

# Examination Report

## September 2014 Diploma Examination



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## **Summary**

This was the fourth sitting of the current format for the Diploma examination. Only 6/14 of the candidates sat the written papers with the remainder having been granted exemption. Although the numbers are too small to draw firm statistical conclusions, the results suggest that these two groups of candidates perform differently in the oral part of the examination. Only two candidates who sat the written part of the examination went on to pass the examination

The small number of candidates limits interpretation of the statistical analysis of the written papers. The MCQ paper was reliable and the quality of the questions high. The pass rate was 50% with a stable pass mark of 50%. Unfortunately two questions were found to be ambiguous and so were removed after marking. The pass rate for the CRQ paper was again very low at 17%. Only 2/6 candidates passed the written examination, both of whom went on to pass the examination overall.

The structured viva and OSCE parts of the examination were both reliable. There was a wide variation in the performance of candidates. Nine (64%) candidates passed the viva, and seven (50%) passed the OSCE. All of the candidates who passed the OSCE passed the examination overall.

This sitting of the new style diploma examination attracted the fewest candidates to date, and the effort that goes into producing an examination with four components will be difficult to justify if the numbers do not grow. The poor performance of the candidates who were not exempt from the written paper is of concern and the content and standard of the questions in the MCQ and CRQ should be reviewed.

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The written part of the DRCOphth examination took place on 15 September 2014 in London. Six candidates sat the written papers, two of whom fulfilled the criteria required to pass the written examination overall.

### MCQ paper

**Table 1 Content**

Topic	Number	%
Anatomy	24	20
Physiology	24	20
Pathology	24	20
Pharmacology	18	15
Optics	24	20
Miscellaneous	6	5
TOTAL	120	

### MCQ paper statistics

Mean score:	61.5	(52%)
Median score:	59	(50%)
Standard deviation:	13.9	(11.8%)
Candidates:	6	
KR20: (measurement of reliability)	0.9	
Standard error of measurement (SEM):	4.9	
Range of marks:	46-86	(39%-73%)
Pass mark derived from Standard Setting:	59/118	(50%)
Pass rate	3/6	(50%)

Two questions were removed after the paper was marked after errors were identified. The MCQ paper was therefore marked out of 118.

**Table 2 Distribution of results**

Range of scores	Distribution	Number
41-50	/	1
51-60	///	3
61-70	/	1
71-80		
81-90	/	1
Total		6

## Standard setting

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

The examiners agreed the distribution of the questions in each category:

**Table 4**

	Difficult	Moderate	Easy	Total
Essential	2	22	32	56
Important	2	25	14	41
Supplementary	2	12	7	21
Total	6	59	53	118

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

**Table 5**

	Difficult	Moderate	Easy
Essential	0.5	0.55	0.65
Important	0.4	0.45	0.5
Supplementary	0.25	0.3	0.3

**Table 6**      **Weighted marks**

	Difficult	Moderate	Easy	Total
Essential	1	12.1	20.8	33.9
Important	0.8	11.25	7	19.05
Supplementary	0.5	3.6	2.1	6.2
Total	2.3	26.95	29.9	59.15

**The final pass mark = 59/118 (50%)**

**Summary of pass marks and pass rates for the MCQ papers to date**

**Table 7**

	September 2011	September 2012	September 2013	September 2014
Candidates	7	6	7	6
Mean score	64/119 (54%)	74/119 (62%)	64/120 (53%)	61.5/118 (52%)
Median score	61/119 (51%)	75/119 (63%)	68/120 (57%)	59/118 (50%)
Reliability (KR 20)	0.6	0.89	0.84	0.9
SEM	5	5	5	5
Standard setting	Ebel	Ebel	Ebel	Ebel
Pass mark	58 (49%)	58 (49%)	60 (50%)	59 (50%)
33% discrimination				
Negative	21	15	21	17
Poor	51	47	34	46
Good	47	58	65	55
Facility				
Difficult (<25%)	10	13	18	24
Moderate	36	56	76	66
Easy (>75%)	23	51	26	28
Pass rate	86%	89%	57%	50%

**The CRQ paper**

The examination covered the following areas:

**Table 8**

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy	Retinal anatomy	4	OCT image
2	Investigations	Orthoptics	5	Field of BSV
3	Investigations	Exophthalmometer	5	Device
4	Optics	Maddox rod	5	Device
5	Optics	Lens aberrations	4	None
6*	Optics	Catoptrics	4	None
7	Management	Skin pathology	5	Clinical image
8	Management	CRVO	4	Clinical image
9	Pathology	Retinoblastoma pathology	4	Pathology
10	Optics	Indirect ophthalmoscope	4	Device
11	Optics	Cross cylinder	4	Device
12	Investigations	Retinoschisis	6	OCT image

## Statistics

Mean score:	57/120	(47.5%)
Median score:	50.5	(42%)
Standard deviation:	17.1	(14%)
Range of scores:	39-85	(33%-71%)
Reliability: Cronbach alpha	0.94	
Standard error of measurement:	4	
Pass mark derived from Standard Setting:	73/120(61%)	
Pass rate	1/6	(17%)

Two examiners mark each question. The mark awarded to a candidate for each question is the average awarded by the two examiners.

**Table 9 Correlation between examiners marks:**

1	2	3	4	5	6	7	8	9	10	11	12
0.95	0.84	0.90	0.76	0.82	0.96	0.79	0.97	0.91	0.97	0.94	0.58

**Table 10 Correlation between examiners global judgments:**

1	2	3	4	5	6	7	8	9	10	11	12
0.8	0	0.8	0.6	0.9	0.8	0.4	1	0.9	1	0.7	1

**Table 11 Distribution of scores**

Range of marks	Distribution	Number
31-40	/	1
41-50	//	2
51-60	/	1
61-70	/	1
71-80		
81-90	/	1
Total		6

One candidate's performance was extremely poor.

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

**Table 12**

Q	Subject	Mean	Median	SD	Min	Max
1	Retinal anatomy	5.9	6.25	1.20	4	7
2	Orthoptics	1.1	1	0.66	0	2
3	Exophthalmometer	6.0	5.75	2.17	3	9.5
4	Maddox rod	4.6	3.75	2.60	2	9.5
5	Lens aberrations	4.3	4.25	2.62	0	7.5
6	Catoptrics	3.8	4	3.09	0	8.5
7	Skin pathology	4.3	4.75	2.44	1	7.5
8	CRVO	6.8	7	2.34	4	9
9	Retinoblastoma pathology	7.0	7	2.02	4.5	9.5
10	Indirect ophthalmoscope	7.0	8.25	2.76	3.5	9.5
11	Cross cylinder	3.1	3	1.53	1	4
12	Retinoschisis	3.0	2.75	0.77	2.5	4.5

Candidates performed badly with questions 2 (orthoptics), 6, 11 (optics) and 12 (investigations)

### Summary of statistics

**Table 13**

	2011	2012	2013	2014
Mean score	68/120 (57%)	80/120 (67%)	59/110 (54%)	57/120 (47.5%)
Median score	74/120 (62%)	82.5/120 (69%)	54/110 (49%)	50.5/120 (42%)
Standard deviation	18 (15%)	12.6 (11%)	13.8 (12.5%)	17.1 (14%)
Reliability	0.9	0.9	0.9	0.9
SEM	5	7	5	4
Pass mark	66/120 (55%)	75/120 (63%)	62/110 (56%)	73/120 (61%)
Pass rate	6/7 (86%)	5/6 (83%)	2/7 (29%)	1/6 (17%)
Correlation with MCQ	0.45	0.83	0.73	0.92

### Standard setting

The Angoff method was used to identify the pass mark for the CRQ. The standard expected from a borderline candidate was explained after which the examiners who to mark the CRQ paper were asked to agree the expected score for each question. The sum of each borderline score was used to produce the pass mark:

**Table 14**

	Topic	Sections	Data	Tasks	Angoff
1	Retinal anatomy	4	OCT image	Label diagram	7
2	Orthoptics	5	Field of BSV	Describe	5
3	Exophthalmometer	5	Device	Explain use	5
4	Maddox rod	5	Device	Explain optics and use	5
5	Lens aberrations	4	None	Ray diagrams	5
6	Catoptrics	4	None	Explain	4
7	Skin pathology	5	Clinical image	Describe	7
8	CRVO	4	Clinical image	Explain	8
9	Retinoblastoma pathology	4	Pathology	Describe	7
10	Indirect ophthalmoscope	4	Device	Ray diagram	7
11	Cross cylinder	4	Device	Explain optics and use	7
12	Retinoschisis	6	OCT image	Describe	6

Pass mark = 73/120 (61%)

### Overall Results for the written papers

Candidates are allowed a degree of cross compensation between the MCQ and CRQ papers. A marginal fail in one the written paper can be compensated by an exceptional performance in the other paper.

The pass marks for both papers are combined to produce a combined pass mark for the written part of the examination of 132/238 (55%)

Candidates must obtain at least the pass mark minus 1 SEM in each paper. The minimum mark required in each paper was 54/118 in the MCQ paper and 69/120 in the CRQ paper.

Only two candidates gained marks that met both standards above and therefore passed the written examination overall.



**Table 15**      **Distribution of scores**

Range of marks	Distribution	Number
91-100	//	2
101-110	/	1
111-120	/	1
121-130		
131-140	/	1
141-150		
151-160		
161-170		
171-180	/	1
Total		6

Mean                    119/238      (50%)  
Median                109.5/238    (46%)  
Minimum              91/238(38%)  
Maximum              171/238      (72%)

The oral parts of the DRCOphth examination were held on 16 and 17 September 2014.

### Candidates

14 candidates sat the clinical examination. Eight candidates had gained exemption from the written papers having passed the Part 1 FRCOphth, Part 2 MRCOphth or Part 2 MRCSEd examinations.

### The Structured Vivas

There were five structured vivas, which were held on 16 September at the Royal College of Ophthalmologists in London. The communication skills OSCE station was conducted as one of the viva stations, making six stations in all. Each viva lasted 5 minutes. The stations were:

**Station 1.** Patient investigations and data interpretation  
Round 1: Giant cell arteritis  
Round 2: Glaucoma

**Station 2.** Patient management 1  
Round 1: Cataract surgery  
Round 2: Strabismus

**Station 3.** Patient management 2  
Round 1: Orbital cellulitis  
Round 2: Orbital trauma

**Station 4.** Ethics and evidence based medicine  
Round 1: Wet AMD studies  
Round 2: Diabetic retinopathy NICE guidance

**Station 5.** Public Health  
Round 1: Endophthalmitis  
Round 2: Glaucoma

The examination was conducted in three rounds. Each station began with a clinical scenario, and subsequent discussion was based upon, but not limited to, the clinical diagnosis suggested by the scenario.

### Results:

Maximum mark (5 stations, 10 examiners, 6 marks per station):	60	
Pass mark (using borderline candidate method):	30.5/60	(51%)
Mean score:	34/60	(57%)
Median score:	34/60	(57%)
Range:	14-51	(23%-85%)
Standard deviation	10.7	(18%)
Reliability: (Cronbach alpha)	0.9	
SEM:	3.87	
Adjusted pass mark (+ 1 SEM)	34/60	(57%)
Pass rate	9/14	(64%)

**Table 16** Distribution of results

Range of scores	Distribution	Number
11-15	/	1
16-20		
21-25	//	2
26-30	/// <i>///</i>	2
31-36	/// <i>///</i>	3
36-40	/// <i>///</i>	3
41-45		
46-50	//	2
51-55	/	1
56-60		
Total		14

**Table 17** Results for each station

Station		Mean score	Median score	Range
1	Patient Investigations	7	8	0-11
2	Patient Management 1	6.4	5	2-12
3	Patient Management 2	7.1	9	1-11
4	Ethics and EBM	6.5	7	2-12
5	Public Health	7.2	7.5	3-11

**Table 18** Correlation between examiner's marks at each station:

<i>Station 1</i>	<i>Station 2</i>	<i>Station 3</i>	<i>Station 4</i>	<i>Station 5</i>
<i>PI</i>	<i>PM1</i>	<i>PM2</i>	<i>AER/EBM</i>	<i>Public health</i>
<i>0.85</i>	<i>0.85</i>	<i>0.86</i>	<i>0.83</i>	<i>0.79</i>

**Table 19** Correlation between examiner's global judgements at each station:

<i>Station 1</i>	<i>Station 2</i>	<i>Station 3</i>	<i>Station 4</i>	<i>Station 5</i>
<i>PI</i>	<i>PM1</i>	<i>PM2</i>	<i>AER/EBM</i>	<i>Public health</i>
<i>0.94</i>	<i>0.60</i>	<i>0.90</i>	<i>0.87</i>	<i>0.70</i>

**Table 20** Correlation between viva stations:

		<i>Station 2</i>	<i>Station 3</i>	<i>Station 4</i>	<i>Station 5</i>
		<i>PM1</i>	<i>PM2</i>	<i>AER/EBM</i>	<i>Public health</i>
<i>Station 1</i>	PI	0.29	0.43	0.63	0.26
<i>Station 2</i>	PM1		0.15	0.36	0.24
<i>Station 3</i>	PM2			0.37	0.29
<i>Station 4</i>	AER/EBM				0.67

**Table 21 Standard setting for the structured vivas:**

	1		2		3		4		5		Total
<i>Number of borderline candidates</i>	3	4	3	4	1	2	5	4	3	6	
<i>Median borderline candidate mark</i>	3	3	3	3	3	3.5	3	3	3	3	30.5

The pass mark for the structured viva was increased by 1 SEM to 34

### The OSCE

There were seven OSCE stations in all. The six clinical stations were held on 18 September the Moorfields Eye Hospital. The communication OSCE was conducted with the vivas. There were four rotations. Stations 1-6 last 10 minutes, Station 7 lasts 5 minutes.

Station 1: Posterior Segment 1

Station 2: Anterior Segment

Station 3: Strabismus and Neuro-Ophthalmology

Station 4: Posterior Segment 2

Station 5: Pupils and Visual Fields

Station 6: External Eye

Station 7: Communication Skills (takes place with Structured Viva)

Patients with appropriate conditions were available for the examination.

### Results

Candidates examine two patients in stations 1-6 and each patient is worth a maximum of 12 marks (2 examiners x 3 marks x 2 criteria). One patient is examined in station 7 (communication skills) and is worth a maximum of 18 points. The maximum mark for the OSCE therefore 162.

Pass mark (using borderline candidate method):	80/162	(49%)
Mean score:	91/162	(56%)
Median score:	89.5/162	(55%)
Range:	31-134	(19%-83%)
Reliability (Cronbach alpha):	0.9	
SEM:	8	
Adjusted pass mark (+1 SEM)	88/162	(54%)
Pass rate	7/14	(50%)

**Table 22** Distribution of results

Range of scores	Distribution	Number (candidates sat written paper)
21-30		
31-40	/	1
41-50		
51-60		
61-70	//	2
71-80	/	1
81-90	///	3
91-100	//	2
101-110	//	2
111-120	//	2
121-130		
131-140	/	1
Total		14

**Table 23** Station marks

Station		Maximum possible	Mean	Median	Min	Max
1	Posterior segment 1	24	13.4	14.5	4	24
2	Anterior segment	24	13.6	13	4	24
3	Strabismus and Neuro-ophthalmology	24	11.1	11.5	0	20
4	Posterior segment 2	24	15.5	18	5	24
5	Pupils and visual fields	24	12.1	11.5	4	20
6	External eye	24	14.8	16	2	22
7	Communication	18	10.3	9	3	18

**Table 24** Correlation between examiner's marks at each station

<i>Station 1</i>	<i>Station 2</i>	<i>Station 3</i>	<i>Station 4</i>	<i>Station 5</i>	<i>Station 6</i>	<i>Station 7</i>
<i>Posterior segment</i>	<i>Anterior segment</i>	<i>Strabismus neuro</i>	<i>Posterior segment</i>	<i>Pupils fields</i>	<i>External</i>	<i>Comms</i>
0.87	0.87	0.92	0.82	0.87	0.82	0.77

**Table 25** Correlation between examiner's global judgements at each station

<i>Station 1</i>	<i>Station 2</i>	<i>Station 3</i>	<i>Station 4</i>	<i>Station 5</i>	<i>Station 6</i>	<i>Station 7</i>
<i>Posterior segment</i>	<i>Anterior segment</i>	<i>Strabismus neuro</i>	<i>Posterior segment</i>	<i>Pupils fields</i>	<i>External</i>	<i>Comms</i>
0.85	0.77	0.88	0.84	0.84	0.83	0.57

**Table 26** Correlation between station scores (combined marks 2 examiners)

		Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
		Anterior segment	Strabismus neuro	Posterior segment	Pupils fields	External	Comms
Station 1	Posterior segment	0.59	0.61	0.26	0.21	0.61	0.42
Station 2	Anterior segment		0.60	0.64	0.02	0.65	0.24
Station 3	Strabismus neuro			0.66	0.21	0.57	0.32
Station 4	Posterior segment				0.00	0.48	0.14
Station 5	Pupils fields					-0.32	-0.09
Station 6	External						0.54

**Table 27** Standard setting for the OSCE

Station	1		2		3		4		5		6		7		Total
No. of borderline candidates	1	5	6	6	3	4	2	2	4	7	2	1	3	6	
Median borderline candidate score	8	6	5.5	5.5	6	4.5	6	6	6	6	6	6	4	4.5	80

The pass mark for the OSCE was increased by 1 SEM to 88/162 (54%).

### Overall results for the oral examination

Pass mark	122/222	(55%)
Mean	125/222	(56%)
Median	125/222	(56%)
Range	45-185	(20%-83%)

To pass the oral examination candidates must achieve 122/222 overall, 34/60 in the viva and 88/162 in the OSCE)

Pass rate for the oral examination	7/14	(50%)
Pass rate for the entire examination	7/14	(50%)

**Table 28**      **Distribution of scores**

Score	Distribution	Total (candidates who sat written paper)
41-50	/	1 (1)
51-60		
61-70		
71-80		
81-90		
91-100	//	2 (2)
101-110	/	1 (0)
111-120	//	2 (1)
121-130	///	3 (1)
131-140		
141-150	//	2 (1)
151-160		
161-170	//	2 (0)
171-180		
181-190	/	1 (0)
191-200		
201-210		
Total		14 (6)

**Final results**

To be awarded the Diploma of the Royal College of Ophthalmologists (DRCOphth) candidates are expected to:

1. Achieve a total mark from all 4 parts of the examination (MCQ, CRQ, viva and OSCE) that equals or exceeds the sum of the pass marks for each examination, AND
2. Achieve a mark in each of the written parts of the examination that equals or exceeds the pass mark minus 1 SEM, AND
3. Achieve a mark in the viva that equals or exceeds the pass mark agreed by the BCM standard setting plus 1 SEM.
4. Achieve a mark in the OSCE that equals or exceeds the pass mark plus 1 SEM.

A degree of cross-compensation is therefore allowed between the 4 parts of the examination, with the exception of the OSCE, which must be passed outright.

Seven candidates met all 4 standards and passed the examination (5 were exempted from the written papers having passed the part 1 FRCOphth examination). Both candidates who passed the written examination passed the oral examination.

**Table 29**      **Correlation between scores in each part of examination:**

	CRQ*	VIVA	OSCE
MCQ*	0.92	0.77	0.65
CRQ*		0.88	0.86
VIVA			0.93

(\*Correlation between written and oral papers based upon the results from only 6 candidates)

**Correlation between written and oral examinations = 0.81**

**Table 30 Summary of examination statistics**

Date	2011	2012	2013	2014
Candidates	20 (7 written)	18 (6 written)	21 (7 written)	14 (6 written)
MCQ pass mark	58	58	60	59
Reliability	0.6	0.89	0.84	0.9
CRQ pass mark	66/120	75/120	62/110	73
Reliability	0.9	0.9	0.87	0.9
Viva pass mark	36	36	35	34
Reliability	0.7	0.75	0.92	0.9
OSCE pass mark	89	95	90	88
Reliability	0.9	0.83	0.96	0.9
Written pass rate	6/7	5/6	3/7	2/6
Oral pass rate	17/20	13/18	16/21	7/14
Overall pass rate	15/20 (75%)	12/18 (67%)	14/21 (67%)	7/14 (50%)