of the online application form, you must upload an *attested* copy of your certificate which will then be verified and approved by the exams team before you can finalise registration and payment for the exam.

DO NOT submit any attested documents via email, they must only be uploaded via the Online Part 1 Exam Application Form.

Candidates with GMC registration or those on an official OST programme

If you don't currently have an online account you must follow the instructions to create an account. All applications to sit exams are assessed by the Exams department. Once your eligibility has been assessed you will be emailed to confirm if your place has been reserved to sit the exam.

Regulations

The following notes on the regulations concerning applications for admission to the examinations are published for the guidance of candidates:

1. Completed applications for admission to an examination must reach the Examinations Department **no later than 5.00pm on the closing date**, namely approximately **eight weeks** before the exam is held. It is not possible to accept applications received after the closing date.

2. The application forms must be accompanied by **the fee** and **such certification as is required by the regulations**. If you cannot supply all the relevant certification **you must contact the Examinations Department or supply a covering letter as to the reasons why**. All outstanding certification must be received **BEFORE the closing date**, otherwise the candidate will be withdrawn from the examination and forfeit their examination fee. Applications submitted without the required fee will not be accepted.

3. Upon receipt of application the Examinations Department will send all candidates a written receipt. Detailed instructions including written and clinical examination dates will be dispatched to all candidates within ten days after the closing date for receipt of applications.

4. Applicants wishing to withdraw their entry for an examination must notify the Examinations Department in writing by 5.00pm on the closing date for receipt of applications. Fees cannot be refunded or transferred after this time.

5. Applicants must apply for entry visas for the United Kingdom in good time prior to the date of the examination. In exceptional circumstances, if written evidence of the refusal of a visa is provided, the Examinations Committee will consider requests for candidates to withdraw their examination entry, subject to the receipt of a 20% administration charge.

6. Candidates unable to attend an examination will forfeit their examination fee. In exceptional circumstances, the Examinations Committee will consider requests to withdraw a candidate's entry from the examination sitting subject to receipt of written supplementary evidence (e.g. a detailed medical certificate, a death certificate for a close family member) and subject to a 20% administration charge. Please note that lack of preparation is not considered a suitable reason to withdraw from an examination.

7. If a candidate cancels their examination within 4 working days of the examination, with the evidence provided as in point 6 above, the 20% administration charge will apply + a 50.00 GBP late cancellation fee levied by the proctoring provider.

8. If a candidate fails to turn up for their examination, they will lose 100% of their exam fee.

9. All candidates will receive feedback regarding their individual performance in the examinations.

10. Results are sent via email with the Pass List being displayed on the College Website. Results are only released upon approval of the Senior Examiner. We regret that examination results are not available by telephone.

Written Examination Procedures

The Part 1 FRCOphth examination is taken as an Online Proctored Examination, where the candidate sits the exam at their home or their workplace, without the need to travel to a testing centre or examination venue. The examination will be taken online by being delivered over the internet to the candidate's computer at a pre-agreed examination date and time.

Both Paper 1 (MCQ) and Paper 2 (MCQ) will take place on the same day with a one-hour lunch break in-between.

IMPORTANT – Please read fully and carefully all of the following including the web-links:

Please see the following document and video links which detail the examination process along with the infrastructure and hardware requirements.

Remote Invigilation Candidate Quick Guide
https://www.rcophth.ac.uk/wp-content/uploads/2021/01/Remote-Invigilation-Candidate-User-Guide-v1.1.pdf

How to prepare for your Exam - Video link
https://youtu.be/xsi0an49ISM

Online Proctored Exam RCOphth Privacy Policy
https://www.rcophth.ac.uk/wp-content/uploads/2020/07/RCOphth-OPE-Privacy-Policy-FINAL.pdf

We recommend that you familiarise yourself with the process and system requirements as soon as possible to ensure that all processes work reliably.

Candidate Application Process Steps:

1. Candidates will apply for the Part 1 FRCOphth examination via the RCOphth website.

2. Once the closing date for entries has passed, the candidate will receive a confirmation email from the College which will contain the following information:

    - Confirmation of their exam place
    - Their candidate ID number
    - Their exam date and time slot based on their location in the world
    - ID requirements and computer requirements in order to take the exam
    - A link to practice questions on the RCOphth exams website
    - Notes on what candidates can expect on the examination day
    - The examination rules and regulations

System Testing

- One week prior to the examination, you will receive an e-mail from BTL with a link to complete a computer system check, as well as to re-iterate the information from this confirmation e-mail. The system check link will ensure a candidate's audio and video work properly, as well as making sure that their computer is suitable to run the software. If you do not appear to have received the e-mail please check your "junk folder".

- 72 – 24 hours before the examination, candidates will be sent another email with the links for launching the exam. These links will not activate until the start of the actual examination. The

keycodes to start the exam when then be displayed to the candidate when they are just about to start the exam.

- The examination will be available to the candidate, for the whole examination duration specified.

Rules and Regulations

1. Candidates will be required to log in at their computer at the agreed examination start time to run through ID checks and web camera/microphone set-up with the live proctor. The exam will then start once ID checks and set-up is complete. If you log on before the start time, you will be presented with a timer counting down to the start time.

   This means that for example although 10am is the exam start time, at 10am you will do the pre-exam set up and THEN start the exam paper. Please note that this means that, depending on how long you take to complete the set-up, the exam paper might run past the stated exam times. You WILL however get the full time allotted for the exam paper and also the FULL allotted break time between papers before logging on to repeat the process for the second paper.

   Example: **You are told to log on at 10:00am**
   You log on at 10:00
   You complete set-up that takes 20 mins
   At 10:20 you start the exam paper
   Exam finishes at 12:20 (you have the full two hours)
   You break for 1 hour
   You log on for the second paper at 13:20
   You complete set-up at 13:15
   Exam finishes at 15:15 (full two hours)

2. Photographic identification (a passport or photographic driver's licence ONLY) will be checked by the live proctor through the candidate's web camera before candidates can start the examination.

3. Candidates will be monitored at all times by a live proctor during the examination. The live proctor will be able to see the candidate through their web camera and hear them through their microphone. The live proctor will also ask the candidate to show the whole room via their web camera or their smartphone which must also be connected as a second camera for the examination (the live proctor will demonstrate how to do this).

4. All examinations are timed by the computer and will end automatically once the examination time has expired. Once the timing for the examination has begun, it cannot be paused. Candidates will be able to skip questions and come back to them at the end.

5. A candidate cannot be late for their examination. If they are late, their examination will be cancelled and their examination fee forfeited.

6. If a candidate wishes to raise a query during the examination, they can communicate with the live proctor via a chat facility.

7. The candidate's computer screen will be locked into the examination during the duration of the examination and access to any other websites or applications will not be possible.

8. Candidates are **not permitted** to use calculators in any section of the examinations.

9. Candidates are **not permitted** to use notebooks, books or any other form of written material during the examination.

10. Candidates are **not permitted** to wear any form of earplugs or headphones.

11. Candidates are **permitted** one sheet of white paper and a pencil for rough use/calculations, which must be destroyed at the end of the examination in front of the webcam by tearing into small pieces and then screwed up.

12. Candidates **must not**, at any point during the examination, look at their hands, wrists or arms, or at any mobile phone or tablet.

13. Candidates are **not permitted** to leave the room during the examination except for the designated one-hour break between examination papers.

14. Candidates are **not permitted** to wear any form of sunglasses or smart glasses.

15. Candidates are **not permitted** to wear any kind of watch or smart watch.

16. Candidates are **not permitted** to smoke or vape during the examination.

17. Candidates are **not permitted** to consult any other materials during the examination. This includes notes and textbooks.

18. Candidate are **not permitted** to eat any food during the examination. For drinks, the candidate may have one transparent tumbler of clear liquid drink that must be present at the start of the examination and not replenished at any time except for during the designated one-hour break between examination papers.

19. No other person will be permitted to be present in the room in which the candidate sits the examination.

20. Candidates are **not permitted** to communicate in any way with or seek assistance from anyone else except from the live proctor during the examination.

21. Candidates are advised to read in advance the RCOphth Online Proctored Examinations Privacy Policy and the RCOphth Policy on Allegations of Cheating and Misconduct in Examinations.

22. Candidates will **not be permitted** to visit the toilet during the examination. Toilet visits will only be permitted in the one-hour break between the examination papers. The only exceptions are for candidates who have medical conditions or pregnancy. These candidates must request the need for toilet breaks upon applying for the exam and must provide a medical letter explaining the reasons why.

23. Other than as a second camera linked to the proctoring system (as in point 3 above) candidates are **not permitted** to use mobile phones.

24. Candidates are **not permitted** to have or use any other electronic equipment or device during the examination.

25. Candidates are **not permitted** to interfere with, e.g. turn on / off, their internet connection without the permission of the online proctor.

The RCOphth will treat any breach of the above rules as cheating and does not expect to have to deal with any impropriety or issues of probity. However, we are obliged to ensure that such safeguards are in place in order

that such issues cannot occur unnoticed. As such BTL provide three live and recorded streams of feedback whilst the examination is in progress online.

These three sources are:

1. the candidate's computer screen
2. the candidate's computer web camera view
3. a separate side view video-stream via a phone camera

The role of the live proctor invigilator

There will be one online proctor per 6-8 candidates.

It is the proctor's role to check candidates into the examination and monitor the candidates throughout for "unusual behaviours" (see rules and regulations and below). Such behaviours will be recorded on a time-line, which will then be brought to the attention of a senior RCOphth examiner after the examination to decide whether any action is required. Please note, unless there is incontrovertible serious evidence of impropriety, your examination will proceed uninterrupted to be reviewed after the event.

Internet connectivity issues

The testing processes that the candidate will have undertaken will ensure that the likelihood of a problem with the internet connection is minimised. If a candidate's internet connection does drop during the examination, no examination time will be lost as the timer will automatically pause. As the system updates every 3 seconds data loss is also likely to be minimal.

In the event of an interruption to the internet connection we recommend that the candidate tries to reconnect to the internet as soon as possible, if possible without leaving their chair or the room.

Once the internet connection is re-established the examination can proceed from where the candidate left off. The candidate will not lose any time to the interruption however, as answers are uploaded to the server every 3 seconds, it would be advisable to quickly check the answer to the question last answered.

If the internet connection is lost entirely for the duration of the whole exam, the candidate will have to reschedule for the next examination.

If there happens to be an unforeseen event that prevents the candidate completing the examination, only with written evidence from an appropriate authority (e.g. ISP, electricity power provider) we will consider an examination fee refund and a removal of the examination attempt from the candidate's record.

The online proctor has been instructed to report unusual behaviour in relation to the candidate's internet connection. Repeatedly dropping off-line unexpectedly in the presence of a previously tested and good connection will be regarded as a suspicious behaviour, as will excessive reconnection times. Each case of lost connection will be dealt with using the data that the proctor provides to us.

Eligibility

A medically qualified candidate will be eligible to sit the examination provided that he/she:

a) holds a medical qualification approved by the General Medical Council for the purpose of registration

Candidates who are registered with the General Medical Council (GMC) should include their GMC number in the appropriate place on the application form for verification and candidates with the Irish Medical Council (IMC) should do the same with their IMC number.

All other candidates are required to submit an attested copy of their medical degree in evidence of their eligibility to sit this examination. Medical degree certificates may be attested by a Fellow of *this* College or your embassy, a solicitor or the university issuing the certificate.

The Part 1 examination must be the first component of the FRCOphth to be taken by candidates.

Condition of the Examination

No previous experience in ophthalmology will be necessary for candidates to sit the Part 1 FRCOphth, but candidates in Ophthalmic Specialist Training (OST) will be required to pass this examination before they enter into the **third** year of OST. For those not in a GMC registered OST training programme, please write NOT IN OST in the application.

An examination can be taken before the candidate enters the relevant GMC-approved training programme or when they are on a break in the programme.

The pass will be considered current as long as the candidate enters or re-enters the programme within seven years of passing the examination and satisfies any other currency requirements.

A pass in an examination taken after completing a run-through or higher training programme will not be acceptable for a certificate of completion of training. In that situation, doctors may be able to demonstrate equivalence via the CESR or CEGPR process.

Guidance for diagnostic assessment candidates with additional requirements and specific learning difficulties

The Royal College of Ophthalmologists (RCOphth) recognise that there may be some candidates who require additional arrangements when undertaking a RCOphth examination.

The following guidance for diagnostic assessments has been developed from the recommendations of a Working Group on Specific Learning Difficulties (SpLD) within the University of Oxford, which reported in Trinity Term 2011. The recommendations are rooted in the extensive data collection, interviews, research and analysis undertaken by the group whose membership included internal and external experts.

The primary purpose of a diagnostic assessment report is to provide the candidate with a greater understanding of his / her profile of cognitive and educational strengths and weaknesses and an opportunity to consider how this profile might impact upon study. The assessment report should be used to support the candidate to develop greater self-awareness and inform strategy development in managing key academic tasks whilst studying in a demanding and challenging environment. It is imperative that a diagnostic assessment is not viewed simply as a route to obtaining accommodations, such as extra time, in examinations or extensions for written assignments.

In order to provide support and make reasonable adjustments, including examination adjustments, on the grounds of a specific learning difficulty, the RCOphth requires that:

- a full diagnostic assessment has been carried out by a psychologist or a specialist teacher which confirms the presence of a specific learning difficulty. Psychologists must be HCPC registered as a practitioner psychologist. Specialist teachers must hold a qualification recognised under the SpLD Working Group 2005/DfES Guidelines and
hold a valid Assessment Practising Certificate (updated SASC guidance, March 2019);

- the assessment has been conducted when the candidate was aged 16 years or over, using individually administered, up to date, psychometrically valid and reliable tests such as those recommended by the SpLD Working Group;

- ***candidates' reports are normally no more than 5 years old at the date of entry to the examination.***

- that a signed copy of the diagnostic assessment report has been supplied to the RCOphth and that the report follows closely the guidance of the SpLD Working Group 2005/ DfES report and its subsequent updates. This applies to the tests used, the format of the report and the detail of the content. Please note that "top up" assessments are not acceptable nor are copies of the JCQ Form 8.

With reference to test selection, we ask that professionals administer the psychometric tests to assess the areas listed below to provide comprehensive evidence of the impact of difficulties on study. For assessments conducted in the UK, the test materials should be those approved
by UK national professional standards bodies in line with the SpLD Working Group 2005/ DfES guidelines, and utilise the most recently available standardisation information. International reports must include the same range of assessment areas and use internationally recognised
materials with similarly robust standardisation. We ask that the following core aspects are included to allow the RCOphth to make decisions about support and reasonable adjustments for a candidate with a specific learning difficulty, in line with SASC guidance, March 2019.

• Background Information and history of need to provide the context of the assessment

• Underlying cognitive ability (verbal abilities, nonverbal abilities, working memory, phonological processing, visual processing)

• Attainment (reading, spelling, writing, maths as appropriate)

• Other relevant areas (motor coordination, attention as relevant if they are suspected as causing further difficulties)

Qualitative commentary regarding the approach to each assessment task and the anticipated impact of any observations on academic study activities such as reading, research, note taking, planning, writing, proofreading and editing etc.

Further Information can be found on the SpLD Assessment Standards Committee website on their SpLD Assessment page. This includes the diagnostic assessment report proforma, the SpLD Working Party 2005 / DfES report and its 2019 update

http://www.sasc.org.uk/SASCDocuments/Post%20-%2016%20Diagnostic%20Assessment%20Report%20120219.pdf update

Recommendations for examination arrangements should be clearly and explicitly stated, with any time allowances quantified. This would normally be where at least 2 areas of cognitive functioning resulted in scores less than 85 (i.e. below the average range) The standard extra time allowance for candidates with SpLDs is 25% (15 minutes per hour) both for hand written and electronic exams. Any recommendation for additional extra time over the standard
25% would need to be fully justified with evidence of a very substantial impact on measures of attainment. The RCOphth will consider all reasonable adjustments to examinations including the use of assistive technology. Diagnostic assessors and candidates should be aware that the final decision on adjustments rests with the Chair of the Examinations Committee.

All candidates who require additional arrangements must adhere to the guidelines set out above. Candidates must note that upon receipt of sufficient evidence additional arrangements may not necessarily be granted.

In awarding additional arrangements, the RCOphth seeks to:

1. Approve valid arrangements and access to written and clinical examinations.
2. Give special consideration to candidates where specific circumstances have arisen at or near to the examination time which have not previously been highlighted.
3. Ensure that no additional arrangement gives an unfair advantage over another candidate

When submitting their application form applicants must indicate if additional arrangements are needed and supporting evidence must be provided at the time of application.

CODE OF CONDUCT FOR EXAMINATION APPLICANTS AND CANDIDATES

The College's code of conduct can be found on our website, at the following link:

https://www.rcophth.ac.uk/wp-content/uploads/2014/11/Code-of-Conduct-Examination-candidates-and-applicants-20170404.pdf

ALLEGATIONS OF CHEATING AND MISCONDUCT IN EXAMINATIONS

Further information regarding the College's Policy on Allegations of Cheating and Misconduct in Examinations can be found on our website, at the following link:

https://www.rcophth.ac.uk/wp-content/uploads/2018/11/Policy-on-Allegations-of-Cheating-and-Misconduct-20181008.pdf

Appeals Procedure

The College's appeal procedure is available online at
https://www.rcophth.ac.uk/examinations/appeals-procedure/

Language Requirements

All examinations run by the Royal College of Ophthalmologists are conducted in English.

Although candidates are not expected to undertake examinations such as IELTS or PLAB it is expected that candidates should be equivalent to IELTS Level 7.

Preparing for the examinations

The Royal College of Ophthalmologists recommend that candidates preparing for examinations should:

- Read the appropriate text, syllabi and curriculum for the relevant examination.
- Gain clinical experience in ophthalmology in hospitals this may also include working within other specialties such and Medicine and Pathology.
- Attend courses – A list of courses for examinations can be found on the College website (the College does not run or endorse any of the listed courses: https://www.rcophth.ac.uk/events-and-courses/non-rcophth-events/).
- Ensure they are familiar with principles and values of the General Medical Council's Good Medical Practice (http://www.gmc-uk.org).

  Candidates may also find useful information from the National Advice Centre for Postgraduate Education. (http://www.nhscareers.nhs.uk/nacpme/)

THE ROYAL COLLEGE OF OPHTHALMOLOGISTS

PART 1 FRCOPHTH EXAMINATION

TIMETABLE 2022

January 2022

Examination Date: **Wednesday 18 January 2022**

Opening Date for Receipt of Applications: **Monday 27 September 2021**
Closing Date for Receipt of Applications: **Monday 29 November 2021**

April 2022

Examination Date: **Wednesday 27 April 2022**

Opening Date for Receipt of Applications: **Wednesday 12 January 2022**
Closing Date for Receipt of Applications: **Monday 28 February 2022**

October 2022

Examination Date: **Wednesday 12 October 2022**

Opening Date for Receipt of Applications: **Monday 20 June 2022**
Closing Date for Receipt of Applications: **Monday 15 August 2022**

Examination Format:

a.m.	Multi Choice Questions (MCQ) Paper 1 (2 hours)
p.m.	Multiple Choice Questions (MCQ) Paper 2 (2 hours)

Part 1 FRCOphth - Structure of the Examination

Introduction
Please note that as of 1 August 2013, candidates are permitted a maximum of six attempts in which to pass this examination. Examination attempts prior to August 2013 do not count towards the number of attempts available.

An examination can be taken before the candidate enters the relevant GMC-approved training programme or when they are on a break in the programme.

The pass will be considered current as long as the candidate enters or re-enters the programme within seven years of passing the examination and satisfies any other currency requirements.

Candidates who have entered Ophthalmic Specialist Training (OST) must have passed this examination by the end of the second year of run-through training.

The examination will comprise of theoretical papers based on learning outcomes of the OST curriculum appropriate to the first two years of training as follows:

- Two x 2 hour Multiple Choice Question (MCQ) paper of 90 questions each consisting of single best answer from four options

Standard Setting

The exam is standard set in advance using the Ebel method.

Overall Result

To pass the Part 1 FRCOphth examination, candidates are required to achieve the agreed pass mark that is calculated from the total of 180 questions covering both MCQ papers. If awarded a fail, candidates must re-sit the entire examination.

Results

Results will be released approximately four weeks after the examination, once verified by the Senior Examiner. Candidates are not permitted to telephone the College for examination results. All results will be sent to candidates by email and the pass list will be displayed on the College website.

Part 1 FRCOphth Examination Syllabus

The Fellowship of the Royal College of Ophthalmologists examinations are designed to assess the knowledge, skills and professional attitudes required of a doctor who wishes to practice as an ophthalmologist in the United Kingdom. A pass in the Part 1 FRCOphth, Refraction Certificate and Part 2 FRCOphth examinations represents a high level of achievement. The FRCOphth is a necessary but insufficient requirement for the Certificate of Completion for Training in Ophthalmology.

The three examinations that comprise the FRCOphth are based upon the curriculum for ophthalmic specialist training and candidates are **strongly advised to become familiar with the curriculum** (available at: https://www.rcophth.ac.uk/curriculum/ost/.

The Part 1 FRCOphth examination assesses understanding of patient investigations and knowledge of basic and clinical sciences relevant to ophthalmology. The specific learning outcomes from the RCOphth OST curriculum that the examination assesses are:

Basic and clinical sciences

BCS1 Anatomy

Understand and apply knowledge of the anatomy of the eye, adnexae, visual pathways and associated aspects of head, neck and neuro anatomy
Understand applied anatomy relevant to clinical methods of assessment and investigation used in ophthalmic clinical and surgical practice.

The Orbit and adnexae: Osteology, orbital foramina, eyelids, conjunctiva, lacrimal system, extraocular muscles, intraorbital nerves, vessels, orbital fascia

Ocular anatomy: Conjunctiva, cornea, sclera, limbus and anterior chamber angle, iris and pupil, lens and zonule, ciliary body, choroid, retina, vitreous, optic nerve

The Cranial Cavity: Osteology of the skull, meninges, vascular supply, foramina, cranial fossae, pituitary gland and its relations

Central Nervous System: Cerebral hemispheres and cerebellum including microscopic anatomy of visual cortex, cranial nerves, spinal cord, vascular supply, visual pathways, control of eye movement, autonomic regulation of eye.

Head and neck: Nose, mouth, paranasal sinuses, face and scalp, pharynx, soft palate, larynx, trachea, major arteries and veins, lymphatic drainage of the head and neck

Cardiovascular system: Gross anatomy of the heart, and major blood vessels. Microscopic anatomy of arteries, veins and capillaries

BCS2 Physiology

Understand and apply knowledge of the physiology of the eye, adnexae and nervous system, including related general physiology.
Understand the applied physiology relevant to clinical methods of assessment in ophthalmic practice.
Use this knowledge when interpreting clinical symptoms, signs and investigations and in the practice of ophthalmic medicine and surgery.

General principles including:

Maintenance of homeostasis: Characteristics of control systems - nervous and hormonal
Body fluids - volume, osmolarity, osmotic and oncotic pressure, and electrolyte (including H+) concentrations

Excitable tissues – nerve and muscle: Structure and function of nerve cell, membrane potential, action potential, nerve conduction, synapse, the motor unit, muscle

Blood: Plasma composition and functions, cell types, immune mechanisms, blood groups, haemoglobin and red and white cell formation and destruction, anaemias, clotting and fibrinolysis

Cardiovascular system: Pressure resistance and flow in blood vessels, blood pressure And blood flow, the activity of the heart and its control, cardiac output, control Mechanisms within the CVS, transcapillary exchange, tissue fluid formation

Respiratory system: Structure, lung volumes, composition of respiratory gases, lung mechanics, gas exchange in the lung, carriage of O_2 and CO_2 in blood, ventilation perfusion relationships, chemical and neural control of ventilation

Nervous system and special senses: Receptors, synapses, afferent pathways, efferent pathways, cerebral cortex, control of movement, hearing, pain and its control, autonomic nervous system, cholinergic transmission, adrenergic transmission

Endocrinology: Hormonal control, hypothalamus, pituitary, thyroid / parathyroid, adrenals, pancreas

Nutrition: Dietary requirements, absorption, vitamins

Kidney and adrenal cortex: Glomerular and tubular function, osmolality and pH of body fluids

Ocular physiology including:

Physiology of tear production and control and the lacrimal drainage system
Physiology of aqueous production and drainage including principles of intraocular pressure measurement
Physiology and biochemistry of the cornea
Lens metabolism
Physiology of the vitreous
Retinal physiology including phototransduction
Retinal pigment epithelium
Choroid
Blood ocular barrier

Physiology of vision including:

Visual acuity
Accommodation
Pupillary reflexes
Light detection
Dark adaptation
Colour vision
Electrophysiology of the visual system
Visual fields
Contrast sensitivity
Eye movements
Stereopsis
Motion detection
Visual perception
Magnocellular and parvocellular pathways

BCS3 Biochemistry and cell biology

Understand and apply knowledge of the basic biochemistry and cell biology, in particular those aspects relevant to common eye diseases.
Use this knowledge when interpreting clinical symptoms, signs and laboratory investigations and in the practice of ophthalmic medicine and surgery.

Biochemistry of the cell: Organelles, plasma membranes, cytoskeleton, nucleus (DNA, RNA), transport mechanisms, cell-cell communications, cell-matrix interactions

Signalling: Growth factors, cytokines, hormones, eicosanoids, receptors, signal transduction, intracellular signalling pathways (e.g. second messengers)

Cellular processes: Cell cycle, protein synthesis (transcription, translation, post-translational modification), nucleic acid synthesis, proliferation, migration, apoptosis, metabolic processes

Connective tissue and extracellular matrix: Extracellular matrix molecules, composition of ocular extracellular matrices, synthesis/degradation, cell-matrix interactions

Biochemical and molecular biological techniques: Examples include: gene cloning, polymerase chain reaction, in-situ hybridisation, immuno-localisation, ELISA assays, Western, Northern and Southern blotting.

Biochemistry and cell biology of ocular tissues: Cornea, sclera, ciliary body, lens, vitreous, retina, choroid.

Active oxygen species: Free radicals and H_2O, scavengers, lipid peroxidation, phospholipase A

BCS4 Pathology

Understand and apply knowledge of pathology, especially the specialist pathology of the eye, adnexae and visual system. This includes histopathology, microbiology and immunology and other branches of pathology.
Use this knowledge when interpreting clinical symptoms, signs and investigations and in the practice of ophthalmic medicine and surgery.

Acute inflammation: Chemical mediators, cellular mechanisms

Wound healing
Chronic inflammation: Types, granulomata, immune mechanisms, ulceration, specific examples
Immunological mechanisms: Types of hypersensitivity reaction
Graft rejection
Degenerations: Examples: amyloidosis, calcification
Ageing and atrophy
Hypertrophy, hyperplasia and metaplasia
Vascular disorders: Atheroma, thrombosis (and homeostatic clotting mechanisms embolism (including pulmonary embolism), ischaemia and infarction, congestion and oedema, angiogenesis, hypertension, aneurysms, diabetic microangiopathy
Shock
Neoplasia: Definition, terminology, concepts; benign and malignant tumours; carcinogenesis; gene control – including regulation of apoptosis; oncogenes; geographical and environmental factors; pre-neoplastic conditions; effects of irradiation and cytotoxic drugs

BASIC OCULAR PATHOLOGY
With an emphasis on:
Cornea endothelial dysfunction and corneal dystrophies
Glaucoma
Cataract
Diabetes
Age Related Macular Degeneration
Retinal vascular occlusion
Ocular neoplasia
Retinal detachment and Proliferative Vitreo-retinopathy

MICROBIOLOGY:
The biological and clinical behaviour of the micro-organisms responsible for infections
Elementary principles of microbial pathogenesis: Concepts of colonisation, invasion, endotoxins, exotoxins, virulence and pathogenicity etc.
Gram staining and classification
Commensal eye flora
Viruses: Classification, structure and replication, antiviral agents, laboratory methods of viral detection; viral infections of the eye.
Prions
HIV and AIDS
Fungi: Classification, factors which predispose to fungal infection, antifungal agents.
Toxoplasmosis, Chlamydia, Acanthamoeba, helminthic infections
Principles of sterilization: Disinfection and asepsis and the application of these to current practice and practical procedures
Antimicrobials: Spectrum of activity, mode of action, pharmacokinetics and resistance

IMMUNOLOGY

Principles of immunology e.g. non-specific resistance, genetic basis of immunity, cellular and humoral mechanisms
Host defence mechanisms with particular reference to the eye
Mechanisms of immunologically-induced tissue damage with special reference to the eye
Role of soluble mediators (cytokines and chemokines) in regulation of inflammatory responses
MHC antigens, antigen presenting cells and antigen processing
Transplantation immunology (with particular reference to the cornea)
Immunodeficiency and immunosuppression
Tissue regulation (with particular reference to the eye) of inflammatory responses)

BCS5 Growth and senescence

Understand and apply knowledge of growth, development and senescence, and the anatomical, physiological and developmental changes which occur during embryogenesis, childhood and ageing relevant to ophthalmic practice.
Use this knowledge when interpreting clinical symptoms, signs and investigations and in the practice of ophthalmic medicine and surgery.

Embryology: General embryology especially at early stages; embryology of the eye, orbit, adnexae and visual pathways; the embryological origins of congenital malformations of the eye.

Child development: key milestones in childhood development especially regarding the visual and central nervous systems.

Senescence: the process of ageing and degeneration.

BCS6 Optics

Understand and apply knowledge of optics, ultrasound and electromagnetic wavelengths relevant to ophthalmic practice.
Acquire a basic understanding of medical physics.
Use this knowledge when interpreting clinical symptoms, signs and investigations and in the practice of ophthalmic medicine and surgery.

PHYSICAL AND GEOMETRIC OPTICS:

Properties of light: Electromagnetic spectrum, wave theory, particle theory, diffraction, interference, resolution, polarisation, scattering, transmission and absorption, photometry, lasers

Reflection: Laws of reflection, reflection at a plane surface, reflection at curved surfaces

Refraction: Laws of refraction (Snell's Law), refraction at a plane surface, refraction at curved surfaces, critical angle and total internal reflection

Prisms: Definition, notation of prisms, uses in ophthalmology (diagnostic and therapeutic), types of prism

Spherical lenses: Cardinal points, thin lens formula, thick lens formula, formation of the image, vergence power (dioptric power), magnification, spherical decentration and prism power, lens form

Astigmatic lenses: Cylindrical lenses, Maddox rod, toric lenses, Conoid of Sturm, Jackson's cross cylinder

Notation of lenses: Spectacle prescribing, simple transposition, toric transposition

Identification of unknown lenses: Neutralisation, focimeter, Geneva lens measure

Aberrations of lenses: Correction of aberrations relevant to the eye, Duochrome test

CLINICAL OPTICS

Optics of the eye: Transmittance of light by the optic media, schematic and reduced eye, Stiles-Crawford effect, visual acuity, contrast sensitivity, catoptric images, emmetropia, accommodation, Purkinje shift, pinhole.

Ametropia: Myopia, hypermetropia, astigmatism, anisometropia, aniseikonia, aphakia

Accommodative problems: Insufficiency, excess, AC/A ratio

Refractive errors: Prevalence, inheritance, changes with age, surgically induced

Correction of ametropia: Spectacle lenses, contact lenses, intraocular lenses, principles of refractive surgery

Problems of spectacles in aphakia: Effect of spectacles and contact lens correction on accommodation and convergence, effective power of lenses, back vertex distance, spectacle magnification, calculation of intraocular lens power, presbyopia

Low visual aids: High reading addition, magnifying lenses, telescopic aids - Galilean telescope

BCS8 Therapeutics

Understand and apply knowledge of clinical therapeutics relevant to ophthalmic practice.
Use this knowledge when prescribing for a patient.
Understand the therapeutics used in general medicine and surgery to a basic standard.
Be aware of the possible ocular effects of systemic medications and systemic effects of ocular medications.

PHARMACOLOGY

Pharmacokinetics and pharmacodynamics: General and specific to ocular tissues

Drug-receptor interactions

Mechanisms of drug actions (including receptor pharmacology and biochemical pharmacology)

Mechanisms of drug toxicity

Specific classes of pharmacological agents: Examples include catechol aminergics, cholinergics, serotonergics and histaminergics, eicosanoids

Pharmacology of drugs used in inflammation and immunosuppression

Pharmacology of drugs used in glaucoma

Local anaesthetics

Analgesics

BCS 12 Lasers

Understand and apply knowledge of lasers relevant to ophthalmic practice.
Use this knowledge when recommending laser treatment in the practice of ophthalmic medicine and surgery.
Comply with local laser safety procedures.

The physics of light and lasers: coherence, laser physics, laser properties, types of ophthalmic laser, tissue effects of laser, photocoagulation, photoablation, photodisruption, drug-enhanced laser absorption, OCT

BCS13 Epidemiology and evidence based medicine

Understand and apply knowledge of clinical epidemiology and evidence based medicine relevant to ophthalmic practice.
Use this knowledge during clinical assessment, interpreting investigations and planning clinical management for a patient.
Be aware of the influence of economic and political considerations (on a local and global scale) on individual and community health and how these may be influenced.

Scientific method: clinical measurement instruments, reliability and scales, definition of epidemiological terms, definition of blindness, main causes throughout world,

Screening for ocular disease: principles of screening, evaluation of screening programmes, sensitivity and specificity

Evidence based practice: hierarchy of evidence, trial design, sources of information, interpretation of evidence

BCS14 Instrument technology

Understand and apply knowledge of instrument technology relevant to ophthalmic practice.
Be aware of the limitations of technology and the risks involved in their use.
Maintain an understanding of new developments in relevant technologies.

Direct and indirect ophthalmoscopes
Retinoscope
Focimeter
Simple magnifying glass (Loupe)
Lensmeter
Automated refractor
Slit-lamp microscope
Applanation tomography and tonometry
Keratometer
Specular microscope
Operating microscope
Zoom lens principle
Corneal pachometer
Lenses used for fundus biomicroscopy (panfunduscope, gonioscope Goldmann lens, Hruby lens, 90D lens, etc.)
Fundus camera
Lasers
Fields machines (Goldmann, Humphrey)
Retinal and optic nerve imaging devices (OCT, SLO, GDx)

BCS15 Biostatistics

Understand and apply knowledge of statistics relevant to ophthalmic practice.
Use this knowledge in the interpretation and publication of research.

Basic descriptive and inferential statistics

Statistical tests: Choice of test, parametric vs. nonparametric, sensitivity, specificity,

predictive values, odds ratio, likelihood ratio, correlation and regression.

Clinical study design: Types, stages of clinical studies, bias, errors, randomisation, power, sample size calculation, confidence intervals, P-values, reliability and validity)

BCS16 Clinical Genetics

Understand and apply knowledge of clinical genetics relevant to ophthalmic practice.
Use this knowledge when advising patients about patterns of inheritance.
Recognise when it is appropriate to refer a patient for genetic counselling.
Recognise when it is important to offer a consultation with family members.

Organisation of the genome: Genes, chromosomes, regulation of transcription

Mendelian genetics: General principles

Population genetics: General principles

Cytogenetics: Aneuploidy, deletions, translocations, mosaicism, chimerism

Genetic basis of eye conditions: Genes involved in ocular disorders or systemic disorders with an ocular phenotype

Investigative and research techniques: Linkage analysis, candidate genes, twin studies, association studies

Gene therapy: General principles

Patient Investigations (PI):

Candidates are expected to understand the basic principles underlying these investigations, when to order them and how the results should be interpreted.

PI1 Orthoptic assessment

Know the relevant investigations and when to request them.
Explain the benefits, risks and potential discomfort to the patient/carer.
Be able to interpret, explain and act upon the results.
Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance underlying basic science of the tests that make up a typical orthoptic report, including:
Quantitative and qualitative assessment of vision
Cover-uncover test and alternate cover test
Assessment of ocular movements
Measurement of deviation
Assessment of fusion, suppression and stereoacuity.

PI2 Assessment of corneal shape, structure and thickness

Know the relevant investigations for the assessment of the anterior segment and corneal shape, structure and thickness.
Be aware of new, specialised techniques, as they develop.
Know how and when (urgent vs routine) to request them.
Explain the benefits, risks and potential discomfort to the patient/carer.
Be able to interpret, explain and act upon the results.

Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance underlying basic science of contemporary tests that are used in corneal practice, including:
Keratometry
Corneal topography
Pachymetry
Optical coherence tomography
Specular and confocal microscopy
Wavefront analysis

PI3 Retinal and optic nerve imaging

Know the relevant investigations and be aware of new and specialised techniques as they develop.
Know how and when (urgent vs routine) to request them.
Explain the benefits, risks and potential discomfort to the patient/carer.
Be able to interpret, explain and act upon the results.
Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in retinal practice, including:
Retinal photography
Optical coherence tomography
Scanning laser ophthalmoscopy

PI4 Ocular angiography

Know the relevant investigations.
Know how and when (urgent vs routine) to request them.
Explain the benefits, risks and potential discomfort to the patient/carer.
Be able to interpret, explain and act upon the results.
Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance and underlying basic science of contemporary angiographic tests that are used in retinal practice, including:
Fluorescein and indocyanine green angiography

PI5 Ultrasonography

Know the relevant investigations including ocular, orbital and other relevant ultrasound images and measurements.
Know how and when (urgent vs routine) to request them.
Use with accuracy & efficiency the instruments available to you.
Explain the benefits, risks and potential discomfort to the patient/carer.
Know the limitations and cost implication of each investigation.

PI6 Radiology and other neuro-imaging

Know the relevant investigations and their contra-indications.
Know how and when (urgent vs routine) to request them
Explain the benefits, risks and potential discomfort to the patient/carer
Be able to interpret, explain and act upon the results
Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance underlying basic science of contemporary tests that are used in radiological practice, of relevance to the practice of ophthalmology, including:
Plain skull and chest X ray
Orbital and neuro-CT scans
Orbital and neuro-MRI scans
Neuro-angiography

PI7 Ocular and neuro-physiology

Know the relevant investigations including ocular and neuro-electrophysiology.
Know how and when (urgent vs routine) to request them.
Explain the benefits, risks and potential discomfort to the patient/carer.
Be able to interpret, explain and act upon the results
Know the limitations and cost implication of each investigation.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including:
Electroretinography
Electrooculography
Visually evoked potentials

PI8 Biochemistry

Know the relevant haematological, and biochemical investigations.
Know how and when (urgent vs routine) to request them.
Interpret, explain and act upon the results.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Liver and renal function tests
Blood glucose
Cardiac enzymes
Acid-base balance
Blood gases
Thyroid function tests

PI9 Haematology

Know the relevant haematological, and biochemical investigations.
Know how and when (urgent vs routine) to request them.
Interpret, explain and act upon the results.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Clotting screens
Blood count
Blood transfusion
ESR. CRP and blood viscosity

PI10 Pathology

Know the relevant investigations.
Know how and when (urgent vs routine) to request them.
Know how to prepare and transport a sample or biopsy.

Interpret, explain and act upon the results.

An understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Types of biopsy
Transport of specimens
The law in relation to human tissue

PI11 Microbiology

Know the relevant investigations.
Know how and when (urgent vs routine) to request them.
Know how to take and transport a sample or tissue scrape, including use of optimal transport medium to isolate the causative organism.
Interpret, explain and act upon the results.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Collection of samples for virology, bacteriology, mycology, parasitology
Corneal scrapes
Conjunctival swabs
Intra-ocular samples

PI12 Biometry

Know the relevant investigations in particular for cataract surgery.
Recognise an error in the biometry result and identify when it may need to be repeated.
Know how and when to request contact and non-contact biometry.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Keratometry
Axial length measurement
IOL power calculation
And
A constants
Sources of biometric error
Choice of post-operative refractive error
Refractive error

PI13 Fields (automated, Goldmann)

Know the different perimeters available and the different strategies and algorithms used for measuring visual field.
Choose appropriate strategies for different conditions e.g. glaucoma monitoring, neurological assessment, driving standards.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Humphrey and other automated perimeters
Statistical analysis
Goldmann perimetry

PI14 Immunology and allergy testing

Know the relevant immunological investigations.
Know how and when (urgent vs routine) to request them.
Interpret, explain and act upon the results.
Know about allergy testing such as the patch test.
Understand the use of immunological tests in patients on immunosuppressive treatment.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Auto-antibodies
HLA antigens
Patch tests

PI16 Bone scans

Know the relevant investigations.
Know how and when to request them, especially for long-term steroid use to guide bone protection management.
Interpret, explain and act upon the results.

Interpretation and an understanding of the performance and underlying basic science of contemporary tests that are used in ophthalmic practice, including
Dexa-scans

Suggested reading list for Part 1 Fellowship Examination

This list is not designed to be exhaustive. Similarly, only some sections in these books are directly relevant to the Part 1 examination.

The Eye: Basic Sciences and Practice. Forrester JV, Dick AD, McMenamin P, Lee WR. WB Saunders 2003. ISBN: 0-7020-2541-0

MCQ companion to the Eye. Basic Sciences in Practice. Galloway PH, Forrester JV, Dick AD, Lee WR. WB Saunders 2001. ISBN: 0702025666

American Academy of Ophthalmologists. Basic and Clinical Science Course. ISBN: 1-56055-570-X
Volume 1. Update on general medicine.
Volume 2. Fundamentals and principles of ophthalmology
Volume 3. Optics, refraction and contact lenses
Volume 4. Ophthalmic pathology and intraocular tumours.

Adler's Physiology of the Eye. Ed. Hart WM. Mosby 2003. ISBN: 0-323-01136-5

Clinical Anatomy of the Eye. Snell RS, Lemp MA. Blackwell Scientific Publications 1998. ISBN: 063204344X

Clinically orientated anatomy. Moore KL, Dalley AF. Lippincott Williams and Wilkins 2005. ISBN: 0781736390.

Pathology for Surgeons in Training: An A-Z revision text. Gardner DL and Tweedle DEF. Arnold 2002. ISBN: 0340759046

Ocular Pathology, 5th ed. Yanoff M and Fine BS. Mosby 2002. ISBN: 0323014038

Medical Microbiology. Greenwood D, Slack R, Peutherer J. Churchill Livingstone 2002. ISBN 0443070776

Medical pharmacology at a glance. Neal MJ. Blackwell Publishing 2002. ISBN: 0632052449

Clinical Ocular Pharmacology. Jaanus SD, Barlett JD. Butterworth-Heinemann 2001. ISBN: 0750670398

Neuro-Ophthalmology. Glaser JS, 3rd edition, 1999. JB Lippincott Co, Philadelphia 1999. ISBN: 0781717299.

Genetics for Ophthalmologists: The molecular genetic basis of ophthalmic disorders. Black GCM. Remedica Publishing 2002. ISBN: 190134620X

Biochemistry of the eye. Whikehart R. Butterworth-Heinemann 2003. ISBN: 0750671521

Clinical optics. Elkington AR, Frank HJ and Greaney MJ. Blackwell Science. ISBN: 0632049898