

Examination Report

Part 1 Fellowship of the Royal College of Ophthalmologists (FRCOphth) Examination

April 2019

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# Summary

The Part 1 Fellowship of the Royal College of Ophthalmologists (FRCOphth) examination took place in April 2019. A total of 119 candidates sat the examination, of which 45 (38 per cent) fulfilled the criteria required to pass the examination overall.

The pass rate for candidates in Ophthalmic Specialist Training (OST) is 60 per cent compared with a 29 per cent pass rate for non-trainees.

The multiple choice question (MCQ) exam had a reliability of 0.89 and the constructed response question (CRQ) exam had a reliability of 0.94. The correlation between the two examinations was 0.83.

# Multiple choice question (MCQ) paper

The table below gives the paper contents compared with previous years.

1. MCQ paper content

| **Date** | **Anatomy/embryology** | **Optics** | **Pathology** | **Pharmacology & genetics** | **Physiology** | **Miscellaneous & investigations** | **Total** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Oct 2014 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Jan 2015 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| May 2015 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Oct 2015 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Jan 2016 | 24 | 23 | 23 | 18 | 23 | 8 | 119\* |
| May 2016 | 24 | 24 | 22 | 18 | 23 | 8 | 119\* |
| Oct 2016 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Jan 2017 | 24 | 24 | 22 | 18 | 23 | 8 | 119\* |
| May 2017 | 24 | 24 | 23 | 18 | 23 | 7 | 119\* |
| May 2018 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Oct 2018 | 24 | 24 | 23 | 18 | 23 | 8 | 120 |
| Jan 2019 | 22 | 24 | 23 | 18 | 22 | 8 | 117\* |
| Apr 2019 | 24 | 24 | 22 | 18 | 23 | 8 | 119\* |

\* = questions removed

## Paper statistics

1. MCQ paper summary statistics

| **Statistic** | **Value** | **Percentage** |
| --- | --- | --- |
| Mean score | 72/119 | 60.5% |
| Median score | 73/119 | 61.3% |
| Standard deviation | 14.3 | 12.0% |
| Candidates | 119 |  |
| Reliability: Cronbach's alpha | 0.89 |  |
| Standard error of measurement (SEM) | 4.70 | 3.9% |
| Range of marks | 27 – 101 | 22.7% – 84.9% |
| Pass mark derived from standard setting | 73/119 | 61.3% |
| Pass - 1 SEM | 69/119 | 58.0% |
| Pass rate | 64/119 | 53.8% |



1. Distribution of marks – MCQ

The vertical line denotes the point on the mark distribution where the pass mark lies.

## Quality of questions

The Speedwell data allows us to identify easy, moderate and difficult questions, and those which are good, poor or perverse (negative) discriminators. Ideally, all questions should be moderately difficult and good discriminators.

1. MCQ paper quality

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | **Discrimination** |
|  |  |  | **Negative** | **Poor** | **Good** | **Total** | **%** |
|  |  |  | **<0** | **0-0.249** | **≥0.250** |
|  |  |  | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| **Facility** | **Difficult** | **<25%** | 6 | 5.0 | 3 |  2.5 | 0 |  0.0 | 9 |  7.6 |
| **Moderate** | **25–75%** | 4 | 3.4 | 32 | 26.9 | 43 | 36.1 | 79 |  66.4 |
| **Easy** | **≥75%** | 0 | 0.0 | 11 |  9.2 | 20 | 16.8 | 31 |  26.1 |
| **Total** | 10 | 8.4 | 46 | 38.7 | 63 | 52.9 | 119 | 100.0 |

## Standard setting

The pass mark for the paper was agreed using the Ebel method.

1. MCQ Ebel categories

|  | **Difficult** | **Moderate** | **Easy** | **Total** |
| --- | --- | --- | --- | --- |
| **Essential** | 1 | 19 | 46 |  66 |
| **Important** | 1 | 21 | 22 |  44 |
| **Supplementary** | 2 |  3 |  4 |  9 |
| **Total** | 4 | 43 | 72 | 119 |

The Part 1 FRCOphth subcommittee considered the success of a minimally competent candidate in each category as below:

1. MCQ Ebel categories – expert decision

|  | **Difficult** | **Moderate** | **Easy** |
| --- | --- | --- | --- |
| **Essential** | 0.55 | 0.65 | 0.75 |
| **Important** | 0.45 | 0.50 | 0.55 |
| **Supplementary** | 0.25 | 0.25 | 0.25 |

1. MCQ Ebel categories – expert decision

|  | **Difficult** | **Moderate** | **Easy** | **Total** |
| --- | --- | --- | --- | --- |
| **Essential** | 1.00 | 12.00 | 34.00 | 47.00 |
| **Important** | 0.00 | 10.00 | 12.00 | 23.00 |
| **Supplementary** | 0.00 |  1.00 |  1.00 |  2.00 |
| **Total** | 2.00 | 24.00 | 48.00 | 73.00 |

The MCQ pass mark was 73/119 (61%)

1. Comparison of pass marks and rates for previous MCQ papers

|  | **33% discrimination** | **Facility** |  |
| --- | --- | --- | --- |
| **Year** | **Candidates** | **Mean score** | **Reliability (KR 20)** | **SEM** | **Standard setting** | **Pass mark** | **Negative** | **Poor** **(0-0.249)** | **Good (>0.250)** | **Difficult (<25%)** | **Moderate** | **Easy (>75%)** | **Number of questions** | **Pass number (rate)** |
| Jan 2015 | 89 | 69 | 0.86 | 4.90 | Ebel | 69(58%) | 9 | 56 | 55 | 9 | 91 | 20 | 120 | 53(60%) |
| May 2015 | 114 | 72 | 0.89 | 4.70 | Ebel | 68(57%) | 3 | 47 | 70 | 5 | 90 | 25 | 120 | 73(64%) |
| Oct 2015 | 188 | 68 | 0.85 | 4.90 | Ebel | 71(60%) | 3 | 59 | 58 | 6 | 90 | 24 | 120 | 79(42%) |
| Jan 2016 | 107 | 69 | 0.90 | 4.90 | Ebel | 71(59%) | 3 | 55 | 62 | 6 | 91 | 23 | 119 | 47(44%) |
| May 2016 | 123 | 70 | 0.90 | 4.90 | Ebel | 71(60%) | 6 | 34 | 79 | 3 | 90 | 26 | 119 | 71(58%) |
| Oct 2016 | 194 | 71 | 0.88 | 4.80 | Ebel | 72(60%) | 5 | 49 | 66 | 9 | 88 | 23 | 120 | 72(37%) |
| Jan 2017 | 101 | 64 | 0.80 | NA | Ebel | 71(60%) |  |  |  |  |  |  |  |  |
| May 2017 | 136 | 69 | 0.80 | 4.80 | Ebel | 75(63%) | 6 | 63 | 50 | 8 | 89 | 22 | 119 | 45(33%) |
| May 2018 | 119 | 70 | 0.83 | 4.73 | Ebel | 72(60%) | 15 | 61 | 44 | 9 | 70 | 41 | 120 | 59(50%) |
| Oct 2018 | 214 | 70 | 0.86 | 4.84 | Ebel | 72(60%) | 7 | 68 | 45 | 4 | 87 | 29 | 120 | 103(48%) |
| Jan 2019 | 96 | 65 | 0.82 | 4.68 | Ebel | 70(60%) | 15 | 63 | 39 | 15 | 70 | 32 | 117 | 39(41%) |
| Apr 2019 | 119 | 72 | 0.89 | 4.70 | Ebel | 73(61%) | 10 | 46 | 63 | 9 | 79 | 31 | 119 | 64(54%) |

# Constructed response question (CRQ) paper

The table below gives the paper contents.

1. CRQ paper content

| **Question** | **Subject** | **Topic** | **Subsections** | **Data provided** |
| --- | --- | --- | --- | --- |
| 1 | Anatomy | Bones of the orbit | 8 | CT Scan image of orbit |
| 2 | Pathology | Lacrimal tumour | 5 | Photograph of macroscopic biopsy specimen and histopathology slides |
| 3 | Pathology | Corneal pathogens | 5 | Low power image of corneal tissue as seen through a microscope |
| 4 | Optics\* | Indirect ophthalmoscope | 4 | None |
| 5 | Optics\* | Prismatic effect of lenses | 9 | Picture of a prism |
| 6 | Optics   | Optical aberrations | 4 | Three ray diagrams |
| 7 | Optics\* | Concave mirror | 5 | None |
| 8 | Investigations | Electrooculogram | 5 | Graph showing amplitudes measured during an electrooculogram |
| 9 | Investigations | Thyroid eye disease | 4 | Thyroid function test results are shown in a table |
| 10 | Investigations | Visual fields | 5 | Humphrey 24-2 field |
| 11 | Investigations | Genetics | 3 | Family tree diagrams and a chromosomal array |
| 12 | Statistics | Interpreting statistical results in scientific papers | 6 | Extract of paper from American Journal of Opthalmology (AJO) |
| \* Candidates are expected to draw a diagram as part of the answer |

## Paper statistics

1. CRQ paper summary statistics

| **Statistic** | **Value** | **Percentage** |
| --- | --- | --- |
| Mean score | 53/120 | 44.2% |
| Median score | 53/120 | 44.2% |
| Standard deviation | 18.3 | 15.3% |
| Candidates | 119 |  |
| Reliability: Cronbach's alpha | 0.94 |  |
| Standard error of measurement (SEM) | 4.61\* | 3.8% |
| Range of marks | 10 – 92 | 8.3% – 76.7% |
| Pass mark derived from standard setting | 61/120 | 50.8% |
| Pass - 1 SEM | 57/120 | 47.5% |
| Pass rate | 42/119 | 35.3% |

\*Note that the CRQ paper is scored out of 240, with two examiners each marking out of 120. In order to put the score back on the same scale as the MRQ paper and give each equal weight, the mark out of 240 is halved and so is the SEM. As such this SEM value is technically [SEM out of 240]/2.



1. Distribution of marks – CRQ

The vertical line denotes the point on the mark distribution where the pass mark lies.

Two examiners marked each question in the CRQ papers and the average mark from each was used to produce the candidate mark. Each question has a maximum possible 10 marks. Candidate performance was variable for each question, with mean, median, minimum and maximum scores (with standard deviations) set out in Table 10 below.

1. Results for each question

| **Question** | **Subject** | **Mean** | **Median** | **Min** | **Max** | **SD** | **BCM** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  1 | Anatomy | 3.26 | 3.00 | 0 |  9 | 2.02 | 4.0 |
|  2 | Pathology | 3.23 | 3.00 | 0 |  7 | 2.33 | 5.0 |
|  3 | Pathology | 5.00 | 5.00 | 0 |  9 | 1.88 | 4.5 |
|  4 | Optics\* | 4.41 | 4.00 | 0 | 10 | 2.79 | 5.5 |
|  5 | Optics\* | 6.64 | 8.00 | 0 | 10 | 2.50 | 5.0 |
|  6 | Optics   | 4.14 | 4.00 | 0 |  9 | 2.66 | 5.5 |
|  7 | Optics\* | 4.34 | 4.00 | 0 | 10 | 2.87 | 4.5 |
|  8 | Investigations | 6.66 | 7.00 | 0 | 10 | 2.33 | 6.0 |
|  9 | Investigations | 4.87 | 5.00 | 0 |  9 | 1.88 | 5.0 |
| 10 | Investigations | 3.87 | 4.00 | 0 |  9 | 2.41 | 5.0 |
| 11 | Investigations | 4.86 | 5.00 | 0 | 10 | 2.04 | 5.0 |
| 12 | Statistics | 3.34 | 3.00 | 0 |  9 | 2.65 | 5.0 |

Candidates performed badly in or were particularly ill prepared for question 2 (Pathology).

## Standard setting

The borderline candidate method was used to identify the pass mark for the CRQ. The examiners who marked the CRQ paper were asked to allocate a mark according to the marking scheme provided and, in addition, class the candidate's performance as a pass, fail or borderline. The sum of each median borderline mark was used to produce the pass mark.

1. CRQ standard setting

|  |  |  |  |
| --- | --- | --- | --- |
| **Question** | **Topic** | **Examiner A** | **Examiner B** |
| **Fail no.** | **Border no.** | **Pass no.** | **Sum of MBM** | **Fail no.** | **Border no.** | **Pass no.** | **Sum of MBM** |
| 1 | Anatomy | 77 | 26 | 16 | 4 | 82 | 23 | 14 | 4 |
| 2 | Pathology | 76 | 25 | 18 | 5 | 76 | 24 | 19 | 5 |
| 3 | Pathology | 27 | 67 | 25 | 4 | 58 | 45 | 16 | 5 |
| 4 | Optics\* | 75 | 29 | 15 | 6 | 72 | 33 | 14 | 5 |
| 5 | Optics\* | 33 | 80 | 6 | 5 | 17 | 83 | 19 | 4 |
| 6 | Optics   | 58 | 25 | 36 | 6 | 56 | 32 | 31 | 5 |
| 7 | Optics\* | 62 | 31 | 26 | 5 | 51 | 64 | 4 | 4 |
| 8 | Investigations | 28 | 66 | 25 | 6 | 33 | 72 | 14 | 5 |
| 9 | Investigations | 30 | 42 | 47 | 5 | 63 | 29 | 27 | 5 |
| 10 | Investigations | 67 | 29 | 23 | 5 | 58 | 28 | 33 | 5 |
| 11 | Investigations | 54 | 35 | 30 | 5 | 50 | 24 | 45 | 5 |
| 12 | Statistics | 71 | 21 | 27 | 5 | 65 | 31 | 23 | 5 |
| **Total** | **658** | **476** | **294** | **61** | **681** | **488** | **259** | **57** |

1. Comparison with previous years

| **Date** | **Mean score** | **Median score** | **Reliability** | **SEM** | **Pass mark** | **Pass rate** | **Correlation with MCQ** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Oct 2014 | 50% | 52% | 0.94 | 4.3 | 57% | 38% | 0.76 |
| Jan 2015 | 58% | 62% | 0.92 | 4.6 | 61% | 56% | 0.77 |
| May 2015 | 51% | 52% | 0.93 | 4.6 | 54% | 49% | 0.75 |
| Oct 2015 | 48% | 50% | 0.94 | 4.3 | 59% | 28% | 0.81 |
| Jan 2016 | 48% | 50% | 0.94 | 3.0 | 54% | 32% | 0.80 |
| May 2016 | 51% | 54% | 0.94 | 4.5 | 56% | 41% | 0.85 |
| Oct 2016 | 50% | 50% | 0.93 | 4.0 | 59% | 30% | 0.83 |
| Jan 2017 | 49% | 51% | 0.92 | 4.0 | 51% | 50% | \* |
| May 2017 | 57% | 58% | 0.92 | 5.0 | 53% | 67% | 0.76 |
| May 2018 | 57% | 59% | 0.93 | 8.1 | 54% | 71% | 0.78 |
| Oct 2018 | 58% | 60% | 0.93 | 4.8 | 55% | 68% | 0.75 |
| Jan 2019 | 50% | 52% | 0.93 | 4.3 | 49% | 62% | 0.71 |
| Apr 2019 | 44% | 44% | 0.94 | 4.6 | 51% | 35% | 0.83 |
| \* Data unavailable |

# Overall Results

To pass the Part 1 FRCOphth examination candidates are required to both

1. obtain a combined mark from both papers that equals or exceeds the combined pass marks obtained by the standard setting exercise explained above, and
2. obtain a mark in both papers that equals or exceeds the pass mark minus one standard error of measurement for each paper.

A candidate is therefore allowed to compensate a poor performance in one paper by a very good performance in the other paper. They cannot compensate for an extremely poor performance in one paper whatever the combined mark.

The minimum mark required in order to meet standard 1 above for this examination was 134/239 (56 per cent). The minimum mark required in each paper (to meet standard 2 above) was 73/119 in the MCQ paper and 61/120 in the CRQ paper.

Forty five (38 per cent) gained a total mark that met boths standards 1 and 2 above. Four candidates achieved 134/239 or greater but failed to achieve 73/119 in the MCQ paper.

In total, 45 out of 119 (38 per cent) candidates passed the examination.



1. Distribution of marks – Combined

The vertical line denotes the point on the mark distribution where the pass mark lies.

## Comparison with previous Part 1 examinations

1. Comparison with previous years

| **Examination** | **Candidates** | **Number passing** | **% passed** | **MCQ pass mark %** | **CRQ pass mark %** |
| --- | --- | --- | --- | --- | --- |
| Oct 2006 | 33 | 3 |  9 | 58 | 62 |
| Jan 2007 | 24 | 4 | 16 | 60 | 43 |
| May 2007 | 32 | 5 | 15 | 50 | 64 |
| Oct 2007 | 56 | 13 | 23 | 51 | 59 |
| Jan 2008 | 73 | 27 | 37 | 56 | 55 |
| May 2008 | 66 | 16 | 24 | 57 | 48 |
| Oct 2008 | 88 | 45 | 51 | 58 | 51 |
| Jan 2009 | 79 | 37 | 47 | 61 | 57 |
| Jul 2009 | 49 | 33 | 67 | 63 | 58 |
| Oct 2009 | 101 | 56 | 56 | 62 | 56 |
| Jan 2010 | 50 | 20 | 40 | 63 | 58 |
| May 2010 | 79 | 31 | 39 | 60 | 57 |
| Oct 2010 | 89 | 34 | 38 | 61 | 54 |
| Jan 2011 | 62 | 23 | 37 | 59 | 58 |
| May 2011 | 95 | 47 | 49 | 54 | 57 |
| Oct 2011 | 122 | 63 | 52 | 56 | 56 |
| Jan 2012 | 66 | 20 | 33 | 57 | 54 |
| May 2012 | 104 | 53 | 51 | 56 | 58 |
| Oct 2012 | 150 | 84 | 56 | 56 | 54 |
| Jan 2013 | 91 | 47 | 52 | 57 | 53 |
| May 2013 | 102 | 54 | 53 | 58 | 58 |
| Oct 2013 | 151 | 65 | 43 | 58 | 60 |
| Jan 2014 | 77 | 23 | 30 | 57 | 57 |
| May 2014 | 119 | 55 | 46 | 58 | 56 |
| Oct 2014 | 232 | 102 | 44 | 58 | 57 |
| Jan 2015 | 89 | 50 | 56 | 58 | 61 |
| May 2015 | 114 | 62 | 54 | 57 | 54 |
| Oct 2015 | 188 | 57 | 30 | 59 | 59 |
| Jan 2016 | 107 | 36 | 34 | 59 | 54 |
| May 2016 | 123 | 61 | 50 | 60 | 56 |
| Oct 2016 | 194 | 70 | 36 | 60 | 59 |
| Jan 2017 | 101 | 38 | 38 | 60 | 51 |
| May 2017 | 136 | 62 | 46 | 63 | 53 |
| May 2018 | 119 | 64 | 54 | 60 | 54 |
| Oct 2018 | 214 | 122 | 57 | 60 | 55 |
| Jan 2019 | 96 | 37 | 39 | 60 | 50 |
| Apr 2019 | 119 | 45 | 38 | 61 | 51 |

1. Comparison to previous years

| **Sitting** | **Candidates** | **Number passing** | **Pass rate (%)** |
| --- | --- | --- | --- |
| January |  915 |  362 | 40 |
| May | 1089 |  510 | 47 |
| October | 1585 |  728 | 46 |
| **Total** | **3589** | **1600** | **45** |

## Breakdown of results

1. Breakdown of results by training number (%)

| **Training** | **Failed** | **Passed** | **Percentage** | **Total** |
| --- | --- | --- | --- | --- |
| In OST | 14 | 21 | 60.0 |  35 |
| Not in OST | 60 | 24 | 28.6 |  84 |
| **Total** | **74** | **45** | **37.8** | **119** |

1. Breakdown of results by deanery

| **Country** | **Deanery** | **Failed** | **Passed** | **Total** |
| --- | --- | --- | --- | --- |
| UK | East Midlands |  1 |  1 |  2 |
| East of England |  1 |  0 |  1 |
| KSS (Kent, Surrey & Sussex) |  0 |  1 |  1 |
| London |  3 |  4 |  7 |
| North Western |  0 |  3 |  3 |
| Northern |  1 |  1 |  2 |
| Northern Ireland |  1 |  1 |  2 |
| Peninsula (South West) |  1 |  0 |  1 |
| South East of Scotland |  0 |  1 |  1 |
| Wales |  2 |  3 |  5 |
| Wessex |  1 |  0 |  1 |
| West Midlands |  2 |  2 |  4 |
| West of Scotland |  0 |  1 |  1 |
| Yorkshire |  1 |  3 |  4 |
| **Total** | **14** | **21** | **35** |

1. Breakdown of results by stage of training

| **Stage** | **Failed** | **Passed** | **Percentage** | **Total** |
| --- | --- | --- | --- | --- |
| FY2 |  4 |  3 | 57.1 |  7 |
| OST1 |  9 | 16 | 36.0 | 25 |
| OST2 |  1 |  2 | 33.3 |  3 |
| **Total** | **14** | **21** | **40.0** | **35** |

1. Breakdown of results by number of attempts

| **Attempt** | **Failed** | **Passed** | **Total** |
| --- | --- | --- | --- |
| 1 | 48 | 37 |  85 |
| 2 | 16 |  4 |  20 |
| 3 |  8 |  2 |  10 |
| 4 |  0 |  1 |  1 |
| 5 |  0 |  1 |  1 |
| 6 |  2 |  0 |  2 |
| **Total** | **74** | **45** | **119** |

Appendix 1: Overall results for each deanery

Result data by deanery has been available since October 2010. The summary results for each deanery are listed below.

1. Cumulative pass by deanery

| **Country** | **Deanery** | **Total candidates passed** | **Total candidates** | **Pass rate %** |
| --- | --- | --- | --- | --- |
| UK | East Midlands |  39 |  77 | 51 |
| East of England |  51 |  110 | 46 |
| East of Scotland |  10 |  11 | 91 |
| KSS (Kent, Surrey & Sussex) |  42 |  69 | 61 |
| London | 139 |  250 | 56 |
| Mersey |  42 |  103 | 41 |
| North of Scotland |  18 |  38 | 47 |
| North Western |  36 |  56 | 64 |
| Northern |  37 |  69 | 54 |
| Northern Ireland |  32 |  80 | 40 |
| Oxford |  21 |  33 | 64 |
| Peninsula (South West) |  28 |  66 | 42 |
| Severn |  17 |  26 | 65 |
| South East of Scotland |  24 |  38 | 63 |
| Wales |  45 |  97 | 46 |
| Wessex |  49 |  104 | 47 |
| West Midlands |  78 |  170 | 46 |
| West of Scotland |  55 |  108 | 51 |
| Yorkshire |  55 |  87 | 63 |
| Overseas | Eire |  4 |  14 | 29 |
| Europe and Overseas |  14 |  32 | 44 |
| **Total** | **836** | **1638** | **51** |