

# Examination Report

## June 2016 Refraction Certificate Examination



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## 1. Introduction

The 22nd Refraction Certificate examination in the format was held in Kuching for the 3<sup>rd</sup> time in June 2016. Twenty-three candidates presented themselves for the examination. The examination consisted of a 12 station OSCE covering a range of skills required to assess visual acuity, refractive error and the prescription of spectacles.

### Examination blueprint

The Refraction Certificate (RCert) is designed to assess the following learning outcomes from the Royal College of Ophthalmologists curriculum for ophthalmic specialist training (OST):

CA2	Vision
CA7	Motility
PM1	Management plan
PM14	Spectacles
PS2	Refraction
PS21	Hand hygiene
C1	Rapport
C2	Communication
C12	Records
BCS6	Optics
BCS14	Instrument technology
AER16	Time management

### Examination Structure

The examination consists of 12 OSCE stations. Each station contributes a possible 15 marks to the overall total. The stations used for the examination were:

1. Cycloplegic Retinoscopy (CR1)
2. Cycloplegic Retinoscopy (CR2)
3. Subjective Refraction Cylinder (SRC)
4. Cycloplegic Retinoscopy (CR3)
5. Cycloplegic Retinoscopy (CR4)
6. Lens Neutralisation (LN)
7. Non Cycloplegic Retinoscopy (NCR1)
8. Non Cycloplegic Retinoscopy (NCR2)
9. Visual acuity and IPD measurement (VA)
10. Subjective Refraction Sphere (SRS)
11. Binocular balance (BB)
12. Near Addition (NA)

## 2. Summary

This is the 14<sup>th</sup> sitting of the refraction certificate with 12 OSCE stations. This was the third refraction certificate exam to be held in Kuching, Malaysia. The reliability of the examination is slightly lower than previous years (Cronbach alpha 0.6).

The Hofstee method of standard setting was used to identify the pass mark for this examination, which was 70%. Two stations achieved high mean and median scores, the cyl, near add, and cycloplegic ret station 4. The stations done very poorly overall were lens neutralisation, non cycloplegic retinoscopy and cycloplegic retinoscopy station 2.

This is interesting as candidates demonstrated an excellent technique in one station but then went on to do poorly with the same technique on a different patient. This may indicate the cycloplegic patients were difficult. Also, the candidates in Kuching appear not be familiar with a focimeter for lens neutralisation

The pass rate is actually lower for this exam compared to previous exams at 57% the lowest pass rate since July 2012. No OST candidates sat this exam.

## 3. Standard setting

Candidates must be able to accurately assess visual acuity, measure refractive error and recommend an appropriate spectacle correction to pass the RCert. The pass mark is identified using the Hofstee method:

### **Hofstee method (see appendix 1 for details)**

After the examination, examiners were asked to review the parameters for the standard setting based upon their judgment of the difficulty of the stations. The following values were used to set the pass mark:

The cumulative fail rate as a function of the pass mark and the co-ordinates derived from the four values above were plotted on a graph. The point where a line joining the two co-ordinates intersects the cumulative function curve is used to identify the pass mark.

1. The maximum credible pass mark for the examination 75%
2. The maximum credible pass rate for the examination 75%
3. The minimum credible pass mark for the examination 60%
4. The minimum credible pass rate for the examination 30%

#### 4. Results (table 1)

Number of candidates	23	
Maximum possible mark	180	
Mean candidate mark	128	71%
Median candidate mark	128	71%
Standard deviation	19	11%
Highest candidate mark	162	90%
Lowest candidate mark	68	38%
Reliability	0.6	
Standard error of measurement (SEM)	11	6%
Hofstee pass mark	126/180	70%
Pass rate	13/23	57%

#### Distribution of marks (table 2)

Score	Distribution	Total
<51		0
51-60		0
61-70	/	1
71-80		0
81-90		0
91-100	/	1
101-110		0
111-120	////	4
121-130	//// ////	8
131-140	///	3
141-150	////	4
151-160	/	1
161-170	/	1
171-180		0
Total		

/ Candidate failed / candidate passed

		Mean	Median	Standard deviation	Minimum	Maximum
1	CR1	11.3	12	4.2	0	15
2	CR2	8.5	9	3.6	0	15
3	SRC	11.7	14	3.5	2	14
4	CR3	11.5	13	3.7	3	15
5	CR4	13	15	3.7	2	15
6	LN	8.2	9	4.6	0	15
7	NCR1	8.4	8	4.2	1	15
8	NCR2	10.7	11	4.1	1	15
9	VA	11.8	12	2.0	7	15
10	SRS	11.3	11	1.8	7	14
11	BB	8.9	9	2.7	2	13
12	NA	12.7	13	2.1	8	15

The relative weights for each skill in refraction (based upon the number of stations is:

Clinical skill	Number of stations	Contribution to total marks	Median mark
Retinoscopy	6	50%	12
Subjective	3	25%	11
Other	3	25%	12

#### Correlation between stations (table 4)

	CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB
CR1											
CR2	0.7										
SRC	0.2	-0.1									
CR3	0.4	0.5	-0.2								
CR4	0.4	0.5	-0.3	0.9							
LN	0.2	0.2	0.3	0.3	0.3						
NCR1	0.0	0.0	0.0	0.1	0.1	0.3					
NCR2	0.4	0.4	0.1	0.4	0.5	0.2	0.6				
VA	0.1	0.1	0.3	0.3	0.4	0.6	0.2	0.1			
SRS	0.3	0.3	0.1	-0.3	-0.4	-0.1	-0.3	-0.3	-0.1		
BB	0.0	0.0	0.1	-0.3	-0.2	0.1	0.1	0.3	-0.1	0.2	
NA	0.0	0.1	0.1	-0.3	-0.1	0.1	0.1	-0.3	0.2	0.3	-0.3

Median correlation between the cycloplegic refraction stations = 0.5

- There was good correlation between CR1 and CR2, and CR3 and CR4.
- There was moderate correlation between CR2 and CR3 and CR4

Correlation between non-cycloplegic refraction stations = 0.6

Best correlation between cycloplegic refraction station 3 and 4 (0.9)

Poorest correlation between cycloplegic refraction and subjective refinement of the sphere (-0.4)

#### Correlation between each station and the total score (table 5)

CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB	NA
0.6	0.7	0.2	0.6	0.6	0.7	0.5	0.7	0.5	0.0	0.2	0.0

## 5. Breakdown of results

### Breakdown of results by number of previous attempts (table 6)

Attempts	Failed	Passed	Total
1 (First)	8	7	15
2	0	5	5
3	2	1	3
4	0	0	0
Any resit	2	6	8
Total	10	13	23

## 6. Comparison to previous examinations (table 7)

Date	Candidates	Pass mark	Pass rate	Pass rate in OST	% Candidates in OST	Reliability	SEM	Hofstee pass mark
Mar 10	43	69%	47%	58%	67%	0.6	9 (9%)	68%
July 10	47	75%	53%	60%	70%	0.6	8 (8%)	72%
Nov 10	53	74%	42%	44%	68%	0.6	7 (7%)	71%
Apr 11	57	71%	35%	47%	63%	0.6	6 (6%)	67%
July 11	41	67%	66%	72%	71%	0.4	6 (6%)	71%
Nov 11	69	65%	71%	75%	70%	0.6	8 (8%)	68%
Mar 12	54	73%	54%	66%	57%	0.6	8 (8%)	72%
July 12	44	71%	59%	67%	64%	0.5	9 (9%)	71%
Dec 12*	71	69%	75%	77%	55%	0.6	11(6%)	72%
Apr 13	64	74%	61%	64%	64%	0.8	11(6%)	74%
July 13	42	72%	74%	90%	48%	0.7	10(6%)	74%
Dec 13	75	72%	67%	76%	65%	0.7	10(6%)	71%
Apr 14	56	73%	84%	89%	66%	0.6	9.5(5%)	75%
July 14	34	74%	62%	55%	65%	0.4	11 (6%)	74%
Dec 14*	63	71%	68%	77%	68%	0.6	12 (7%)	71%
Apr 15*	57	77%	65%	73%	65%	0.4	11 (7%)	77%
June 15*	33	69%	58%	n/a^	0%	0.73	10 (6%)	69%
July 15*	31	66%	58%	55%	65%	0.65	9.4(5%)	66%
Jan 16*	70	70%	60%	60%	81%	0.8	10 (6%)	70%
Mar 16*	57	77%	81%	83%	70%	0.9	7.7 (4%)	77%
Jun 16*	23	70%	57%	n/a^	0%	0.7	11 (6%)	70%

\* Hofstee pass mark used for these examinations

^ Examination held in Kuching

## Appendix 1 Hofstee method for standard setting

### Hofstee method

In advance of the examination, members of the College's Examinations Committee were asked to nominate the values for the following:

5. The maximum credible pass mark for the examination 75%
6. The maximum credible pass rate for the examination 75%
7. The minimum credible pass mark for the examination 60%
8. The minimum credible pass rate for the examination 30%

The cumulative fail rate as a function of the pass mark and the co-ordinates derived from the four values above were plotted on a graph. The point where a line joining the two co-ordinates intersects the cumulative function curve is used to identify the pass mark.

The Hofstee pass mark for this examination was 126/180 (70%).

