

Examination Report

May 2015 Part 1 FRCOphth Examination



Contents

1. Summary	page 2
2. MCQ paper	
Content	page 3
Statistics	page 3
Distribution of scores	page 3
Quality of questions	page 4
Standard setting	page 4
Comparison to previous papers	page 5
3. CRQ paper	
Content	page 6
Statistics	page 6
Distribution of scores	page 7
Marks for each question	page 6
Standard setting	page 8
Examiner concordance	page 9
Comparison to previous papers	page 9
4. Overall results	page 10
5. Comparison to previous Part 1 examinations	page 11
6. Breakdown of results	page 12
Appendix 1 (results by deanery)	page 15

Michael Nelson BSc Hons FRCOphth MEd
Education Advisor

Summary

The 27th Part 1 FRCOphth examination took place on 11th May 2015. One hundred and fourteen candidates sat the examination, of whom 62 (54%) fulfilled the criteria required to pass the examination overall. The pass rate is similar to the last sitting.

Both parts of the examination had a high reliability (>0.90) and had an acceptable correlation (0.75).

The pass rate in the MCQ paper is slightly higher than the last sitting at 64% with a slightly lower pass mark. The quality of the MCQ paper was high with 58% of the questions good discriminators.

The pass rate in the CRQ paper was slightly lower than at the last sitting (49%). Question 1 (anatomy) was removed from the question paper when an error in printing was identified. The paper was therefore marked out of 110 (instead of the usual 120) and the pass mark altered accordingly. It was notable that candidates performed very poorly in the pathology questions.

There were no statistically significant differences in the success rates of candidates based upon their gender, ethnicity or first language, although data was incomplete for many of these characteristics. There was a statistically significant difference based upon training (in training > not in training), and the difference based upon country of qualification almost reached significance (UK > outside UK)

MCQ examination

Content (Table 1)

Topic	Jan 2013	May 2013	Oct 2013	Jan 2014	May 2014	Oct 2014	Jan 2015	May 2015
Anatomy/embryology	25	24	24	24	24	24	24	24
Optics	25	24	24	24	23	24	24	24
Pathology	24	23	23	23	23	23	23	23
Pharmacology & genetics	20	18	18	18	18	18	18	18
Physiology	20	23	23	23	23	23	23	23
Miscellaneous & investigations	5	8	8	8	8	8	8	8
Total	119	120	120	120	119	120	120	120

MCQ paper statistics

Mean score	72	60%
Median score	73	61%
Standard deviation	14.0	11.6%
Candidates	114	
KR20: (measurement of reliability)	0.9	
Standard error of measurement (SEM):	4.7	
Range of marks	39 - 102	32.5% - 85%
Pass mark derived from Standard Setting	68	57%
Pass mark – 1 SEM	63	53%
Pass rate	73/114	64%

Distribution of results (Table 2)

Range of scores	Distribution	Number
1-30		
31-40	/	1
41-50	//// //	10
51-60	//// //	14
61-70	//// // / //	22
71-80	//// // // // // // //	29
81-90	//// // // // // // //	28
91-100	//// //	9
101-120	/	1
Total		114

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 moderate and good.

(Table 3)

	Negative		Poor		Good		Total	%
	< 0		0- 0.249		>0.250			
	Number	%	Number	%	Number	%		
Difficult Facility<25%	1	0.8	4	3.3	1	0.8	6	5
Moderate Facility 25-75%	2	1.7	34	28.3	48	40.0	84	70
Easy Facility >75%	0	0	9	7.5	21	17.5	30	25
Total	3	2.5	47	39.2	70	58.3	120	100

Standard setting

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

(Table 4)

	Difficult	Moderate	Easy	Total
Essential	3	23	28	54
Important	4	33	17	54
Supplementary	2	5	5	12
Total	9	61	50	120

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

(Table 5)

	Difficult	Moderate	Easy	
Essential	0.55	0.65	0.75	
Important	0.45	0.5	0.55	
Supplementary	0.25	0.25	0.25	

(Table 6)

	Difficult	Moderate	Easy	Total
Essential	1.65	14.95	21	37.6
Important	1.8	16.5	9.35	27.65
Supplementary	0.5	1.25	1.25	3
TOTAL	3.95	32.7	31.6	68.25

The MCQ pass mark = 68/120 (57%)

Comparison of pass marks and rates for last 7 MCQ papers (table 7)

	May 13	Oct 13	Jan 14	May 14	Oct 14	Jan 15	May 15
Candidates	102	151	77	119	232	89	114
Mean score	69	72	73	67	72	69	72
Reliability (KR 20)	0.88	0.9	0.9	0.9	0.9	0.86	0.89
SEM	4.9	4	4.7	4.8	4.8	4.9	4.7
Standard setting	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel
Pass mark	69 (58%)	70 (58%)	68 (57%)	69 (58%)	69 (58%)	69 (58%)	68 (57%)
33% discrimination							
Negative	5	3	10	4	5	9	3
Poor (0-0.249)	48	48	59	43	40	56	47
Good (>0.250)	67	69	51	72	75	55	70
Facility							
Difficult (<25%)	5	2	12	6	3	9	5
Moderate	85	92	70	82	94	91	70
Easy (>75%)	30	26	38	31	23	20	25
Questions	120	120	120	119	120	120	120
Pass number (rate)	51 (50%)	88 (58%)	55 (71%)	54 (45%)	144 (62%)	53 (60%)	73 (64%)

The CRQ paper

(Table 8)

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy*	Neuroanatomy	3	None
2	Pathology	Endocrinology	4	Diagram to label
3	Pathology	Lid tumour	8	Images to label
4	Optics*	Concave mirror	4	None
5	Optics*	Gonioscopy	4	Image of lens
6	Optics	Lens prescription	3	None
7	Optics	Aberrations	9	Ray diagrams
8	Investigations	Retinal imaging	6	IFA images
9	Investigations	IOLs and biometry	7	None
10	Investigations	Visual fields	5	Humphrey fields
11	Investigations	Electrophysiology	4	ERG
12	Evidence based medicine	Screening	1	None

* Candidates are expected to draw a diagram as part of the answer

Statistics

Mean score	56	51%
Median score	57.5	52%
Standard deviation	17.6	16%
Candidates	114	
Reliability: Cronbach alpha	0.93	
Standard error of measurement (SEM):	4.6	
Range of marks	3 - 89	3% - 81%
Pass mark derived from Standard Setting	59/110*	54%
Pass mark – 1 SEM	54/110	
Pass rate	56/114	49%

*Question 1 was removed from the examination after a printing error was identified.

Distribution of scores (Table 9)

Range of marks	Distribution	Number
0-30	//// // /	11
31-40	//// // /	11
41-50	//// // // // //	18
51-60	//// // // // // // // // // //	23
61-70	//// // // // // // // // // // //	23
71-80	//// // // // // // // // // // //	22
81-90	//// /	6
91-100		
101-120		
Total		114

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 maximum possible 10 marks. Candidate performance was variable for each question, with mean, median, minimum and maximum scores (with standard deviations) of:

(Table 10) Results for each question

Q	Subject	Mean	Median	Min	Max	SD
1	Anatomy	Not marked	Not marked	Not marked	Not marked	Not marked
2	Pathology	3.4	3.5	0	8	1.7
3	Pathology	2.9	2	0	8	2.2
4	Optics	5.3	6.75	0	10	3.4
5	Optics	6.1	6.5	1	9	2.0
6	Optics	4.5	4.5	0	9.5	2.8
7	Optics	5.4	6	0	9	2.6
8	Investigations	5.5	6	0	9	1.6
9	Investigations	6.7	7.5	0.5	10	2.0
10	Investigations	5.4	5.5	0	10	2.3
11	Investigations	5.7	6	0	10	2.6
12	EBM	4.9	6	0	8.5	2.6
	Total	56	57	3	88.5	17.6

Candidates performed badly in or were particularly ill prepared for questions 2 and 3 (pathology). Two candidates achieved particularly low marks (3 & 7)

33% Item discrimination (ID) and facility (F) for each question and examiner:

(Table 11) Item discrimination and facility for each question and examiner

Q	Subject	33% ID Examiner A	F examiner A		33% ID examiner B	F examiner B	
1	Anatomy						
2	Pathology	237	22	5	263	30	5
3	Pathology	553	31	4	526	30	4
4	Optics	842	53	7	763	57	6
5	Optics	500	66	6	421	80	5
6	Optics	842	42	5	895	56	5
7	Optics	737	57	6	605	70	5
8	Investigations	474	76	5	579	54	6
9	Investigations	526	67	7	474	70	6
10	Investigations	526	54	6	500	54	6
11	Investigations	479	73	5	684	55	6
12	EBM	474	70	4	474	70	5

Questions 4 and 6 (optics) were better able to discriminate between the poor and good candidates based upon their performance in the CRQ overall. Question 2 (pathology) was relatively poor at discriminating between the poor and good candidates. The overall performance of candidates in the pathology questions was poor (facility 23 and 31)

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:

(Table 12) Standard setting by each examiner

	Topic	Examiners A				Examiners B			
		No. Fail	No. Border	No. Pass	Median Border	No. Fail	No. Border	No. Pass	Median Border
1	Anatomy								
2	Pathology	88	17	9	5	68	39	7	5
3	Pathology	75	14	25	4	79	14	21	4
4	Optics	50	6	58	7	47	16	51	6
5	Optics	34	29	51	6	19	34	61	5
6	Optics	65	22	27	5	52	11	51	5
7	Optics	35	57	22	6	37	15	62	5
8	Investigations	25	29	60	5	36	40	38	6
9	Investigations	37	41	36	7	27	44	43	6
10	Investigations	43	50	21	6	24	58	32	6
11	Investigations	31	16	67	5	45	24	45	6
12	EBM	27	14	73	4	31	16	67	5
Total									

(Table 13) Comparison between examiners

Q	Subject	Mean mark examiner A	Mean mark examiner B	Mean absolute difference	t test of difference	Correlation between marks	Correlation between global judgements
1	Anatomy						
2	Pathology	3.4	3.5	0.7	0.08	0.87	0.70
3	Pathology	2.9	2.9	0.4	1.0	0.95	0.87
4	Optics	5.2	5.4	0.9	0.02	0.94	0.87
5	Optics	6.1	6.1	0.9	0.70	0.84	0.70
6	Optics	4.2	4.9	0.9	0.00	0.92	0.79
7	Optics	5.4	5.4	0.6	0.70	0.94	0.72
8	Investigations	5.7	5.4	0.8	0.00	0.86	0.73
9	Investigations	7.0	6.5	0.9	0.00	0.87	0.70
10	Investigations	5.3	5.6	0.9	0.01	0.89	0.72
11	Investigations	5.8	5.7	0.4	0.16	0.96	0.70
12	EBM	4.6	5.2	0.3	0.00	0.89	0.70

(Table 14) Examiner concordance

Q	Examiner B - A									Pairings (A/B)
	Scripts remarked	-4	-3	-2	+/- 1 or 0	+2	+3	+4	+5	
1										
2				4	101	8	1			
3				4	108	2				
4			2	8	87	15	2			
5			2	8	89	13	2			
6			1	0	89	15	9			
7			1	3	105	2	3			
8			3	11	98	2				
9			3	16	92	3				
10				2	91	18	3			
11*			1	5	106	2				
12			1	9	72	23	9			
TOTAL			14	70	1038	103	29			

There was an error in the printing of question 1, which was removed from the examination.

An assessment of examiner concordance was made shortly after the scripts were marked. As there were no significant differences in the marks awarded by the 2 examiners for any questions, the senior examiner did not need to remark any questions. It is notable that:

- Candidates performed very badly in questions 2 & 3
- There were no significant concerns about the marking of any questions that justified remarking all of the scripts as:
 - No questions had relatively poor inter-examiner correlation (lowest value 0.84)
 - There were no questions with a mean absolute difference in marks >1.5 (although question 12 had a mean difference of 1.3, the median difference was 1.0)
- There was a significant difference in the variance in marking for question 12 which suggests that it was difficult for examiners to apply the marking guidance.

Comparison to previous years (Table 15)

	May 13	Oct 13	Jan 14	May 14	Oct 14	Jan 15	May 15
Mean score	57%	52%	47%	53%	50%	58%	51%
Median score	60%	54%	47%	55%	52%	62%	52%
Reliability	0.93	0.93	0.9	0.93	0.94	0.92	0.93
SEM	5	4.6	4.2	4.9	4.3	4.6	4.6
Pass mark	58%	60%	57%	56%	57%	61%	54%
Pass rate	54%	36%	25%	48%	38%	56%	49%
Correlation with MCQ	0.72	0.84	0.79	0.78	0.76	0.77	0.75

The correlation between the two parts of the examination is acceptable at 0.75

Overall Results

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

1. *Obtain a combined mark from both papers that equals or exceeds the combined pass marks obtained by the standard setting exercise explained above.*
2. *Obtain a mark in both papers that equals or exceeds the pass mark minus 1 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 127/230 (55%). The minimum mark required in each paper (to meet standard 2 above) was 63/120 in the MCQ paper and 54/110 in the CRQ paper.

Sixty-two candidates (54%) gained a total mark that met standard 1 above.

62/114 (54%) candidates passed the examination.

Distribution of scores (Table 16)

Range of marks	Distribution	Number
<60	/	1
61-70	//	2
71-80	////	5
81-90	////	5
91-100	//// ////	10
101-110	//// ///	8
111-120	//// //// ///	13
121-130	//// // / / /	12
131-140	//// //// /	11
141-150	//// //// //// /	16
151-160	//// //// //// /	16
161-170	//// ///	8
171-180	//// /	6
181-190	/	1
191-200		0
Total		114

Mean 128/230 (56%)

Median 131/230 (57%)

Range 42 –181 (18%-79%)

Comparison to previous years: (Table 17)

Examination	Candidates	Passed examination	% 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
July 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

Cumulative totals

Sitting	Candidates	Number passed	Pass rate (%)
January	611	251	41
May	711	323	45
October	989	479	48
All examinations	2311	1053	46

Breakdown of results by training number (%) (Table 18)

	Failed	Passed	Total
In OST	18 (36%)	32 (64%)	50 (44%)
Not in OST	34 (53%)	30 (47%)	64 (56%)
Foundation	0	0	0
Total	52 (46%)	62 (54%)	114

These differences are statistically significant (Fishers exact $p = 0.02$)

Breakdown of results by deanery (Table 19)

Deanery	Failed	Passed	Total
East Midlands	2	2	4
East of England	1	2	3
East of Scotland	0	2	2
KSS	1	4	5
London	2	5	7
Mersey	2	1	3
N Ireland	0	1	1
North of Scotland	1	1	2
North Western	1	3	4
Northern	1	1	2
Oxford	1	0	1
Peninsula	2	1	3
Severn	0	1	1
South East of Scotland	0	0	0
Wales	0	2	2
Wessex	0	0	0
West Midlands	2	2	4
West of Scotland	1	3	4
Yorkshire	1	1	2
Total	18	32	50

Breakdown of results by stage of training (Table 20)

Stage (includes FTSTA)	Failed	Passed	Total
ST1 (LAT or LAS)	6	22	28
ST2	8	7	15
ST3	1	1	2
Total in OST	16	33	49

Unknown for 1 candidate

Breakdown of results by gender (Table 21)

	Failed	Passed *	Total
Female	28	31	59
Male	23	31	54
Total	51	62	113

*Gender not declared by 1 candidate.

These differences are not statistically significant (Fishers exact, $p=0.7$)

Breakdown of results by country of qualification* (Table 22)

	Failed	Passed	Total
UK	20 (36%)	36 (64%)	56
Outside UK	31 (54%)	26 (46%)	57
Total	51 (45%)	62 (55%)	113

* Not declared by 1 candidates

These differences are almost statistically significant (Fishers exact $p=0.06$)

Breakdown of results by declared ethnicity (Table 23)

Ethnicity	Failed	Passed	Total
White	10 (29%)	24 (71%)	34
Non-white	28 (47%)	31 (53%)	59
Total	38 (41%)	55 (59%)	93

Ethnicity not declared by 21 candidates

These differences are not statistically significant (Fishers $p=0.13$)

Breakdown of results by first language (Table 24)

	Failed	Passed	Total
English	22 (37%)	37 (63%)	59 (73%)
Other	9 (41%)	13 (59%)	22 (27%)
Total	31 (38%)	50 (62%)	81

First language not declared by 33 candidates

These differences are not statistically significant (Fishers $p=0.8$)

Breakdown of results by number of attempts (Table 25)

Attempts	Failed	Passed	Total
1 (First)	30	41	71
2	13	14	27
3	6	5	11
4	1	1	2
5	0	1	1
6	0	0	0
7	1	0	1
8	0	0	0
9	1	0	1

Any resit	22	21	43
Total	52	62	114

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.

Deanery	Total candidates	Pass rate %
East of Scotland	7	100
Severn	11	73
Yorkshire	43	70
Oxford	13	69
KSS	26	65
South East of Scotland	17	65
North of Scotland	8	63
North Western	24	63
Northern	23	61
East Midlands	28	60
London	94	57
Wales	30	53
West Midlands	58	50
West of Scotland	42	50
East of England	31	48
Wessex	39	46
Peninsula	19	41
Mersey	36	39
N Ireland	21	38
Total	570	55