

Examination Report

May 2014 Part 1 FRCOphth Examination



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Summary

The twenty-fourth Part 1 FRCOphth examination took place on 12 May 2014. 119 sat the examination, of whom 55 (46%) fulfilled the criteria required to pass the examination overall. The pass rate is slightly above the average for the May sitting of the examination.

Both parts of the examination had a high reliability (0.9) and had an acceptable correlation (0.78).

The pass rate in the MCQ paper fell to less than 50% for the first time since May 2012 and was considerably lower than the last sitting. Importantly this MCQ paper had the best statistics for item discrimination (61% were good discriminators) since the examination was introduced. The Part 1 FRCOphth Sub-Committee and Senior Examiner should be congratulated for their efforts in producing a paper of such high quality. One question was removed after marking after an error was identified. The pass mark was adjusted accordingly.

The pass rate in the CRQ paper was better than at the last sitting (48%). Unfortunately there were sufficient discrepancies identified with examiner concordance to prompt a complete remarking on all scripts for two questions.

There were no statistically significant differences in the success rates of candidates based upon their country of qualification, gender, country of qualification or first language. Candidates in OST performed no better than those were not in UK training posts. However there was a difference in the performance of candidates based upon ethnicity, which was statistically significant.

Mr Michael Nelson BSc (Hons) FRCOphth MAEd
Education Adviser

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MCQ examination

Content Table 1

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

MCQ paper statistics

Mean score:	68/119	57%
Median score:	67/119	56%
Standard deviation:	14.6	12.2%
Candidates:	119	
KR20: (measurement of reliability)	0.89	
Standard error of measurement (SEM):	4.8	
Range of marks:	35-100	29%-84%
Pass mark derived from Standard Setting:	69/119	58%
Pass mark – 1 SEM	64/119	53%
Pass rate:	54/119	45%

Distribution of results Table 2

Range of scores	Distribution	Number
1-30		0
31-40	///	3
41-50	//// //	13
51-60	//// //	20
61-70	//// //	34
71-80	//// //	23
81-90	//// //	16
91-100	//// //	10
101-120		0
Total		

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			
	< 0		0- 0.249		>0.250			
	Number	%	Number	%	Number	%	Total	%
Difficult Facility <25%	2	2	3	3	1	1	6	5
Moderate Facility 25-75%	1	1	28	24	53	45	82	69
Easy Facility >75%	1	1	12	10	18	15	31	26
Total	4	3	43	36	72	61	119	100

Standard setting

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

Table 4

	Difficult	Moderate	Easy	Total
Essential	0	28	30	58
Important	4	29	18	51
Supplementary	2	6	2	10
Total	6	63	50	119

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	0	18.2	22.5	40.7
Important	1.8	14.5	9.9	26.2
Supplementary	0.5	1.5	0.5	2.5
TOTAL	2.3	34.2	32.9	69.4

The MCQ pass mark = 69/119 58%

Comparison of pass marks and rates for last 7 MCQ papers

Table 7

	May 12	Oct 12	Jan 13	May 13	Oct 13	Jan 14	May 14
Candidates	104	150	91	102	151	77	119
Mean score	66	70	67	69	72	73	67
Reliability (KR 20)	0.87	0.87	0.87	0.88	0.9	0.9	0.9
SEM	4.8	4.9	4.9	4.9	4	4.7	4.8
Standard setting	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel
Pass mark	67 (56%)	66 (56%)	67 (56%)	69 (58%)	70 (58%)	68 (57%)	69 (58%)
33% discrimination							
Negative	5	2	7	5	3	10	4
Poor (0-0.249)	54	51	47	48	48	59	43
Good (>0.250)	60	64	65	67	69	51	72
Facility							
Difficult (<25%)	10	2	8	5	2	12	6
Moderate	85	92	87	85	92	70	82
Easy (>75%)	4	23	24	30	26	38	31
Questions	119	117	119	120	120	120	119
Pass number (rate)	51 (49%)	95 (63%)	46 (51%)	51 (50%)	88 (58%)	55 (71%)	54 (45%)

The CRQ paper

Table 8

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy	Autonomic nervous system	6	Drawings of pathways
2	Pathology	Chalazion	7	Histopathology
3	Pathology	Lid tumour	5	Pathology report
4	Optics*	Ophthalmoscope	4	None
5	Optics	Lenses	2	None
6	Optics*	Physiological optics	3	None
7	Optics*	Aberrations	4	None
8	Investigations	CT scan	6	CT scan image
9	Investigations	Angiography	6	IFA
10	Investigations	Visual fields	8	Humphrey 24-2
11	Investigations	Electrodiagnostics	7	VER
12	Genetics	Inheritance	5	Family tree

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

Statistics

Mean score:	63/120	53%
Median score:	66/120	55%
Standard deviation:	18.1	15.1%
Range of scores:	15 – 101	13%-84%
Reliability: Cronbach alpha	0.93	
Standard error of measurement:	4.9	
Pass mark derived from Standard Setting:	67/120	56%
Pass mark – 1 SEM	62/120	52%
Pass rate	57/118*	48%

* 1 candidate did not attend sit the CRQ paper

Distribution of scores Table 9

Range of marks	Distribution	Number
0-30	///// /	6
31-40	///// /////	10
41-50	///// ///// //	12
51-60	///// ///// ///// ///// /	21
61-70	///// ///// / / / / / / / / / / /	22
71-80	///// ///// ///// ///// ///// /	25
81-90	///// ///// ///// //	17
91-100	////	4
101-120	/	1
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:

Table 10 Results for each question

Q	Subject	Mean	Median	Min	Max	SD
1	Anatomy	5.0	5.5	0	10	2.4
2	Pathology	4.7	5	0	9.5	2.5
3	Pathology	5.2	5	1.5	8	1.6
4	Optics	4.0	4	0	10	2.3
5	Optics	6.0	8	0	10	3.5
6	Optics	5.6	6.5	0	9	2.6
7	Optics	6.5	7.5	0	10	2.9
8	Investigations	5.6	5.5	0.5	9.5	1.9
9	Investigations	5.3	5	0	10	2.3
10	Investigations	6.6	7	0	10	1.9
11	Investigations	4.4	4.5	0	10	2.6
12	Genetics	4.3	4.25	0.5	8	1.9
	Total	63.4	65.5	15	101	18.1

Candidates performed badly in or were particularly ill prepared for questions 2 (pathology), 4 (optics), 11 (investigations) and 12 (genetics).

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 B	F examiner B	33% ID examiner A	F examiner A
1	Anatomy	475	42	575	51
2	Pathology	325	31	275	79
3	Pathology	300	84	225	74
4	Optics	650	47	550	35
5	Optics	675	56	600	67
6	Optics	550	59	575	61
7	Optics	525	69	500	78
8	Investigations	400	72	750	51
9	Investigations	775	60	700	59
10	Investigations	275	81	550	46
11	Investigations	625	47	650	35
12	Genetics	400	25	475	36

Questions 4, 5 (optics), 9 and 10 (Investigations) were better able to discriminate between the poor and good candidates based upon their performance in the CRQ overall. Questions 2 and 3 (pathology) were relatively poor at discriminating between the poor and good candidates. The performance of questions 2 (pathology) and 10 (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 12 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	55	41	22	6	61	25	32	6
2	Pathology	72	17	29	7	25	30	63	3
3	Pathology	7	32	79	4	28	30	60	5
4	Optics	61	23	34	5	60	40	18	5
5	Optics	50	12	56	7	36	15	67	5
6	Optics	53	16	49	6	35	19	64	6
7	Optics	54	31	33	5	21	13	84	5
8	Investigations	33	40	45	5	47	45	26	6
9	Investigations	51	20	47	5	49	20	49	5
10	Investigations	16	14	88	6	51	31	36	7
11	Investigations	51	38	29	5	60	34	24	5.5
12	Genetics	76	32	10	6	56	44	18	5.5
Total		579	316	521	67	529	346	541	64

Table 13 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	4.8	5.3	0.6	0.000	0.947	0.746
2	Pathology	4.7	4.7	0.5	0.499	0.948	0.632
3	Pathology	4.8	5.6	1.3	0.000	0.688	0.372
4	Optics	4.3	3.6	0.9	0.000	0.900	0.767
5	Optics	6.0	6.0	0.3	0.899	0.979	0.853
6	Optics	5.4	5.8	0.7	0.001	0.920	0.734
7	Optics	6.3	6.7	0.6	0.000	0.949	0.574
8	Investigations	5.6	5.6	0.7	0.731	0.852	0.715
9	Investigations	5.2	5.3	0.7	0.227	0.911	0.807
10	Investigations	7.0	6.2	1.0	0.000	0.875	0.506
11	Investigations	4.4	4.4	0.8	0.527	0.907	0.716
12	Genetics	4.0	4.6	0.9	0.000	0.840	0.686

Comparison to previous years Table 14

	May 12	Oct 12	Jan 13	May 13	Oct 13	Jan 14	May 14
Mean score	58%	52%	50%	57%	52%	47%	53%
Median score	60%	54%	52%	60%	54%	47%	55%
Reliability	0.92	0.93	0.93	0.93	0.93	0.9	0.93
SEM	5	4.5	5	5	4.6	4.2	4.9
Pass mark	58%	54%	53%	58%	60%	57%	56%
Pass rate	51%	52%	48%	54%	36%	25%	48%
Correlation with MCQ	0.70	0.78	0.79	0.72	0.84	0.79	0.78

The correlation between the two parts of the examination is acceptable at 0.78

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 136/239 (57%). The minimum mark required in each paper (to meet standard 2 above) was 64/119 in the MCQ paper and 62/120 in the CRQ paper.

59 candidates gained a total mark that met standard 1 above but 4 candidates failed to obtain the minimum mark required in the one of the papers and therefore failed the examination overall.

55/119 (46%) candidates passed the examination.

Distribution of scores Table 15

Range of marks	Distribution	Number
<60	///	3
61-70	//	2
71-80	//	2
81-90	/////	7
91-100	////////	9
101-110	////////	8
111-120	//////////	16
121-130	////////	10
131-140	///	9
141-150	//////////	20
151-160	////////	11
161-170	////////	11
171-180	////	4
181-190	////	5
191-200	//	2
201-210		0
Total		119

Mean 131/239 (55%)

Median 134/239 (56%)

Range (49) 56 – 199 (23%-83%)

Comparison to previous years: Table 16

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

Sitting	Candidates	Number passed	Pass rate (%)
January	522	201	39
May	597	261	44
October	757	360	48

Breakdown of results by training Table 17

	Failed	Passed	Total
In OST	17	22	39
Not in OST	47	33	80
Total	64	55	119

These differences are not statistically significant ($p=0.17$)

Breakdown of results by deanery Table 18

Deanery	Failed	Passed	Total
East Midlands	2	0	2
East of England	0	0	0
East of Scotland	0	1	1
KSS	0	4	4
London	3	6	9
Mersey	3	0	3
N Ireland	1	0	1
North of Scotland	0	0	0
North Western	1	1	2
Northern	1	1	2
Oxford	0	0	0
Peninsula	1	0	1
Severn	0	0	0
South East of Scotland	0	1	1
Wales	1	2	3
Wessex	0	3	3
West Midlands	0	2	2
West of Scotland	2	0	2
Yorkshire	2	1	3
Total	17	22	39

Breakdown of results by stage of training Table 19

Stage (includes FTSTA)	Failed	Passed	Total
<i>Foundation</i>	0	0	0
ST1	13	17	30
ST2	4	5	9
ST3	0	0	0
Total in OST	17	22	39

Breakdown of results by gender Table 20

	Failed	Passed *	Total
Female	33	28	61
Male	31	25	56
Total	64	53	117

*Gender not declared by 2 candidates.

These differences are statistically not significant ($p=1$)

Breakdown of results by country of qualification Table 21

	Failed	Passed	Total
UK	29	31	60
Outside UK	35	24	59
Total	64	55	119

These differences are not statistically significant ($p=0.27$)

Breakdown of results by declared ethnicity Table 22

Ethnicity	Failed	Passed	Total
White	8	13	21
Non-white	50	30	80
Total	58	43	101

Ethnicity not declared by 18 candidates

These differences are statistically significant ($p=0.05$)

Breakdown of results by first language Table 23

	Failed	Passed	Total
English	34	33	67
Other	24	11	35
Total	58	44	102

First language not declared by 17 candidates

These differences are not statistically significant ($p=0.53$)

Breakdown of results by number of attempts Table 24

Attempts	Failed	Passed	Total
1 (First)	34	40 (54%)	74
2	15	9 (38%)	24
3	7	3 (30%)	10
4	1	2 (67%)	3
5	2	1 (33%)	3
6	2	0 (0%)	2
7	1	0 (0%)	1
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	2	0 (0%)	2
Any resit	30	15 (33%)	45
Total	64	55 (46%)	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:

Deanery	Number of candidates	Pass rate (%)
East of Scotland	5	100
Yorkshire	34	71
Severn	10	70
North of Scotland	6	67
Oxford	9	67
East Midlands	19	63
KSS	20	60
Northern	20	60
South East of Scotland	15	60
London	73	56
North Western	13	54
Wales	23	52
East of England	23	48
West Midlands	50	48
Wessex	38	45
West of Scotland	29	45
Mersey	24	38
N Ireland	19	37
Peninsula	11	36
Total	441	54

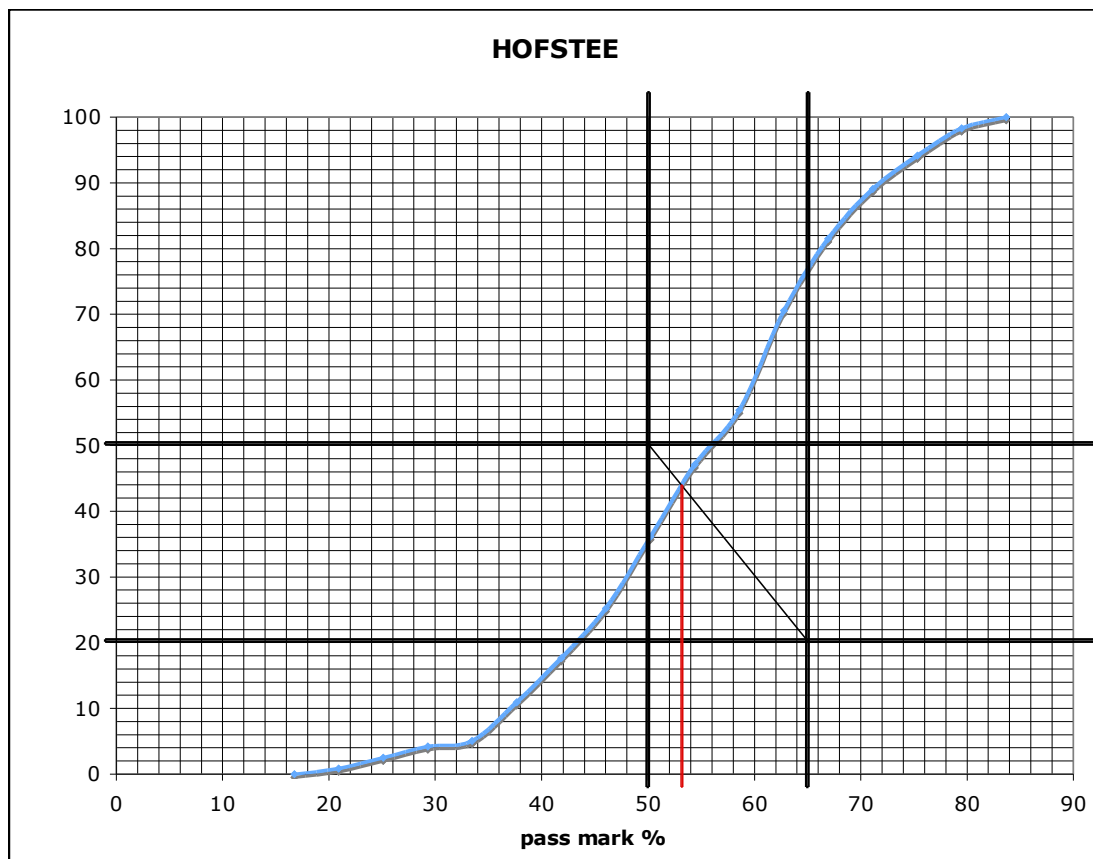
Appendix 2 Hofstee pass mark

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% (155/239)
Minimum pass mark	50% (120/239)

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 127/239 (53%), 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 66/119 (55%).