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FROM THE EXAMINATIONS DEPARTMENT

## Final Report January 2014 Part 1 FRCOphth Examination

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## Summary

The twenty-third Part 1 FRCOphth examination took place on 13 January 2014. 77 candidates sat the examination, of whom 23 (30%) fulfilled the criteria required to pass the examination overall. The performance of candidates in the January examination is usually poorer than in May and October, but this represents the lowest pass rate since May 2008.

Both parts of the examination had a high reliability (0.9) and were also highly correlated (0.79).

Candidates performed extremely well in the MCQ paper, which had a 71% pass rate. Performance in the CRQ paper was the poorest since the examination was introduced with a pass rate of only 25%.

The quality of the MCQ paper was lower than previous years, with only 42% of the questions having a 33% item discrimination greater than 0.250.

The CRQ paper marking is assessed for examiner concordance so that significant errors in marking can be reviewed before the results are known. Only five scripts required review by the Senior Examiner.

There were no statistically significant differences in the success rates of candidates based upon their country of qualification, ethnicity or first language. Candidates in OST performed no better than those were not in UK training posts. However there was a notable difference in the performance of candidates based upon gender, which was statistically significant. The pass rate for females was 16% compared to 44% for males.

## MCQ examination

### Content (Table 1)

Topic	Oct 2011	Jan 2012	May 2012	Oct 2012	Jan 2013	May 2013	Oct 2013	Jan 2014
Anatomy/embryology	23	25	23	24	25	24	24	24
Optics	25	25	24	24	25	24	24	24
Pathology	23	25	23	23	24	23	23	23
Pharmacology & genetics	18	17	18	18	20	18	18	18
Physiology	24	20	23	23	20	23	23	23
Miscellaneous & investigations	7	8	8	8	5	8	8	8
Total	120	120	119	117	119	120	120	120

### MCQ paper statistics

Mean score:	72.6 (60.5%)
Median score:	71 (59%)
Standard deviation:	12.13 (10.10%)
Candidates:	77
KR20: (measurement of reliability)	0.85
Standard error of measurement (SEM):	4.68
Range of marks:	44-103 (37% - 86%)
Pass mark derived from Standard Setting:	68 (57%)
Pass mark – 1 SEM	63 (53%)
Pass rate:	55/77 (71%)

### Distribution of results (Table 2)

Range of scores	Distribution	Number
1-30		0
31-40		0
41-50	///	3
51-60	//// //	9
61-70	//// // // // // // // // // //	24
71-80	//// // // // // // // // // //	22
81-90	//// // // //	14
91-100	///	4
101-120	/	1
Total		77

## Standard setting

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

**(Table 3)**

	Difficult	Moderate	Easy	Total
Essential	5	23	27	55
Important	8	26	19	53
Supplementary	1	5	6	12
Total	14	54	52	120

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

**(Table 4)**

	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 5)**

	Difficult	Moderate	Easy	Total
Essential	2.75	14.95	20.25	37.95
Important	3.6	13	10.45	27.05
Supplementary	0.25	1.25	1.5	3
TOTAL	6.6	29.2	32.2	68

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

## Comparison of pass marks and rates for last 7 MCQ papers (Table 6)

	Jan 12	May 12	Oct 12	Jan 13	May 13	Oct 13	Jan 14
Candidates	66	104	150	91	102	151	77
Mean score	64	66	70	67	69	72	73
Reliability (KR 20)	0.85	0.87	0.87	0.87	0.88	0.9	0.9
SEM	4.95	4.8	4.9	4.9	4.9	4	4.7
Standard setting	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel
Pass mark	66 (57%)	67 (56%)	66 (56%)	67 (56%)	69 (58%)	70 (58%)	68 (57%)
33% discrimination							
Negative	6	5	2	7	5	3	10
Poor (0-0.249)	56	54	51	47	48	48	59
Good (>0.250)	54	60	64	65	67	69	51
Facility							
Difficult (<25%)	5	10	2	8	5	2	12
Moderate	98	85	92	87	85	92	70
Easy (>75%)	13	4	23	24	30	26	38
Questions	116	119	117	119	120	120	120
Pass number (rate)	22 (42%)	51 (49%)	95 (63%)	46 (51%)	51 (50%)	88 (58%)	55 (71%)

## The CRQ paper

**(Table 7)**

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy	Visual pathway	6	Diagram
2	Pathology	Orbital tumour	8	Photomicrograph
3	Genetics	Mitochondria	7	Diagram
4	Optics	Spectacles	4	Prescription
5	Optics*	Focimeter	4	None
6	Optics	AC/A ratio	6	None
7	Optics	Lenses	5	None
8	Investigations	Ultrasound	6	B scan images
9	Investigations	Neuroimaging	6	MRI scans
10	Investigations	Hess chart	8	Hess chart
11	Investigations	Blood tests	7	Blood test results
12	Research	Critical appraisal	4	Abstract

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

### Statistics

Mean score:	56.8	(47.3%)
Median score:	56	(47%)
Standard deviation:	15.3	(12.7%)
Range of scores:	28-97	(23%- 80%)
Reliability: Cronbach alpha	0.92	
Standard error of measurement:	4.24	
Pass mark derived from Standard Setting:	68	(56.6%)
Pass mark – 1 SEM	64	(53%)
Pass rate	19/77	(25%)

### Distribution of scores (Table 8)

Range of marks	Distribution	Number
0-30	//	2
31-40	//// //// ///	13
41-50	//// ////	10
51-60	//// //// //// //// //	22
61-70	//// //// //	14
71-80	//// ////	10
81-90	////	5
91-100	/	1
101-120		0
Total		77

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 9) Results for each question**

Q	Subject	Mean	Median	Min	Max	SD
1	Anatomy	6.1	6	2	9	3.1
2	Pathology	3.7	3.5	0	9.5	2.6
3	Genetics	5.1	5.0	1	9	1.9
4	Optics	6.3	6.5	0.5	9.5	1.9
5	Optics	3.6	3.0	0	10	2.8
6	Optics	2.2	1.0	0	7	2.0
7	Optics	3.5	3.0	0	9	2.8
8	Investigations	4.7	5.0	0	9	1.9
9	Investigations	5.3	5.5	1	9	1.9
10	Investigations	6.3	6.5	1	9.5	1.9
11	Investigations	5.5	6.0	1	9	1.6
12	Research	4.2	4.5	0	8	2.0
	Total	56.6	55.5	28	97	15.3

Candidates performed badly in or were particularly ill prepared for questions 2 (pathology), 5, 6, 7 (optics) and 12 (research).

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

**(Table 10) Item discrimination and facility for each question and examiner**

Q	Subject	33% ID Examiner B	F examiner B	33% ID examiner A	F examiner A
1	Anatomy	0.31	73	0.19	82
2	Pathology	0.54	25	0.81	53
3	Genetics	0.46	47	0.27	73
4	Optics	0.58	70	0.50	66
5	Optics	0.65	30	0.73	31
6	Optics	0.54	29	0.46	23
7	Optics	0.46	25	0.42	19
8	Investigations	0.35	25	0.58	47
9	Investigations	0.35	51	0.27	45
10	Investigations	0.46	71	0.62	51
11	Investigations	0.46	49	0.31	61
12	Research	0.54	52	0.42	48

Questions 2 (pathology) and 4 (optics) were better able to discriminate between the poor and good candidates based upon their performance in the CRQ overall. Questions 1 (anatomy), 8 and 11 (investigations) were relatively poor at discriminating between the poor and good candidates. The performance of questions 2 (pathology) and 3 (genetics) differed markedly between examiners.

### 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 11) Standard setting by each examiner**

	Topic	Examiners B				Examiners A			
		No. Fail	No. Border	No. Pass	Median Border	No. Fail	No. Border	No. Pass	Median Border
1	Anatomy	14	28	35	6	15	30	32	5
2	Pathology	53	11	12	6	39	18	20	4
3	Genetics	40	17	20	5	22	18	37	5
4	Optics	27	15	35	6	16	39	22	6
5	Optics	50	12	15	6	48	20	9	6
6	Optics	51	17	9	4	58	8	11	4
7	Optics	59	6	12	6	59	9	9	7
8	Investigations	58	10	9	6	35	21	21	6
9	Investigations	41	16	20	6	43	19	15	6
10	Investigations	23	16	38	6	25	28	24	7
11	Investigations	26	28	23	6	16	45	16	6
12	Research	35	20	22	5	37	20	20	5
Total		477	196	250	68	413	275	236	67

**(Table 12) Comparison between examiners**

Q	Subject	Mean mark examiner B	Mean mark examiner A	Mean absolute difference	t test of difference	Correlation between marks	Correlation between global judgements
1	Anatomy	6.3	5.9	0.7	0.00	0.83	0.79
2	Pathology	3.7	3.7	0.5	0.77	0.96	0.79
3	Genetics	4.7	5.5	1.0	0.00	0.86	0.70
4	Optics	6.6	6.0	1.0	0.00	0.85	0.74
5	Optics	3.7	3.6	0.8	0.33	0.91	0.80
6	Optics	2.2	2.1	0.2	0.32	0.97	0.84
7	Optics	3.4	3.6	0.7	0.03	0.94	0.79
8	Investigations	4.4	5.1	1.1	0.00	0.83	0.50
9	Investigations	5.6	5.0	0.7	0.00	0.90	0.80
10	Investigations	6.5	6.1	0.8	0.00	0.87	0.72
11	Investigations	5.4	5.6	0.6	0.03	0.87	0.63
12	Research	4.3	4.2	1.2	0.88	0.74	0.67

**Comparison to previous years (Table 13)**

	Jan 12	May 12	Oct 12	Jan 13	May 13	Oct 13	Jan 14
Mean score	47%	58%	52%	50%	57%	52%	47%
Median score	48%	60%	54%	52%	60%	54%	47%
Reliability	0.87	0.92	0.93	0.93	0.93	0.93	0.9
SEM	5	5	4.5	5	5	4.6	4.2
Pass mark	54%	58%	54%	53%	58%	60%	57%
Pass rate	26%	51%	52%	48%	54%	36%	25%
Correlation with MCQ	0.66	0.70	0.78	0.79	0.72	0.84	0.79

The correlation between the two parts of the examination is acceptable at 0.79

## 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 136/240 (57%). The minimum mark required in each paper (to meet standard 2 above) was 63/120 in the MCQ paper and 64/120 in the CRQ paper.

Thirty candidates gained a total mark that met standard 1 above but 7 candidates failed to obtain the minimum mark required in the one of the papers and therefore failed the examination overall.

**23/77 (30%) candidates passed the examination.**

### Distribution of scores (Table 14)

Range of marks	Distribution	Number
<60		0
61-70		0
71-80		0
81-90	//// /	6
91-100	////	5
101-110	////	5
111-120	//// //// ////	15
121-130	//// //// ////	14
131-140	/// / /	7
141-150	//// /	8
151-160	//// /	8
161-170	////	5
171-180	/	1
181-190	/	1
191-200	//	2
201-210		0
Total		77

Mean 129/240 (54%) Median 126/240 (53%) Range 82-196 (34-82%)



### Comparison to previous years: (Table 15)

Examination	Candidates	Passed examination	% Passed	MCQ pass mark %	CRQ pass mark %
<b>Oct 2006</b>	33	3	9	58	62
<b>Jan 2007</b>	24	4	16	60	43
<b>May 2007</b>	32	5	15	50	64
<b>Oct 2007</b>	56	13	23	51	59
<b>Jan 2008</b>	73	27	37	56	55
<b>May 2008</b>	66	16	24	57	48
<b>Oct 2008</b>	88	45	51	58	51
<b>Jan 2009</b>	79	37	47	61	57
<b>July 2009</b>	49	33	67	63	58
<b>Oct 2009</b>	101	56	56	62	56
<b>Jan 2010</b>	50	20	40	63	58
<b>May 2010</b>	79	31	39	60	57
<b>Oct 2010</b>	89	34	38	61	54
<b>Jan 2011</b>	62	23	37	59	58
<b>May 2011</b>	95	47	49	54	57
<b>Oct 2011</b>	122	63	52	56	56
<b>Jan 2012</b>	66	20	33	57	54
<b>May 2012</b>	104	53	51	56	58
<b>Oct 2012</b>	150	84	56	56	54
<b>Jan 2013</b>	91	47	52	57	53
<b>May 2013</b>	102	54	53	58	58
<b>Oct 2013</b>	151	65	43	58	60
<b>Jan 2014</b>	77	23	30	57	57

### Cumulative Pass Rates (Table 16)

Sitting	Candidates	Number passed	Pass rate (%)
January	522	201	39
May	478	206	43
October	757	360	48

### Breakdown of results by training (Table 17)

	Failed	Passed	Total
In OST	18	10	28
Not in OST	36	13	49
Total	54	23	77

These differences are not statistically significant (p=0.44)

**Breakdown of results by deanery (Table 18)**

Deanery	Failed	Passed	Total
East Midlands	0	1	1
East of England	1	0	1
East of Scotland	0	0	0
KSS	3	1	4
London	3	0	3
Mersey	0	0	0
North of Scotland	0	0	2
North Western	1	1	0
Northern	0	2	2
N Ireland	2	0	2
Oxford	0	0	0
Peninsula	0	0	0
South East of Scotland	1	2	0
Severn	0	0	3
Wales	2	0	2
Wessex	0	0	0
West Midlands	1	1	2
West of Scotland	2	0	2
Yorkshire	2	2	4
Total	18	10	28

**Breakdown of results by stage of training (Table 19)**

Stage (includes FTSTA)	Failed	Passed	Total
<i>Foundation</i>	0	0	0
ST1	7	5	12
ST2	10	4	14
ST3	1 (LAT)	0	1
Total in OST	18	9	27

Stage of training unknown for 1 trainee

**Breakdown of results by gender (Table 20)**

	Failed	Passed	Total
Female	31	6	37
Male	20	16	36
Total	51	22	73

\*Gender not declared by 4 candidates.

These differences are statistically significant (p=0.01)

**Breakdown of results by country of qualification (Table 21)**

	Failed	Passed	Total
UK	27	11	38
Outside UK	27	12	39
Total	54	23	77

These differences are not statistically significant (p=1)

**Breakdown of results by declared ethnicity (Table 22)**

Ethnicity	Failed	Passed	Total
White	15	5	20
Non-white	30	13	43
Total	45	18	

Ethnicity not declared by 14 candidates

These differences are not statistically significant (p=0.77)

**Breakdown of results by first language (Table 23)**

	<b>Failed</b>	<b>Passed</b>	<b>Total</b>
English	29	14	43
Other	16	4	20
Total	45	18	63

First language not declared by 14 candidates

These differences are not statistically significant (p=0.37)

**Breakdown of results by number of attempts (Table 24)**

Attempts	Failed	Passed	Total
1 (First)	31	18	49
2	12	3	15
3	4	0	4
4	3	1	4
5	1	1	2
6	1	0	1
7	0	0	0
8	1	0	1
9	0	0	0
10	0	0	0
11	1	0	1
Any resit	23	5	28
Total	54	23	77

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**April 2014**

## 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	Number of candidates	Pass rate
East of Scotland	4	100
Yorkshire	31	74
East Midlands	17	71
Severn	10	70
North of Scotland	6	67
Oxford	9	67
Northern	18	61
South East of Scotland	14	57
London	64	55
North Western	11	55
KSS	16	50
Wales	20	50
East of England	23	48
West of Scotland	27	48
West Midlands	48	46
Mersey	21	43
Peninsula	10	40
Wessex	35	40
N Ireland	18	39
Total	402	53

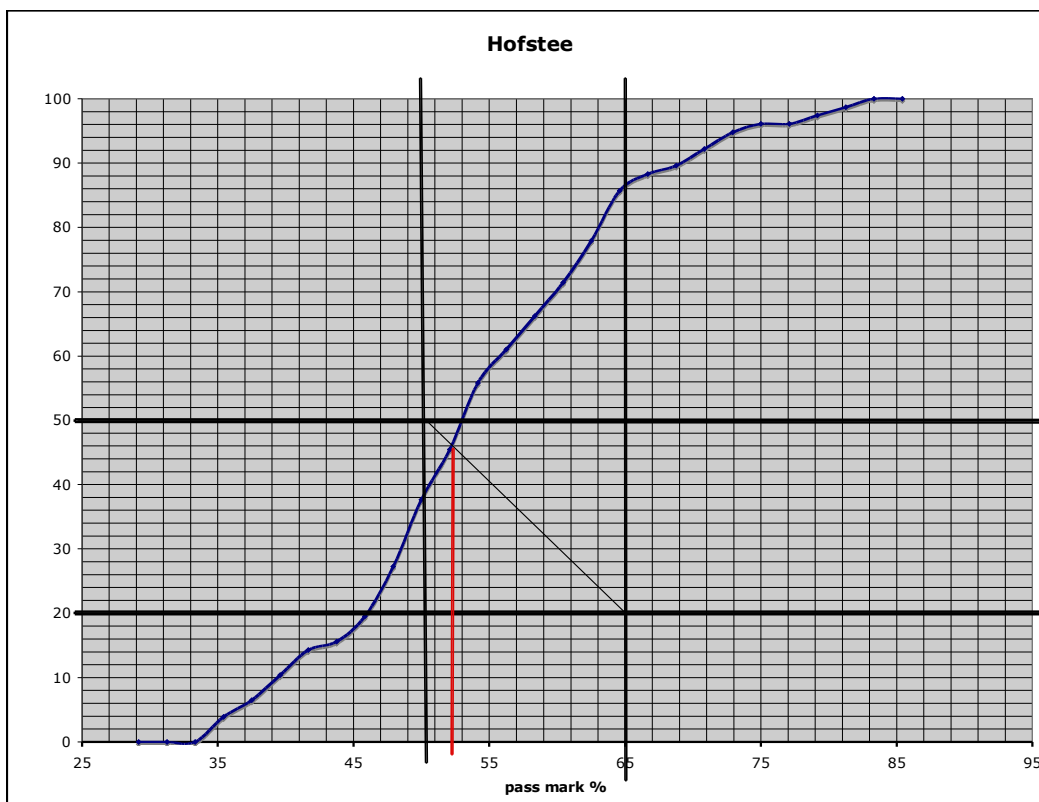
## Appendix 2 Hofstee pass mark

The Hofstee technique is an alternative method of standard setting, which is employed in addition to the Ebel and BCM. The pass mark that is generated is not used to decide the pass list, but acts as a useful way of checking the pass rate and pass mark.

The technique requires the examiners to agree a maximum and minimum acceptable pass marks and a maximum and minimum fail rates. This has not, as yet, been applied to the part 1 FRCOphth examination and the examiners values are therefore unknown. It is likely that the part 1 examiners would agree similar values to those chosen by the examiners for the part 2 written papers. These values are:

Maximum fail rate	50%
Minimum fail rate	20%
Maximum pass mark	65% (156/240)
Minimum pass mark	50% (120/240)

These values are then used to identify 2 coordinates on a plot of the fail rate against the pass mark for the examination. A line is drawn between the coordinates, which crosses the plot line. The pass mark is determined by dropping a line from the intersection to the X-axis as shown.



Using this method, the pass mark is 125/236 (52%), which is lower than the pass mark identified using the Ebel and BCM standard setting techniques. If this pass mark had been used, the pass rate for the examination overall would have been 55%.