PSYCHOMETRIC
SOLUTIONS
GROUP

Examination Report

Refraction Certificate Examination

Singapore – January 2025

Lucy Foard, Kiran Sanghara, Sian Williams

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1 Introduction

16 candidates sat the Cairo Refraction Certificate exam in Singapore, held on the 6th of January 2025. The examination consists of 10 objective structured clinical examination (OSCE) stations, 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 Assess vision

PM14 To use spectacle lenses and prisms when indicated

PS2 Perform a refractive assessment and provide an optical prescription

C1 Establish a good rapport with patients and relatives

C11 Keep clinical records

BCS6 Optics and Medical physics

1.2 Examination structure

The examination consists of 10 OSCE stations. Each station contributes 15 marks to the overall total. The stations used for the examination were:

- SR1 - SR4: Simulated retinoscopy
- NR1 - NR2: Non-cycloplegic retinoscopy
- SC: Subjective refraction: Cylinder
- LN: Lens neutralisation
- SS: Subjective refraction: Sphere
- BB: Binocular balancing / Further refinement

2 Summary

The Hofstee method of standard setting was used to generate the pass mark for this examination, with a final rounded pass mark of 102/150 (68.0%) being applied. On average, candidates scored highest in SR3 and SR4 Simulated retinoscopy stations. On average, candidates scored lowest in the NR1 and NR2 Non-cycloplegic retinoscopy stations. The overall exam pass rate was 62.5%, with 10 of the 16 candidates successful.

The reliability of the exam was α=0.528, with most stations contributing positively. 7/10 station scores correlated well with overall total exam scores. In particular, the Binocular balancing (BB) and Non-cycloplegic retinoscopy 1 (NR1) stations showed strong discriminative power.

3 Standard setting

The exam pass mark is generated 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 maximum credible pass mark for the examination = 75%
- The minimum credible pass mark for the examination = 60%
- The maximum credible pass rate for the examination = 100%
- The minimum credible pass rate for the examination = 0%

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. This pass mark is rounded to the nearest achievable mark.

The raw Hofstee pass mark (before rounding) for this examination was 102.3/150 (68.2%).

4 Results

Table 1: Results summary

Statistic	Value	Percentage
Number of candidates	16	
Maximum possible mark	150	
Mean candidate mark	106.06	70.7%
Median candidate mark	103.50	69.0%
Standard deviation	14.77	9.8%
Highest candidate mark	135	90.0%
Lowest candidate mark	87	58.0%
Reliability	0.528	
Standard error of measurement	10.15	6.8%
Hofstee pass mark (final; rounded)	102/150	68.0%
Pass rate*	10/16	62.5%

**Please note that the pass rate presented reflects any adjustments to candidates' scores. All other analyses are based on original, unadjusted data.*

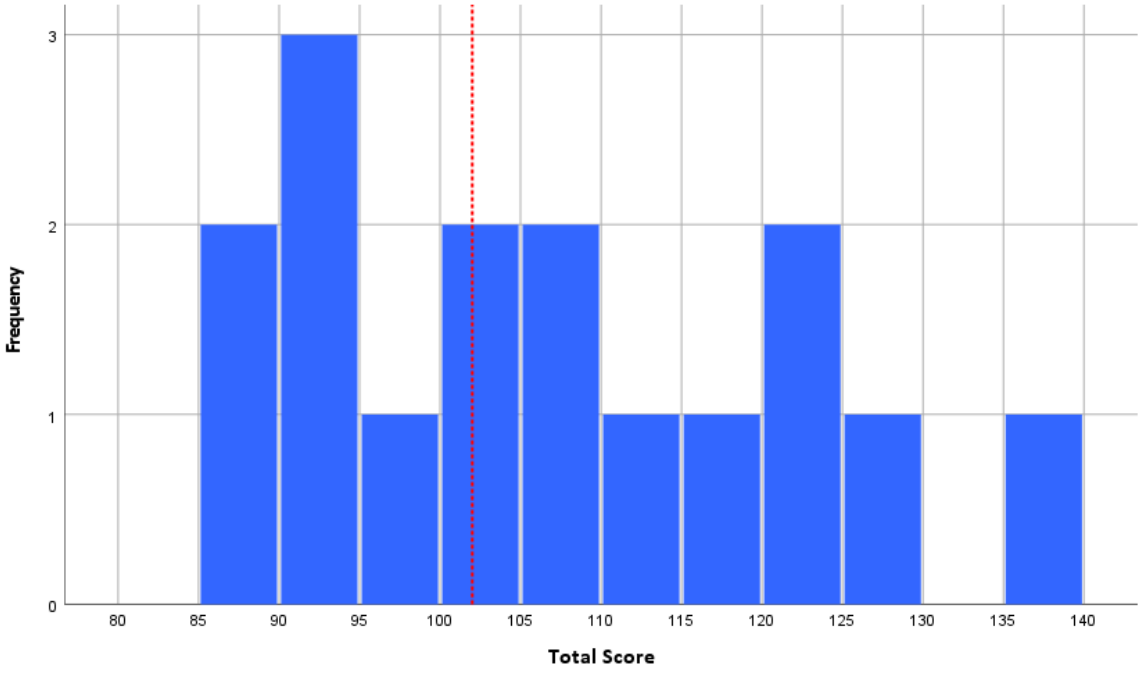

Figure 1: Distribution of marks

The dotted red vertical line denotes the point on the score distribution at which the pass mark lies.

Table 2: Station summary

Station	Category	Mean	Median	Standard deviation	Minimum	Maximum
1	SR1	11.4	13.0	3.41	5	15
2	SR2	11.8	14.0	4.64	1	15
3	SR3	14.4	14.5	0.72	13	15
4	SR4	12.8	13.5	2.52	5	15
5	NR1	7.9	7.0	4.06	1	15
6	NR2	7.8	6.5	4.54	0	15
7	SC	8.9	9.0	1.82	5	11
8	LN	10.8	13.0	5.17	0	15
9	SS	10.9	12.0	2.45	6	14
10	BB	9.4	10.0	3.01	4	14

The stations with the highest mean scores are highlighted in green (SR3 and SR4). The stations highlighted in light red have the lowest mean scores (NR1 and NR2). The LN station saw the largest variation in candidate performance, and the SR3 saw the least variation in candidate performance.

The relative weights for each skill in refraction (based upon the number of stations) are shown in Table 3.

Table 3: Weights for each skill

Clinical Skill	Number of stations	Contribution to total marks	Median mark
Retinoscopy	6	60%	13.00
Subjective	3	30%	10.00
Other	1	10%	13.00

Table 4: Correlation between stations

	SR1	SR2	SR3	SR4	NR1	NR2	SC	LN	SS
SR2	0.63								
SR3	-0.18	0.08							
SR4	-0.28	-0.38	0.13						
NR1	0.18	0.03	-0.38	0.02					
NR2	0.15	0.08	-0.41	0.19	0.54				
SC	0.14	0.40	0.19	-0.04	0.28	-0.17			
LN	-0.06	0.03	0.26	-0.36	0.21	0.16	0.22		
SS	-0.09	-0.10	-0.24	-0.45	0.36	-0.22	0.19	0.21	
BB	0.17	0.20	-0.20	-0.43	0.60	0.29	0.06	0.56	0.51

Within Table 4, cells are highlighted green if the correlation is ≥ 0.50 and orange if the correlation is between 0 and 0.20 (inclusive). Negative correlations between stations are highlighted in light red.

The median correlation between all stations was 0.08. There were 16/45 instances of a negative correlation between stations, 16/45 instances of a weak correlation (orange), and 5/45 instances of a strong relationship between stations (green). The strongest *negative* correlation was seen between the SR4 station and the SS station. The strongest *positive* correlation was seen between the SR1 and SR2 stations.

Table 5: Correlation between each station score and total score

Station	SR1	SR2	SR3	SR4	NR1	NR2	SC	LN	SS	BB
Correlation with total score	0.26	0.22	-0.18	-0.37	0.57	0.31	0.31	0.26	0.09	0.62

Table 5 shows the corrected station-total correlations. This is the correlation between the station score and the overall total score without the score of that specific station included. 8/10 correlations were positive and 7/10 were of an acceptable strength (correlation ≥0.20). Data suggests that the Binocular balancing (BB) and Non-cycloplegic retinoscopy 1 (NR1) stations had the strongest relationships with total scores and were therefore the better discriminators.

5 Breakdown of results

Table 6: Breakdown of results by demographic groups

Demographics	Passed	Total	Pass rate
Ethnicity			
Asian / Asian British – Chinese	8	11	72.7%
Asian / Asian British – Indian	1	2	50.0%
Asian / Asian British – Other	0	2	0%
Unknown	1	1	100%
PMQ			
OS	9	15	60.0%
UK	1	1	100%
Gender			
Female	0	3	0%
Male	10	13	76.9%
Attempt			
1st Attempt	10	16	62.5%

6 Comparison to previous examinations

Table 7: Comparison to previous years' exams

Date	Centre	Number of Candidates	Pass mark	Pass rate	Pass rate in OST	% of candidates in OST	Reliability (alpha)	SEM (rounded)
Jan-25	**Singapore**	**16**	**68%**	**62.5%**	**78%**	**56%**	**0.53**	**10 (7%)**
Dec-24	Birmingham	95	70%	78%	100%	2%*	0.65	10 (7%)
Nov-24	Cairo	30	69%	73%	n/a	n/a	0.48	10 (7%)
Sept-24	Malaysia	22	69%	68%	n/a	n/a	0.65	11 (7%)
May-24	Birmingham	100	69%	67%	n/a	n/a	0.76	11 (7%)
Feb-24	Rawalpindi	18	71%	72%	n/a	n/a	0.67	10 (7%)
Feb-24	Chennai	21	67%	52%	n/a	n/a	0.72	12 (8%)
Jan-24	Singapore	14	72%	93%	n/a	n/a	0.40	7 (5%)
Dec-23	Birmingham	75	71%	79%	n/a	n/a	0.70	10 (7%)
Nov-23	Cairo	10	69%	80%	n/a	n/a	0.81	9 (6%)
Sept-23	Birmingham	58	67%	55%	n/a	n/a	0.66	11 (8%)
June-23	Kuching	44	69%	75%	n/a	n/a	0.41	11 (7%)
May-23	Birmingham	75	70%	71%	n/a	n/a	0.79	10 (7%)
Jan-23	Singapore	22	71%	82%	100%	5%	0.54	9 (6%)
Dec-22	London	63	69%	62%	86%	22%	0.73	11 (7%)
Jul-22	Glasgow	109	72%	81%	n/a	n/a	0.85	9 (6%)
May-22	Birmingham	83	72%	80%	94%	20%	0.77	9 (6%)
May-22	Delhi	33	66%	39%	n/a	n/a	0.81	11 (7%)
Apr-22	Cairo	36	73%	86%	n/a	n/a	0.76	8 (5%)
Dec-21	Singapore	131	72%	79%	80%	31%	0.78	10 (6%)
May-21		171	71%	57%	58%	42%	0.83	10 (7%)
Jan-21		39	74%	92%	n/a	n/a	0.51	9 (6%)
Dec-20		141	70%	57%	72%	56%	0.81	11 (8%)
Jun-19		40	70%	57%	n/a	n/a	0.73	11 (7%)
Jun-19		52	74%	67%	n/a^	n/a^	0.76	9 (6%)
Apr-19		87	72%	59%	68%	51%	0.54	12 (6%)
Dec-18		68	72%	54%	70%	63%	0.7	11 (6%)
Jul-18		64	75%	67%	77%	55%	0.74	11 (6%)
Jun-18		39	75%	74%	n/a^	n/a^	0.69	10 (5%)
Apr-18		60	75%	68%	73%	75%	0.55	10 (6%)
Dec-17		63	71%	56%	59%	65%	0.72	11 (6%)
Jul-17		62	72%	61%	68%	60%	0.7	12 (6%)
Apr-17		63	73%	67%	69%	62%	0.7	11 (6%)
Jan-17		62	72%	63%	64%	90%	0.6	10 (6%)
Jul-16		64	70%	64%	67%	67%	0.6	12 (7%)
Jun-16		23	70%	57%	n/a^	n/a^	0.7	11 (6%)
Mar-16		57	77%	81%	83%	70%	0.9	7.7 (4%)
Jan-16		70	70%	60%	60%	81%	0.8	10 (6%)
Jul-15		31	66%	58%	55%	65%	0.65	9.4 (5%)
Jun-15		33	69%	58%	n/a^	n/a^	0.73	10 (6%)
Apr-15		57	77%	65%	73%	65%	0.4	11 (7%)
Dec-14		63	71%	68%	77%	68%	0.6	12 (7%)
Jul-14		34	74%	62%	55%	65%	0.4	11 (6%)
Apr-14		56	73%	84%	89%	66%	0.6	9.5 (5%)

*Limited OST data available

Table 8: Performance of candidate by deanery for all examinations to date, where deanery is known

Deanery	Pass	Total	Pass rate (%)
London	240	319	75.2
East Midlands	55	74	74.3
East of England	67	91	73.6
East of Scotland	16	22	72.7
Kent, Surrey, and Sussex	57	74	77.0
Mersey	55	71	77.5
North of Scotland	18	23	78.3
Northwest	28	38	73.7
Northwestern	29	37	78.4
Northern	48	64	75.0
Northern Ireland	20	30	66.7
Oxford	33	41	80.5
Peninsula (Southwest)	34	67	50.7
Severn	29	43	67.4
Southeast of Scotland	26	30	86.7
South Yorks & Humber	3	6	50.0
Wales	43	75	57.3
Wessex	40	60	66.7
West Midlands	92	130	70.8
West of Scotland	42	58	72.4
Yorkshire	81	118	68.6
Eire	3	9	33.3
Europe and Overseas	36	59	61.0
Unknown; N/A	96	154	62.3
Total	1191	1693	70.3