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FROM THE EXAMINATIONS DEPARTMENT

Final Report October 2013 Part 1 FRCOphth Examination

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Summary

The twenty-second Part 1 FRCOphth examination took place on 7 October 2013. 151 candidates sat the examination, of whom 65 (43%) fulfilled the criteria required to pass the examination overall.

Both parts of the examination had a high reliability (0.9) and were also highly correlated (0.83).

The pass rate for the examination was the lowest since January 2012. Candidates performed well in the MCQ paper, which had a 58% pass rate. Performance in the CRQ paper was the poorest since January 2012 with a pass rate of only 36%.

The quality of the MCQ paper is now consistently high. Over of 50% of the questions have 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. In spite of the challenges with the marking the high number of scripts, only 8 questions 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. The pass rate for Foundation doctors was high at 55%. There was a notable difference in the performance of candidates based upon gender, which approached, but did not quite meet statistical significance. The pass rate for females was 35% compared to 51% for males.

MCQ examination

Content (Table 1)

Topic	May 2011	Oct 2011	Jan 2012	May 2012	Oct 2012	Jan 2013	May 2013	Oct 2013
Anatomy/embryology	25	23	25	23	24	25	24	24
Optics	25	25	25	24	24	25	24	24
Pathology	26	23	25	23	23	24	23	23
Pharmacology & genetics	15	18	17	18	18	20	18	18
Physiology	22	24	20	23	23	20	23	23
Miscellaneous & investigations	7	7	8	8	8	5	8	8
Total	120	120	120	119	117	119	120	120

MCQ paper statistics

Mean score:	72 (60.2%)
Median score:	74 (61.7%)
Standard deviation:	15.0 (12.5%)
Candidates:	151
KR20: (measurement of reliability)	0.9
Standard error of measurement (SEM):	4.9 (4%)
Range of marks:	43-108 (36%-90%)
Pass mark derived from Standard Setting:	70 (58%)
Pass mark – 1 SEM	65 (54%)
Pass rate:	88/151 (58%)

Distribution of results (Table 2)

Range of scores	Distribution	Number
1-30		0
31-40		0
41-50	//// // /	13
51-60	//// // / // / // / /	26
61-70	//// // / // / // / // / /	26
71-80	//// // / // / // / // / // / // / // /	44
81-90	//// // / // / // /	24
91-100	//// // /	12
101-120	//// /	6
Total		

Standard setting

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

(Table 3)

	Difficult	Moderate	Easy	Total
Essential	0	23	35	58
Important	2	20	25	47
Supplementary	7	5	3	15
Total	9	48	63	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	0	14.95	26.25	41.2
Important	0.9	10	13.75	24.65
Supplementary	1.75	1.25	0.75	3.75
TOTAL	2.65	26.2	40.75	69.6

The MCQ pass mark = 70/120 (58%)

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

	Oct 11	Jan 12	May 12	Oct 12	Jan 13	May 13	Oct 13
Candidates	122	66	104	150	91	102	151
Mean score	67	64	66	70	67	69	72
Reliability (KR 20)	0.87	0.85	0.87	0.87	0.87	0.88	0.9
SEM	4.87	4.95	4.8	4.9	4.9	4.9	4
Standard setting	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel
Pass mark	67 (56%)	66 (57%)	67 (56%)	66 (56%)	67 (56%)	69 (58%)	70 (58%)
33% discrimination							
Negative	10	6	5	2	7	5	3
Poor (0-0.249)	44	56	54	51	47	48	48
Good (>0.250)	66	54	60	64	65	67	69
Facility							
Difficult (<25%)	7	5	10	2	8	5	2
Moderate	91	98	85	92	87	85	92
Easy (>75%)	22	13	4	23	24	30	26
Questions	120	116	119	117	119	120	120
Pass number (rate)	67 (55%)	22 (42%)	51 (49%)	95 (63%)	46 (51%)	51 (50%)	88 (58%)

The CRQ paper

(Table 7)

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy	Visual pathway	10	Diagram
2	Pathology	Uveal melanoma	4	2 Photographs
3	Pathology	Keratitis	5	Photograph
4	Optics	Lenses	4	None
5	Optics*	Microscope	4	None
6	Optics	Lenses	5	4 Photographs
7	Optics	Lens aberration	9	Diagrams
8	Investigations	Myaesthesia	3	None
9	Investigations	Orbital mass	5	CT scan images
10	Investigations	Corneal topography	6	Topography image
11	Investigations	Genetics	10	Karyotype and family tree
12	Epidemiology	Performance of tests	5	Data

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

Statistics

Mean score:	61	(52%)
Median score:	63	(54%)
Standard deviation:	17.5	(15.1%)
Range of scores:	19-94	(16%-81%)
Reliability: Cronbach alpha	0.93	
Standard error of measurement:	4.6	
Pass mark derived from Standard Setting:	70/116	(60%)
Pass mark – 1 SEM	65	(56%)
Pass rate	54/151	(36%)

Distribution of scores (Table 8)

Range of marks	Distribution	Number
0-30		9
31-40		14
41-50		21
51-60		24
61-70		32 (3 = 70)
71-80		32
81-90		17
91-100		2
101-120		0
Total		

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:

* Question 6 was marked out of a possible 6

(Table 9)

Q	Subject	Mean	Median	Min	Max	SD
1	Anatomy	5.1	5.5	0	10	2.2
2	Pathology	5.0	5.5	0	9	2.5
3	Pathology	6.0	6	1.5	10	1.7
4	Optics	7.0	8	0	10	2.7
5	Optics	5.8	7	0	10	3.2
6	Optics*	4.4	4.5	0.5	6*	1.4
7	Optics	5.1	5.5	0	9.5	2.6
8	Investigations	3.6	3.5	0	8.5	2.3
9	Investigations	3.7	4	0	8.5	1.9
10	Investigations	5.1	5.5	0	9.5	2.0
11	Investigations	5.0	5	0	9	1.9
12	Epidemiology	4.6	5	0	10	3.0

* Question 6 was marked out of a possible 6

Candidates performed badly in or were particularly ill prepared for questions 8 and 9 (investigations).

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

(Table 10)

Q	Subject	33% ID Examiner B	F examiner B	33% ID examiner A	F examiner A
1	Anatomy	0.36	67	0.34	30
2	Pathology	0.7	49	0.72	51
3	Pathology	0.44	56	0.52	65
4	Optics	0.78	62	0.72	70
5	Optics	0.64	62	0.7	63
6	Optics	0.74	54	0.68	52
7	Optics	0.74	54	0.62	68
8	Investigations	0.4	34	0.46	23
9	Investigations	0.74	40	0.3	14
10	Investigations	0.62	46	0.62	32
11	Investigations	0.38	64	0.48	42
12	Epidemiology	0.72	58	0.64	39

Questions 2 (pathology), 4, 6, 7 (optics) and 12 (epidemiology) were better able to discriminate between the poor and good candidates based upon their performance in the CRQ overall. Questions 1 (anatomy) and 11 (investigations) were relatively poor at discriminating between the poor and good candidates. The performance of question 9 (investigations) 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)

	Topic	Examiners B				Examiners A			
		No. Fail	No. Border	No. Pass	Median Border	No. Fail	No. Border	No. Pass	Median Border
1	Anatomy	36	37	78	5	99	37	15	7
2	Pathology	66	52	33	6	60	33	58	6
3	Pathology	55	43	53	6	28	70	53	6
4	Optics	58	25	68	7	38	45	68	7
5	Optics	54	15	82	6	53	11	87	6
6	Optics	56	42	53	5	66	36	49	5
7	Optics	67	38	46	6	49	34	68	5
8	Investigations	91	29	31	5	99	40	12	6
9	Investigations	86	36	29	5	116	32	3	6
10	Investigations	77	39	35	6	95	52	4	7
11	Investigations	65	24	62	5	63	52	36	6
12	Epidemiology	55	43	53	5	88	32	31	6
Total		766	423	623	67	854	474	484	73

Comparison between examiners (Table 12)

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	5.3	4.9	0.6	0.000	0.94	0.56
2	Pathology	4.9	5.2	0.9	0.004	0.91	0.79
3	Pathology	5.8	6.2	0.5	0.000	0.91	0.79
4	Optics	6.9	7.2	0.6	0.000	0.94	0.78
5	Optics	5.7	5.9	0.6	0.048	0.96	0.93
6	Optics	4.4	4.3	0.4	0.226	0.90	0.66
7	Optics	5.1	5.1	0.8	0.338	0.93	0.74
8	Investigations	3.5	3.7	1.1	0.069	0.83	0.51
9	Investigations	4.0	3.4	0.9	0.000	0.85	0.64
10	Investigations	5.1	5.2	0.6	0.481	0.90	0.45
11	Investigations	5.1	5.0	0.2	0.105	0.97	0.86
12	Epidemiology	4.8	4.4	0.8	0.000	0.94	0.78

Comparison to previous years (Table 13)

	Oct 11	Jan 12	May 12	Oct 12	Jan 13	May 13	Oct 13
Mean score	57%	47%	58%	52%	50%	57%	52%
Median score	58%	48%	60%	54%	52%	60%	54%
Reliability	0.86	0.87	0.92	0.93	0.93	0.93	0.93
SEM	6	5	5	4.5	5	5	4.6
Pass mark	56%	54%	58%	54%	53%	58%	60%
Pass rate	59%	26%	51%	52%	48%	54%	36%
Correlation with MCQ	0.73	0.66	0.70	0.78	0.79	0.72	0.84

The correlation between the two parts of the examination is high at 0.84.

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 140/236 (59%). The minimum mark required in each paper (to meet standard 2 above) was 65/120 in the MCQ paper and 65/116 in the CRQ paper.

70 candidates gained a total mark that met standard 1 above but 5 candidates failed to obtain the minimum mark required in the one of the papers and therefore failed the examination overall.

65 (43%) candidates passed the examination.

Distribution of scores (Table 14)

Range of marks	Distribution	Number
<60		0
61-70	/	1
71-80	//// /	6
81-90	//// //// /	11
91-100	//// ////	9
101-110	//// //// ////	15
111-120	//// ////	10
121-130	//// //// //	12
131-140	//// //// //// //	18
141-150	//// //// //// ////	20
151-160	//// //// //// //	17
161-170	//// //// ////	15
171-180	//// ////	9
181-190	//// /	6
191-200	//	2
201-210		0
Total		151

Mean 136/240 (57%) Median 142/240 (59%) Range 41-203 (17-85%)

Comparison to previous years: (Table 15)

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

Breakdown of results by training (Table 16)

	Failed	Passed	Total
In OST	14	16	30
Not in OST	72	49	121
Total	86	64	151

These differences are not statistically significant (p=0.22)

Breakdown of results by deanery (Table 17)

Deanery	Failed	Passed	Total
East Midlands			0
East of England		1	1
East of Scotland			0
London & KSS	5	2	7
Mersey	1	3	4
North of Scotland			0
North Western			0
Northern		1	1
N Ireland	1	1	2
Oxford		1	1
Peninsula			0
South East of Scotland	1	1	2
Severn			0
Wales	1		1
Wessex		1	1
West Midlands	1	1	2
West of Scotland	2	2	4
Yorkshire	2	2	4
Total	14	16	30

Breakdown of results by stage of training (Table 18)

Stage (includes FTSTA)	Failed	Passed	Total
<i>Foundation</i>	20	16	36
ST1	7	8	15
ST2	5	7	12
ST3	0	1	1
Total in OST	14*	16	

*stage of training unknown for 2 trainees

Breakdown of results by gender (Table 19)

	Failed	Passed	Total
Female	44	24	68
Male	39	41	80
Total	83*	65	148

*Gender unknown for 3 candidates.

These differences are not statistically significant (p=0.07)

Breakdown of results by country of qualification (Table 20)

	Failed	Passed	Total
UK	50	41	91
Outside UK	36	24	60
Total	86	65	151

These differences are not statistically significant (p=0.62)

Breakdown of results by declared ethnicity (Table 21)

Ethnicity	Failed	Passed	Total
White	21	21	42
Non-white	53	38	91
Total	74	59	133

Ethnicity unknown for 18 candidates

These differences are not statistically significant ($p=0.45$)

Breakdown of results by first language (Table 2)

	Failed	Passed	Total
English	50	43	93
Other	22	15	37
Unknown	14	7	21
Total	86	65	151

These differences are not statistically significant ($p=0.57$)

Breakdown of results by number of attempts (Table 23)

Attempts	Failed	Passed	Total
1 (First)	61	52	113
2	17	7	24
3	3	4	7
4	3	2	5
5	1	0	1
6	0	0	0
7	0	0	0
8	0	0	0
9	1	0	1
Any resit	25	13	38
Total	86	65	151

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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 Scotland	4	100
Yorkshire	27	78
N Scotland	7	71
SE Scotland	11	64
Severn	11	64
Oxford	8	63
London	68	61
East Midlands	19	58
North Western	9	56
Wales	19	53
Northern	18	50
West Scotland	22	50
East of England	23	44
West Midlands	49	43
Wessex	37	38
Mersey	19	37
N Ireland	17	35
Peninsula	12	33
Total	380	52

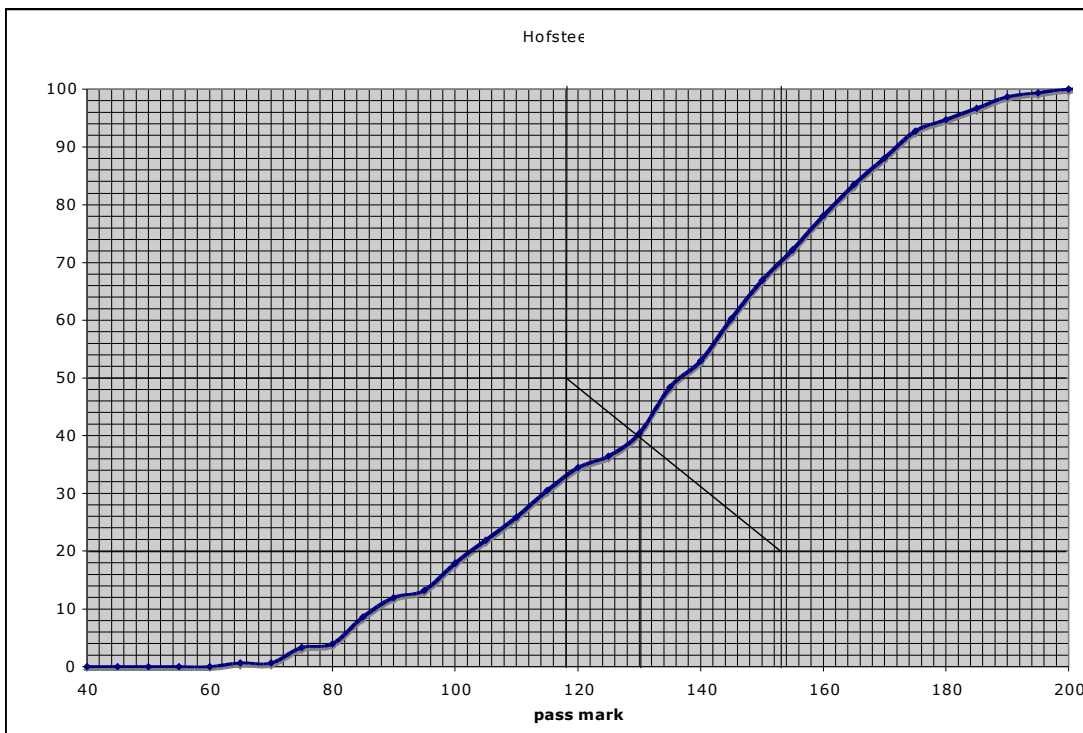
Appendix 2 Hofstee pass mark

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% (153/236)
Minimum pass mark	50% (118/236)

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 130/236 (55%), 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 60%.