

Examination Report

June 2017 Refraction Certificate Examination



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1. Introduction

The 26th Refraction Certificate examination in the format was held in Kuching for the 4th time in June 2017. Thirty-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 18th sitting of the refraction certificate with 12 OSCE stations. This was the fourth refraction certificate exam to be held in Kuching, Malaysia. The reliability of the examination is just at the desired acceptable level (Cronbach alpha 0.8, desired level >0.8).

The Hofstee method of standard setting was used to identify the pass mark for this examination, which was 72%. Two stations achieved high mean scores, cycloplegic ret station 1 and 2. The station with the lowest mean score was lens neutralisation by focimetry. This station has scored low in past Kuching examinations and it is possible the candidates are less familiar with the manual focimeter than Candidates sitting the exam in the U.K.

The pass rate is 67%. This is the highest achieved in Kuching compared to the 2 previous exams (June 16, 57% and June 15, 58%). No UK 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	33	
Maximum possible mark	180	
Mean candidate mark	133	74%
Median candidate mark	138	77%
Standard deviation	24	13%
Highest candidate mark	164	91%
Lowest candidate mark	74	41%
Reliability	0.8	
Standard error of measurement (SEM)	10	6%
Hofstee pass mark	130/180	72%
Pass rate	22/33	67%

Distribution of marks (table 2)

Score	Distribution	Total
<51		0
51-60		0
61-70		0
71-80	//	2
81-90	//	2
91-100		0
101-110	/	1
111-120	/	1
121-130	//// /	6
131-140	//// //	7
141-150	//// /	6
151-160	//// //	7
161-170	/	1
171-180		
Total		

/ Candidate failed / candidate passed

		Mean	Median	Standard deviation	Minimum	Maximum
1	CR1	12.8	14	2.9	4	15
2	CR2	13.3	15	2.8	2	15
3	SRC	11.9	14	4.0	3	15
4	CR3	11.5	13	4.4	0	15
5	CR4	12	14	4.2	1	15
6	LN	8.3	10	4.6	0	15
7	NCR1	9.7	9	3.8	1	15
8	NCR2	10.2	11	3.4	1	15
9	VA	11.7	13	2.9	5	15
10	SRS	10.3	11	2.7	1	15
11	BB	9.7	10	3.3	0	14
12	NA	11.2	12	2.9	4	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%	13
Subjective	3	25%	11
Other	3	25%	11

Correlation between stations (table 4)

	CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB
CR1	X										
CR2	0.7	X									
SRC	-0.1	-0.1	X								
CR3	0.1	-0.1	0.5	X							
CR4	0.1	0.1	0.4	0.9	X						
LN	0.3	0.3	0.1	0.2	0.4	X					
NCR1	0.3	0.2	0.1	0.5	0.4	0.4	X				
NCR2	0.3	0.1	0.2	0.4	0.3	-0.1	0.4	X			
VA	0.3	0.3	0.3	0.3	0.4	0.4	0.2	0.1	X		
SRS	-0.1	0	0.3	0.4	0.4	0.2	0.1	0.2	0.2	X	
BB	0.1	0	0.4	0.7	0.7	0.2	0.4	0.4	0.4	0.5	X
NA	0.1	0	0	0	0.7	0.2	0.2	-0.1	0.3	-0.1	0.3

Median correlation between the cycloplegic refraction stations = 0.1

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

Correlation between non-cycloplegic refraction stations = 0.4

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

Poorest correlation between any station was -0.1 as highlighted in red.

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

CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB	NA
0.4	0.3	0.5	0.8	0.8	0.6	0.6	0.5	0.6	0.4	0.8	0.3

5. Breakdown of results

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

Attempts	Failed	Passed	Total
1 (First)	11	20	31
2	0	1	1
3	0	0	0
4	0	1	1
Any resit	0	2	2
Total	11	22	33

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
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%
June 17*	33	72%	67%	n/a^	0%	0.8	10 (6%)	72%

* Hofstee pass mark used for these examinations

^ Examination held in Kuching

Appendix 1 Hofstee method for standard setting

Hofstee method

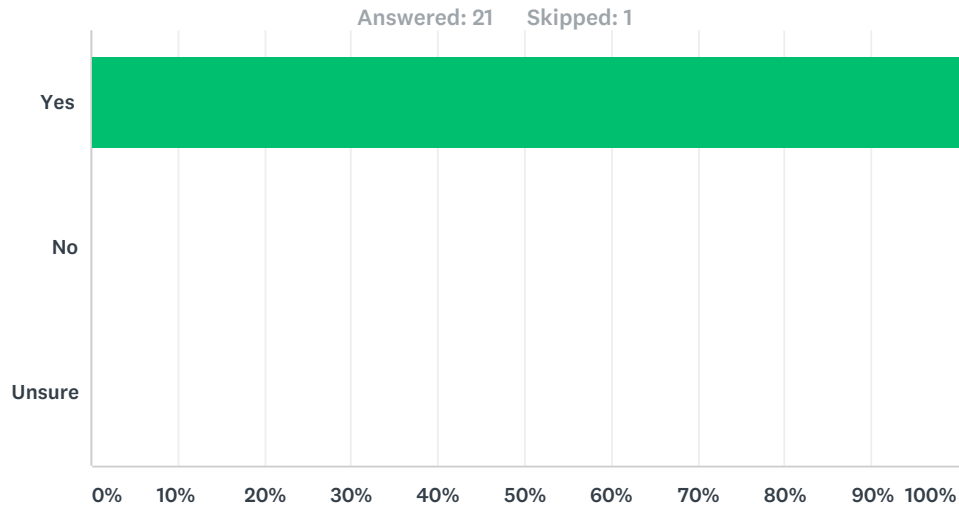
In advance of the examination, members of the College's Examinations Committee were asked to nominate the values for the following:

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 130/180 (72%).

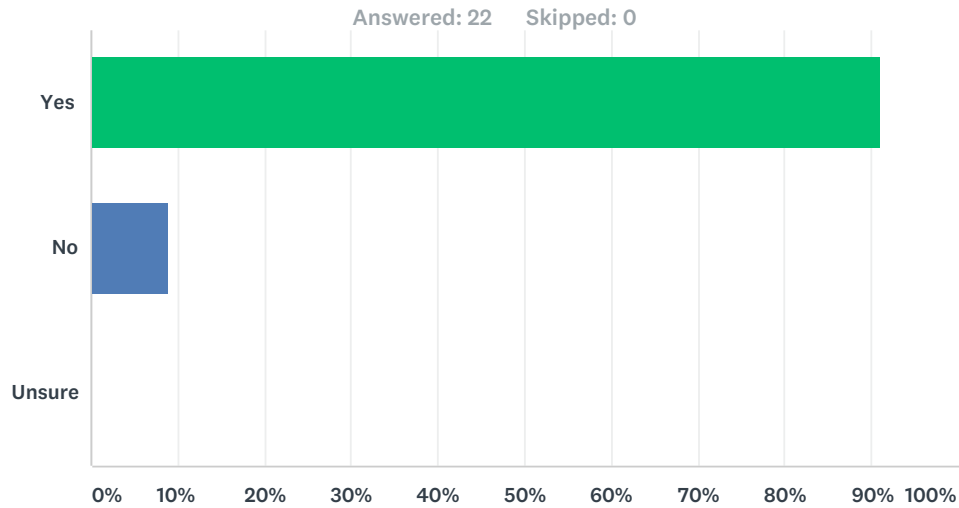
Q1 Were you treated in a courteous manner by the examiners in this examination?



Answer Choices	Responses
Yes	100.00% 21
No	0.00% 0
Unsure	0.00% 0
TOTAL	21

#	Comments	Date
1	All the examiners were very polite and clear in their instructions and maintained high level of professionalism. However, examiners should be able to guide the candidates when they have doubts/queries. For instance, not all candidates are familiar with the focimeter provided in the examination center. Candidates come from all round the world. The manual focimeter used in our practice defers from the examination focimeter. Although the college has provided an exemplary image of the likely exam focimeter it is difficult to find one to practise in reality. Therefore when the candidate asks the examiner where are certain knobs located in the focimeter, the examiner should at least guide accordingly. The candidate is not asking for the answer rather the operation of the focimeter. The examiner himself should know the operation of the focimeter.	7/3/2017 4:23 AM
2	the examiners were very kind	6/26/2017 1:18 PM
3	Very professional, polite and kind.	6/22/2017 12:19 AM
4	The examiners were nice and kind.	6/21/2017 1:56 PM
5	They were all very friendly and courteous.	6/21/2017 11:17 AM

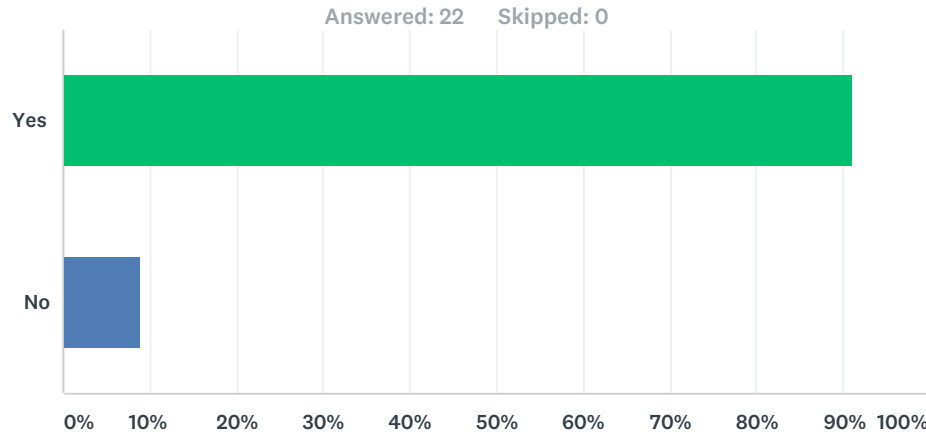
Q2 Were the patients you were asked to examine appropriate for the examination?



Answer Choices	Responses
Yes	90.91% 20
No	9.09% 2
Unsure	0.00% 0
TOTAL	22

#	Comments	Date
1	All the patients were very cooperative, understood the instructions given clearly. All the patients provided were good candidate for refraction as they all had clear media, well dilated (for cycloplegic retinoscopy) which made the examination of the patient run smoothly.	7/3/2017 4:23 AM
2	The patient stationed in the noncycloplegic refraction had very small pupil bilaterally. It was difficult to appreciate the reflex.	6/21/2017 1:56 PM
3	Some of the patients could not understand instructions in english well.	6/21/2017 11:17 AM

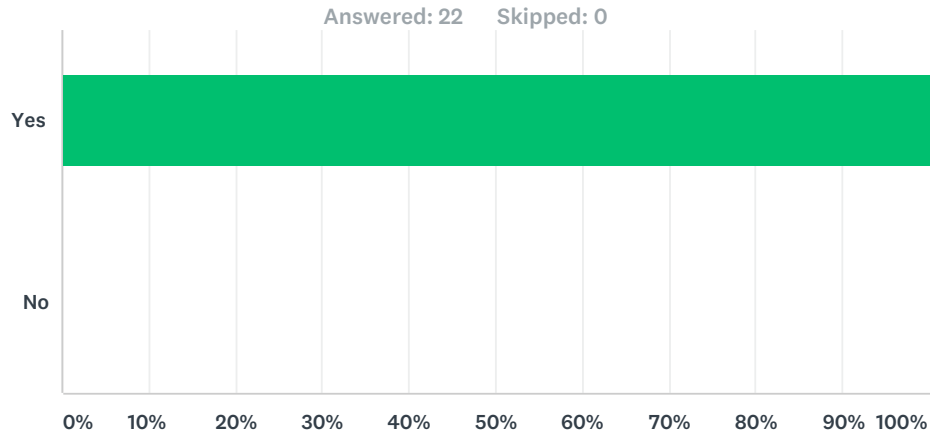
Q3 Was the OSCE well organised overall?



Answer Choices	Responses
Yes	90.91% 20
No	9.09% 2
TOTAL	22

#	Comments	Date
1	1.The selection of rooms for retinoscopy was not appropriate. For instance, a large room with many windows and open door was provided for non- cycloplegic retinoscopy. The patients pupil was already small to begin with. In addition to unnecessary lighting and space causes the pupil to be further constricted and this made the retinoscopy very difficult especially in appreciating the movement of the reflex in the patient. 2.The chairs provided to the examination candidate was not appropriate. The chair should be movable with adjustable level so that the candidate can level up to the level of the patient and move with easy to refract both eyes accordingly(double retinoscopy) Having a non-movable chair causes the candidate to move the chair manually after one eye and this causes a lot of time wastage and inconvenience to both candidate and patients 3. The trial lens set used has no in-built illumination. A large side table lamp was used to illuminate the lens sets. This creates indirect illumination to the patients eye and further constrict the eye for non-cycloplegic refraction.	7/3/2017 4:23 AM
2	The examiner told me I had 10mins for my focimeter station, but the time keeper later called times up at 5mins. Please make sure test site provide better equipment: - One set had cyl lenses that had no handle, making it really difficult to rotate the cyl. - Another trial frame was very difficult to remove lenses from some slots, lenses falling out of other slots.	6/21/2017 2:15 PM

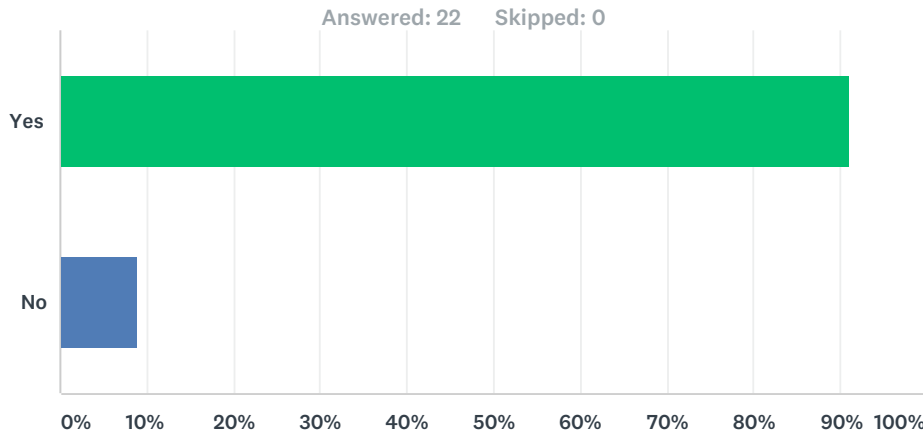
Q4 Were you given clear instructions about the OSCE?



Answer Choices	Responses
Yes	100.00% 22
No	0.00% 0
TOTAL	22

#	Comments	Date
1	examiner could have put analog/digital clock for each station for candidate awereness during test	6/22/2017 11:26 AM

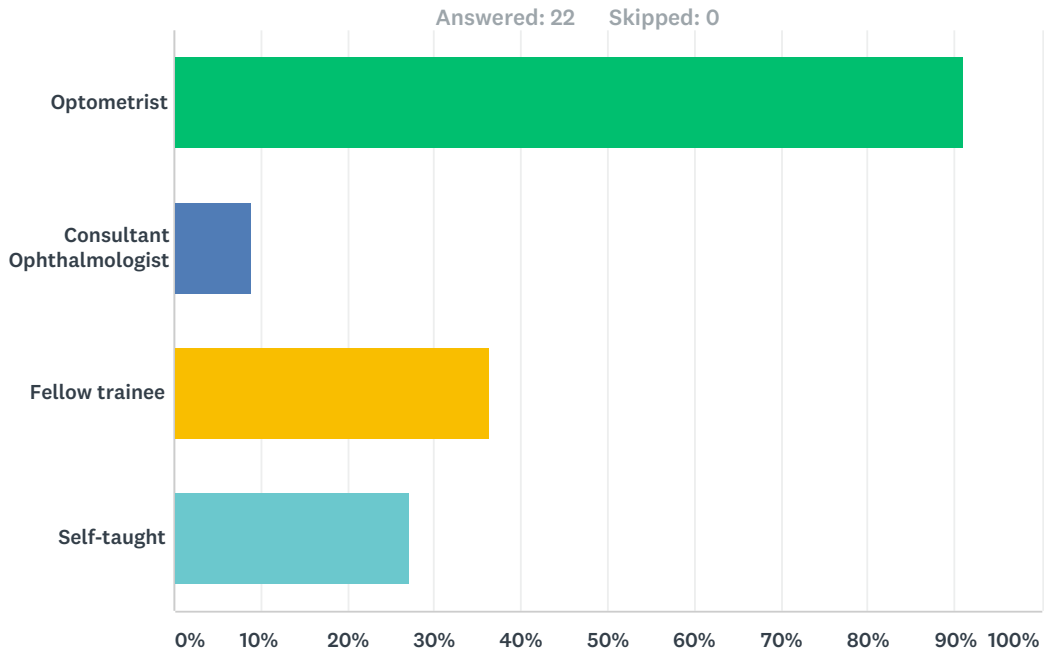
Q5 Did you feel that the OSCE was a fair assessment of your knowledge?



Answer Choices	Responses
Yes	90.91% 20
No	9.09% 2
TOTAL	22

#	Comments	Date
1	The pair of spectacles for focimeter would never have been clinically prescribed, with a high prism on the left and none on the right. The frame is too small for a practical bifocal. The small lens also makes mounting and centering difficult - I wasted a few dear seconds trying to do so and couldn't write down my complete answer.	6/21/2017 2:15 PM
2	Too rushed for non-retinoscopy stations	6/21/2017 1:35 PM

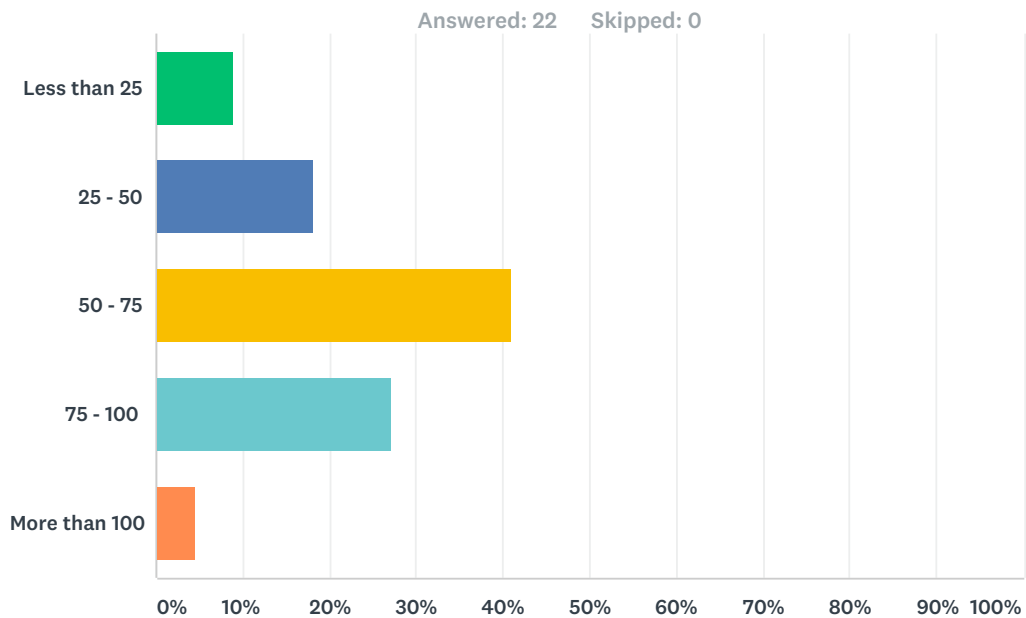
Q6 Who helped you to develop competence in refraction? (Please select the answer as appropriate)



Answer Choices	Responses
Optometrist	90.91% 20
Consultant Ophthalmologist	9.09% 2
Fellow trainee	36.36% 8
Self-taught	27.27% 6
Total Respondents: 22	

#	Other (please specify)	Date
	There are no responses.	

Q7 Approximately how many complete refractions (retinoscopy + subjective modification) did you carry out in your preparation for the examination?



Answer Choices	Responses
Less than 25	9.09% 2
25 - 50	18.18% 4
50 - 75	40.91% 9
75 - 100	27.27% 6
More than 100	4.55% 1
TOTAL	22

Q8 Please provide any other advice that you would like to share with future candidates.

Answered: 8 Skipped: 14

#	Responses	Date
1	Practice practice practice. No other shortcut. Masterpass for Refraction certificate is useful to read	7/5/2017 1:18 AM
2	time management is very important.	6/25/2017 7:59 PM
3	Please remember to wash your hands with the alcohol hand wash provided or else you might be marked down for not doing so although it is not in the marking scheme. I was told about this in the exam hall after completing the exam.	6/22/2017 2:17 PM
4	I think the most most important is to do complete Refractions and practise them with time frame according to that if the OSCE	6/22/2017 2:36 AM
5	Practice and practice	6/22/2017 12:19 AM
6	Write your answer down before you double check.	6/21/2017 2:15 PM
7	Practise makes perfect. So practise , practise and practise.	6/21/2017 1:56 PM
8	Manage your time!	6/21/2017 1:35 PM

Q9 Please write any other comments you have about the Refraction Certificate Exam below.

Answered: 6 Skipped: 16

#	Responses	Date
1	The college should allow the candidates to familiarize with the examination settings and instruments at least a day or 2 before the examination so that the candidates know the instruments being used (for instance focimeter). The failure to not perform well is sometimes not due to the lack of knowledge/skill but because of technical reasons. [REDACTED]	7/3/2017 4:23 AM
2	very well conducted exam	6/25/2017 7:59 PM
3	During the Sphere balancing and Near add station, the trial frame used was faulty. On and off the examiner came to readjust the frame (2-3 times) and that handicapped me as the time I had was greatly reduced. I do hope the exam centre can check the exam equipment prior starting the exam. If they need to adjust or replace the equipment, kindly stop the time or allocate extra time for the candidate as 5 minutes is merely enough to complete the stations. Thank you	6/22/2017 2:17 PM
4	Always been intimidated by the focimeter station	6/22/2017 12:19 AM
5	Overall the examination was well organised. However proper patient selection is imperative.	6/21/2017 1:56 PM
6	The visual acuity testing facilities were lacking in kuching. Instead of a projector, we were given a lighted chart, for which we sometimes had to run back and forth to point which line the patient was reading or to see the visual acuity that the patient was reading as the printed VA (eg 6/36 numbers) were too small.	6/21/2017 11:17 AM