Examination Report

June 2018 Refraction Certificate Examination

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1   Introduction

The XX Refraction Certificate examination in the format was held in XX for the XXth time in June 2018. 39 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.

1.1   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

1.2   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 XX sitting of the refraction certificate with 12 OSCE stations. This was the XX refraction certificate exam to be held in XX. The reliability of the examination is below the desired acceptable level (Cronbach alpha 0.69, desired level >0.8).

The Hofstee method of standard setting was used to identify the pass mark for this examination, which was 75.00%. Six stations achieved high mean scores, stations 1, 2, 3, 4, 5 and 12. The station with the lowest mean score was station 9.

The pass rate was 74.36%.

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:

3.1   Hofstee method

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 coordinates intersects the cumulative function curve is used to identify the pass mark.

- The maximum credible pass mark for the examination = 75%
- The maximum credible pass rate for the examination = 75%
- The minimum credible pass mark for the examination = 60%
- The minimum credible pass rate for the examination = 30%

The Hofstee pass mark for this examination was 135/180 (75%).

4   Results

Table 1:   Results Summary

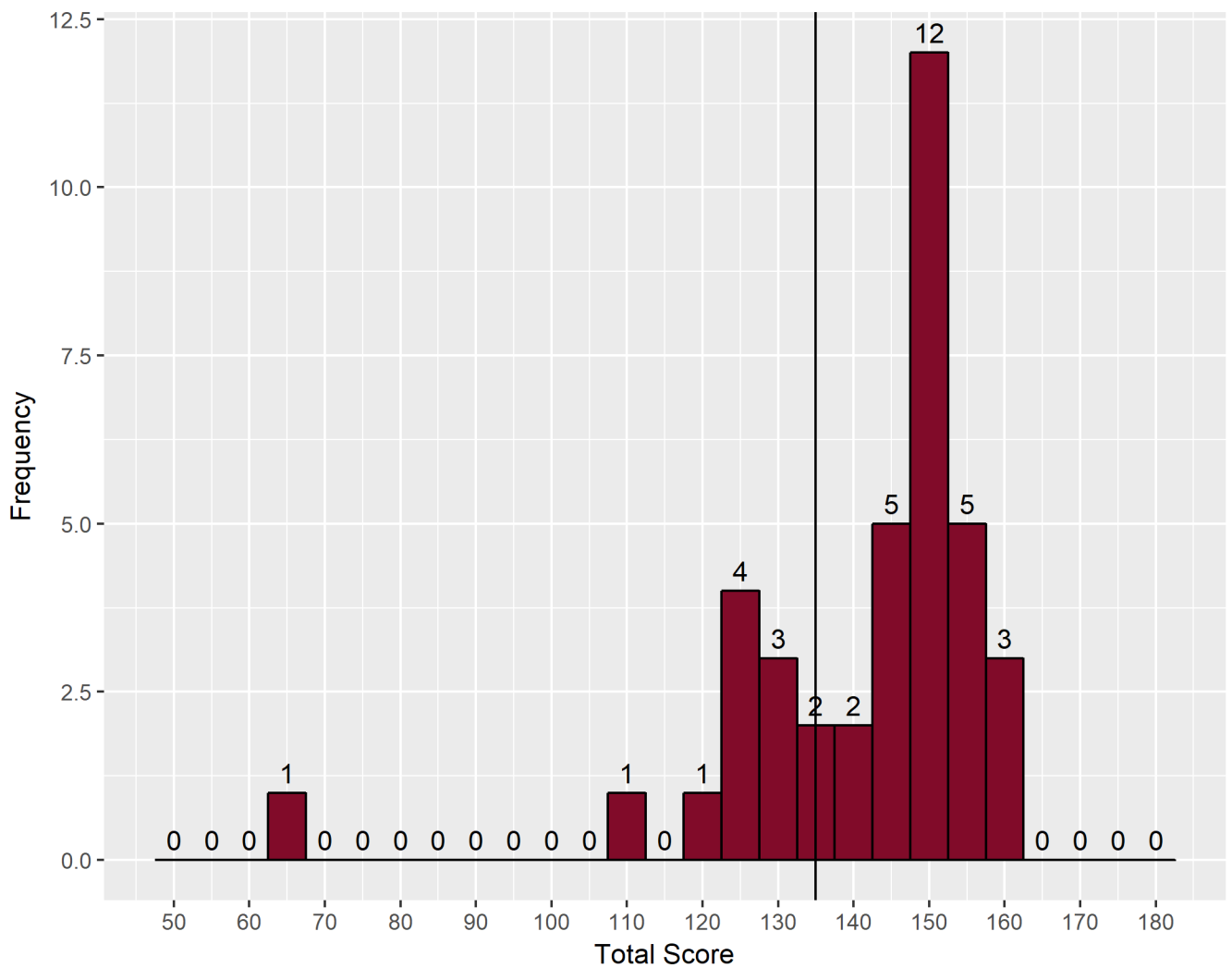| Statistic	Value	Percentage
Number of candidates	39	
Maximum possible mark	180	
Mean candidate mark	141.67	78.71%
Median candidate mark	148.00	82.22%
Standard deviation	17.31	9.62%
Highest candidate mark	160	88.89%
Lowest candidate mark	64	35.56%
Reliability	0.69	
Standard error of measurement (SEM)	9.66	5.37%
Hofstee pass mark	135/180	75.00%
Pass Rate	29/39	74.36%

Figure 1:   *Distribution of Marks*

The vertical line denotes the point on the mark distribution where the pass mark lies.

Table 2: Station Summary

Station	Category	Mean	Median	Standard Deviation	Minimum	Maximum
1	CR1	13.79	15.00	2.64	5	15
2	CR2	13.92	15.00	2.17	4	15
3	SRC	13.26	14.00	3.27	0	15
4	CR3	13.62	14.00	2.25	4	15
5	CR4	13.31	15.00	2.89	3	15
6	LN	10.15	11.00	3.59	2	15
7	NCR1	11.26	12.00	3.34	3	15
8	NCR2	11.56	13.00	3.34	4	15
9	VA	9.18	10.00	2.44	3	13
10	SRS	9.92	11.00	3.28	1	15
11	BB	9.67	11.00	3.95	0	14
12	NA	12.03	12.00	2.70	5	15

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

Table 3:   Weights for each skill

Clinical Skill	Number of stations	Contribution to total marks	Median mark
Retinoscopy	6	50%	14
Subjective	3	25%	12
Other	3	25%	11

Table 4:   Correlation between stations

	CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB
CR1	X										
CR2	0.68	X									
SRC	0.43	0.04	X								
CR3	0.28	-0.07	0.46	X							
CR4	0.50	0.03	0.26	0.41	X						
LN	0.17	0.20	0.29	0.18	-0.02	X					
NCR1	0.36	0.19	0.31	0.27	0.27	-0.07	X				
NCR2	0.36	0.19	0.13	-0.16	0.18	0.05	0.39	X			
VA	-0.10	-0.29	0.14	0.15	0.10	0.23	-0.17	-0.16	X		
SRS	0.14	-0.03	0.65	0.29	0.01	0.46	0.11	-0.10	0.17	X	
BB	0.11	-0.05	0.31	0.25	0.02	0.33	0.09	-0.16	0.13	0.74	X
NA	-0.03	-0.06	-0.07	0.08	0.10	-0.01	0.04	-0.22	0.00	0.23	0.27

Median correlation between the cycloplegic refraction stations = 0.345

There was moderate correlation between the following pairs of cycloplegic refraction stations: CR1 and CR3, CR1 and CR4, CR2 and CR4, CR3 and CR4.

Median correlation between the non-cycloplegic refraction stations = 0.39

Best correlation = between station 10 and 11 (0.74)

Poorest correlation between any station = -0.29, as highlighted in red

Table 5:   Correlation between each station and the total score

Station	CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB	NA
Correlation with Total Score	0.65	0.28	0.71	0.52	0.47	0.52	0.50	0.28	0.20	0.69	0.59	0.23

5 Breakdown of results

Table 6: Breakdown of results by number of previous attempts

Sitting Attempt	Failed	Passed	Total
1	9	23	32
2	1	6	7
Total	10	29	39

6 Comparison to previous examinations

Table 7: Comparison to previous years' exams

Date	Candidates	Pass mark	Pass rate	Pass rate in OST	% Candidates in OST	Reliability	SEM	Hofstee pass mark
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%
July 16*	64	70%	64%	67%	67%	0.6	12 (7%)	70%
Jan 17*	62	72%	63%	64%	90%	0.6	10 (6%)	72%
Apr 17*	63	73%	67%	69%	62%	0.7	11 (6%)	73%
July 17*	62	72%	38%	68%	60%	0.7	12 (6%)	72%
Dec 17*	63	71%	35%	59%	65%	0.72	11 (6%)	71%
Apr 18*	60	75%	41%	73%	75%	0.55	10 (6%)	75%
June 18*	39	75%	29%	n/a^	0%	0.69	10 (5%)	75%

* Hofstee pass mark used for these examinations

^ Examination held in Kuching

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