

# OAT Optometry Admission Test



## OAT User Guide 2017 Data



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## **Part One: Introduction and Background**

### **History of the Optometry Admission Test Program**

In 1987, the format of the Optometry College Admission Test (OCAT) was changed to include four tests: the Survey of Natural Sciences (biology, general chemistry, and organic chemistry); Reading Comprehension; Physics; and Quantitative Reasoning. At that time the name of the test was changed to the Optometry Admission Test (OAT™).

The Optometry Admission Test (OAT) is administered under the auspices of the Association of Schools and Colleges of Optometry (ASCO) for applicants seeking admission to schools and colleges of optometry. This testing program is designed to measure general academic ability and comprehension of scientific information. While all optometry schools in the United States and Canada require applicants to participate in the Optometry Admission Test Program, test results are only one factor considered in evaluating an applicant's potential.

Validity studies conducted by the testing program have shown that test scores in conjunction with collegiate records are useful in predicting optometry school performance. The relative importance of these predictors in the admission process is determined by each optometry school.

### **Content of the Optometry Admission Test**

The OAT is a battery consisting of four individual tests: Survey of Natural Sciences, Reading Comprehension Test, Physics Test, and Quantitative Reasoning Test.

The Survey of Natural Sciences is an achievement test covering content from first-year courses in Biology, General Chemistry, and Organic Chemistry. This 90-minute test contains a total of 100 items, including 40 Biology items, 30 General Chemistry items, and 30 Organic Chemistry items. The three subtests are further subdivided into several topic areas.

The Reading Comprehension Test consists of three reading passages, each of which varies in length from 1,000 to 1,500 words. Each passage is accompanied by 12 to 20 items which relate to the concepts and ideas developed in the corresponding passage. There are a total of 50 items divided among the three passages. The subject matter of these passages is drawn from the basic sciences. The time limit for the test is 60 minutes.

The Physics Test is an achievement test covering content from a two-semester physics course. It is a 50-minute test containing 40 items.

The Quantitative Reasoning Test measures an examinee's ability to reason with numbers and work intelligently with quantitative materials. This 45-minute test contains 40 items.

Additional content specifications for these four tests are presented in Part Three of this *User Guide*. Sample test material can be found at [ADA.org/OAT](http://ADA.org/OAT).

## **Test Construction**

Test construction for the OAT is a complex, multi-step process. Undergraduate faculty specializing in each of these disciplines develop new items for the Survey of Natural Sciences, Physics, and Quantitative Reasoning Tests. Test construction teams specific to each discipline review new items for accuracy and relevance. Items that pass this initial review process are then pre-tested. After pretesting, the appropriate test construction team reviews item content and performance, and, if necessary, revises the content to meet psychometric standards established for the test. Faculty develop the topics for new Reading Comprehension Test passages and work with writers to develop the passages and accompanying items. New reading passages undergo the same review and pretesting process as other test items.

Test construction teams also select items to be included on each edition of the test, based on content specifications and various standards of item quality. Item quality is gauged based on an item's performance when administered to examinees. Two statistics in particular are of chief interest: the difficulty of the item and its discrimination index.

Item difficulty is measured by the percent of individuals who answered the item correctly. The difficulty level of the item is thus inversely related to the percentage of examinees who answer the item correctly. As the percentage of examinees who answer the item correctly increases, the difficulty of the item decreases. The recommended item-difficulty level for the OAT items ranges from 40 percent to 89 percent.

The discrimination index is a point-biserial correlation coefficient, where the coefficient associated with an item represents the correlation between scores on that item and total scores on that particular test. A low correlation coefficient, such as 0.01, would indicate the average test score of individuals who answered the item correctly was roughly the same as the average score of individuals who answered the item incorrectly. In this case, item performance would be unrelated to overall test performance, thus indicating that the item does not discriminate and should therefore be discarded. A higher correlation coefficient, such as .45, would indicate the item is effective at discriminating between high scoring and low scoring examinees. Items with higher discrimination index values are more useful in rank ordering examinees on the characteristic or ability being measured. Test construction teams revise or discard items with insufficient discrimination indices.

## **Interpreting OAT Scores**

Each test in the OAT battery yields a raw score, which is the sum of an examinee's correct answers. The raw score is converted to a scale score which can range from 200 to 400. Using a scale score it is possible to compare examinee performance on any or all of the measures included in this admission testing program.

In addition to the scale scores provided for each test, scale scores are also reported to represent overall performance across the science tests, and overall performance in academic areas appearing on the OAT. The total science score is based on the raw scores for the 100 items from the Survey of Natural Sciences — including Biology, General Chemistry, and Organic Chemistry — and the 40 Physics items. The academic average is a composite score computed from the mean of the Quantitative Reasoning, Reading Comprehension, Biology, General Chemistry, Organic Chemistry, and Physics standard scores. If an examinee does not take a section of the test, they would receive a raw score of zero and a scale score of 200 on that section.

Ideally, the mean score for each test on the OAT would always be exactly 300, assuming a comparably skilled set of examinees is completing the test. However, in any large scale testing program, some variation in scores is inevitable; therefore the amount of drift from the ideal mean of 300 is constantly monitored. The OAT Program provides frequency tables for each OAT subtest quarterly. This information provides guidance in interpreting the scores and insight into any drift from the expected mean score of 300. For example, in the frequency tables for January 2009 to April 2009, the mean scores were 309 for Biology, 309 for General Chemistry, 316.1 for Organic Chemistry, 302.7 for Reading Comprehension, 322 for Quantitative Reasoning, and 299.6 for Physics.

As part of the ongoing validation process for the OAT, ASCO requested the OAT scale be recalibrated so the mean scale score would return to 300 with a standard deviation of 40. The data for this recalibration study was based on a “reference group” of examinees taking the OAT for the first time in 2008. The rescaling for each subtest on the OAT was accomplished through the use of the Rasch model, which takes both examinee ability and item difficulty into account. The score scales for all OAT subtests were recalibrated and the new scale score of 300 took effect May 1, 2009.

The new scale had the following major implications for OAT scores:

- Scores obtained under the new and old scales are not directly comparable. A score of 300 on the old scale, for example, does not have the same conceptual meaning as a score of 300 on the new scale.
- When reviewing examinees’ scores, the date the test was taken and differences in the scale should be considered.
- The recalibration did not change the OAT’s difficulty. Scores achieved after May 1, 2009 might be somewhat lower than those achieved prior to the recalibration date because the mean score was set back to be as close as possible to 300. This does not indicate a change in test takers’ skill levels.
- Scores achieved prior to May 2009 can be compared with other scores from within that time period, and scores achieved after May 2009 are comparable with other scores from the same period. However, scores from different time periods (e.g., scores from May 2008 vs. scores from May 2010) are not considered directly comparable.
  - For example, an examinee who tests in May 2009 and December 2009 will be scored on the same score scale, and the two sets of scores can be directly compared.
  - The scores of an examinee who tested in January 2009 and retested in July 2009 should not be directly compared, because the test’s scale scores were different in the two time periods.
  - When comparing scores involving two or more examinees, take care to determine whether the scores are from a comparable period.

Information on the details of this change was distributed to all optometry schools, pre-health education advisors, and potential examinees in March of 2009. Frequency distributions, or percentile equivalents of scale scores, for the new OAT subtest scales were generated, and the means and standard deviations for the scale scores were computed.

## Evaluation of the Optometry Admission Testing Program

When considering an examination's effectiveness, two basic psychometric aspects of tests—reliability and validity must be considered.

Reliability is the precision or consistency of the assessment. The OAT's internal consistency reliability was measured using the Kuder-Richardson Formula 20 ( $KR_{20}$ ). Table 1 lists internal consistency reliabilities for administrations for each subtest of the OAT in 2017, along with the standard error of measurement (SEM) and additional descriptive statistics.

To ensure the OAT is capable of fulfilling its purpose, it is essential to understand the content and predictive validity evidence available for each section of the test. For the OAT, the involvement of subject matter expert test construction team members provides evidence concerning content validity. These team members are experts in the subject areas corresponding to their team. For the Reading Comprehension Test, published writers typically possessing a minimum of a master's degree in writing or the sciences and educational writing experience produce the passages. Test construction teams review the passages to ensure the content is appropriate for admission testing purposes and consistent with reading requirements for first-year students pursuing advanced degrees in health care.

Predictive validity is assessed by examining correlations among OAT scores and students' grades in their first and second years of optometry school. The predictive power of the OAT varies from school to school and from one OAT section to another. The *OAT Validity Study* report provides detailed information on this topic. Validity is also addressed in the article, *Validity of the Optometry Admission Test in Predicting Performance in Schools and Colleges of Optometry* (Kramer & Johnston, 1997).

### Introduction to the Tables

The tables in this report look at performance on the OAT by gender (Tables 2-9), ethnic identification (Tables 10-17), and Hispanic origin (Table 18). Table 19 provides information on the number of examinees who tested in 2017.

The data in the tables is based on examinees who answered the questions on gender and ethnic identification. Not all examinees chose to answer these demographic questions. The total count for each table varies because some examinees chose not to answer the questions, but the percentages will add up to 100% because the data is based solely on respondents. The columns for gender, ethnicity, Hispanic origin, total percentage, and total count can be added vertically. The statistics in the tables in this User Guide were based on all participating examinees.

The OAT Program publishes an **OAT Program Guide** each year with information about the testing policies, procedures, and eligibility requirements for the calendar year. For additional information concerning the requirements that were applicable to the tested group, please consult the corresponding **OAT Program Guide**.

## References

Kramer, G.A. & Johnston, J. (1997). Validity of the Optometry Admission Test in predicting performance in schools and colleges of optometry. *Optometric Education*, 22(2), 53-59.



## Part Two: 2017 Data Tables

**Table 1**  
**Overall Descriptive Statistics**  
**2017**

N = 3,397	Number of Items	Standard Score			KR-20 Reliability
		Mean	S.D.	SEM	
Quantitative Reasoning	40	312.45	40.72	18.04	0.80
Reading Comprehension	50	323.88	37.91	14.03	0.86
Biology	40	306.00	45.62	19.86	0.81
General Chemistry	30	309.03	45.45	21.83	0.77
Organic Chemistry	30	301.07	45.99	19.85	0.81
Physics	40	284.35	41.59	16.78	0.84
Total Science	140	298.59	44.15	11.38	0.93
Academic Average	230	306.96	34.38	7.75	0.95

N – Number of participants. S.D. – Standard deviation. S.E.M. – Standard Error of Measurement. K.R.-20 – Kuder-Richardson Formula 20

**Table 2**  
**Optometry Admission Test**  
**2017**  
**Biology Score by Gender**

Score	Females	Males	Total	Count
200	1.2%	1.1%	1.2%	39
210	0.6%	1.0%	0.7%	25
220	1.5%	1.2%	1.4%	48
230	2.7%	2.5%	2.7%	90
240	2.7%	3.1%	2.8%	95
250	4.5%	2.4%	3.9%	130
260	6.9%	5.5%	6.5%	218
270	6.3%	6.0%	6.2%	209
280	7.8%	5.9%	7.2%	244
290	10.9%	8.2%	10.1%	340
300	7.5%	6.2%	7.1%	240
310	8.8%	9.6%	9.1%	306
320	8.4%	9.7%	8.8%	297
330	6.6%	6.7%	6.6%	223
340	5.2%	4.1%	4.9%	164
350	4.8%	6.3%	5.2%	176
360	4.3%	7.2%	5.1%	173
370	2.1%	2.8%	2.3%	77
380	2.2%	2.9%	2.4%	80
390	1.7%	2.0%	1.8%	61
400	3.3%	6.0%	4.1%	138
Percentage	70.17%	29.83%	100.00%	3373
Mean	303.54	312.29	306.15	
SD	44.44	47.42	45.52	
Count	2367	1006	3373	

**Table 3**  
**Optometry Admission Test**  
**2017**  
**General Chemistry Score by Gender**

Score	Females	Males	Total	Count
200	1.0%	0.9%	0.9%	32
210	0.6%	0.3%	0.5%	17
220	1.1%	0.6%	0.9%	31
230	1.5%	1.0%	1.3%	45
240	3.3%	2.0%	2.9%	98
250	5.1%	3.2%	4.5%	153
260	7.3%	5.1%	6.6%	223
270	6.0%	5.7%	5.9%	200
280	7.4%	6.6%	7.1%	240
290	8.6%	8.5%	8.6%	290
300	9.8%	8.8%	9.5%	320
310	8.2%	7.9%	8.1%	272
320	8.4%	7.8%	8.2%	276
330	7.2%	5.3%	6.6%	223
340	5.7%	5.9%	5.7%	193
350	4.5%	7.0%	5.2%	177
360	4.5%	6.4%	5.1%	171
370	2.5%	2.8%	2.5%	86
380	2.2%	2.8%	2.4%	81
390	2.2%	3.7%	2.6%	88
400	3.2%	8.1%	4.7%	157
Percentage	70.17%	29.83%	100.00%	3373
Mean	305.57	318.08	309.30	
SD	44.06	46.84	45.27	
Count	2367	1006	3373	

**Table 4**  
**Optometry Admission Test**  
**2017**  
**Organic Chemistry Score by Gender**

Score	Females	Males	Total	Count
200	1.2%	1.9%	1.4%	48
210	1.0%	1.5%	1.1%	38
220	1.8%	1.3%	1.7%	56
230	2.2%	2.1%	2.2%	73
240	4.0%	2.6%	3.6%	120
250	5.1%	4.6%	5.0%	167
260	6.5%	5.8%	6.3%	211
270	10.8%	8.3%	10.1%	340
280	7.0%	5.4%	6.5%	220
290	10.6%	9.9%	10.4%	352
300	8.6%	6.3%	7.9%	266
310	6.8%	8.3%	7.2%	243
320	6.4%	8.4%	7.0%	237
330	6.7%	6.9%	6.8%	228
340	5.8%	5.8%	5.8%	195
350	4.5%	5.4%	4.8%	161
360	1.6%	1.7%	1.6%	55
370	3.0%	4.3%	3.4%	115
380	1.4%	3.0%	1.9%	64
390	1.1%	2.4%	1.5%	51
400	3.8%	4.4%	3.9%	133
Percentage	70.17%	29.83%	100.00%	3373
Mean	299.25	306.03	301.27	
SD	44.74	47.84	45.78	
Count	2367	1006	3373	

**Table 5**  
**Optometry Admission Test**  
**2017**  
**Reading Comprehension Score by Gender**

Score	Females	Males	Total	Count
200	0.1%	0.2%	0.1%	4
210	0.1%	0.0%	0.1%	2
220	0.2%	0.1%	0.1%	5
230	0.4%	0.7%	0.5%	16
240	0.7%	1.0%	0.8%	26
250	1.6%	1.9%	1.7%	57
260	2.5%	2.3%	2.4%	82
270	3.3%	3.8%	3.4%	116
280	5.5%	4.3%	5.1%	173
290	8.0%	6.9%	7.6%	258
300	10.4%	9.5%	10.1%	341
310	10.5%	9.8%	10.3%	348
320	10.6%	10.8%	10.7%	361
330	8.0%	7.0%	7.7%	259
340	9.9%	10.3%	10.1%	339
350	9.0%	9.9%	9.3%	313
360	5.8%	5.6%	5.8%	194
370	3.8%	4.1%	3.9%	131
380	3.3%	4.6%	3.6%	123
390	1.3%	1.6%	1.4%	47
400	5.1%	5.7%	5.3%	178
Percentage	70.17%	29.83%	100.00%	3373
Mean	323.45	325.40	324.03	
SD	37.28	38.89	37.77	
Count	2367	1006	3373	

**Table 6**  
**Optometry Admission Test**  
**2017**  
**Physics Score by Gender**

Score	Females	Males	Total	Count
200	1.8%	1.3%	1.7%	56
210	2.0%	1.0%	1.7%	57
220	3.5%	2.3%	3.1%	105
230	4.9%	1.9%	4.0%	134
240	8.3%	5.8%	7.5%	254
250	7.4%	3.9%	6.3%	214
260	10.3%	8.2%	9.6%	325
270	10.8%	9.1%	10.3%	348
280	9.0%	10.1%	9.4%	316
290	9.2%	9.8%	9.4%	316
300	7.6%	7.5%	7.5%	254
310	7.5%	7.9%	7.6%	256
320	4.9%	6.4%	5.4%	181
330	3.6%	7.0%	4.6%	155
340	3.0%	4.5%	3.5%	117
350	2.1%	3.9%	2.6%	89
360	1.7%	2.7%	2.0%	67
370	0.7%	2.1%	1.1%	38
380	0.7%	1.2%	0.8%	28
390	0.4%	1.4%	0.7%	23
400	0.7%	2.3%	1.2%	40
Percentage	70.17%	29.83%	100.00%	3373
Mean	279.69	295.69	284.46	
SD	39.79	43.36	41.53	
Count	2367	1006	3373	

**Table 7**  
**Optometry Admission Test**  
**2017**  
**Quantitative Reasoning Score by Gender**

Score	Females	Males	Total	Count
200	0.2%	0.3%	0.2%	8
210	0.4%	0.3%	0.4%	13
220	0.7%	0.2%	0.6%	19
230	0.8%	0.5%	0.7%	24
240	1.8%	0.9%	1.5%	51
250	3.6%	2.8%	3.4%	113
260	4.1%	2.6%	3.6%	123
270	7.4%	7.0%	7.3%	245
280	8.9%	5.5%	7.9%	266
290	10.1%	6.6%	9.0%	305
300	11.7%	9.7%	11.1%	374
310	10.2%	10.2%	10.2%	344
320	9.1%	8.3%	8.9%	300
330	7.6%	8.8%	8.0%	269
340	5.8%	7.8%	6.4%	216
350	4.3%	6.3%	4.9%	165
360	3.9%	4.7%	4.1%	139
370	2.5%	5.2%	3.3%	111
380	2.2%	3.6%	2.6%	89
390	1.4%	2.4%	1.7%	56
400	3.3%	6.5%	4.2%	143
Percentage	70.17%	29.83%	100.00%	3373
Mean	308.75	321.60	312.59	
SD	39.46	41.88	40.62	
Count	2367	1006	3373	

**Table 8**  
**Optometry Admission Test**  
**2017**  
**Total Science Score by Gender**

Score	Females	Males	Total	Count
200	0.5%	1.2%	0.7%	25
210	1.1%	0.9%	1.0%	34
220	1.5%	1.0%	1.3%	45
230	2.4%	2.4%	2.4%	80
240	5.1%	2.7%	4.4%	148
250	7.4%	3.7%	6.3%	211
260	8.0%	5.6%	7.3%	246
270	8.7%	7.0%	8.2%	277
280	10.1%	9.0%	9.8%	329
290	8.9%	7.9%	8.6%	289
300	9.0%	9.2%	9.0%	305
310	8.4%	7.5%	8.1%	274
320	5.7%	8.0%	6.4%	216
330	5.6%	5.3%	5.5%	185
340	4.2%	5.7%	4.6%	156
350	3.9%	6.6%	4.7%	159
360	2.6%	3.6%	2.9%	97
370	2.0%	3.2%	2.3%	79
380	1.6%	3.8%	2.3%	77
390	1.6%	2.2%	1.8%	60
400	1.8%	3.9%	2.4%	81
Percentage	70.17%	29.83%	100.00%	3373
Mean	294.96	307.88	298.81	
SD	42.43	46.14	43.96	
Count	2367	1006	3373	



**Table 9**  
**Optometry Admission Test**  
**2017**  
**Academic Average Score by Gender**

Score	Females	Males	Total	Count
200	0.0%	0.0%	0.0%	0
210	0.1%	0.1%	0.1%	3
220	0.3%	0.0%	0.2%	6
230	0.4%	1.1%	0.6%	21
240	1.4%	1.3%	1.4%	46
250	3.0%	2.2%	2.8%	94
260	5.6%	3.3%	4.9%	166
270	8.7%	5.1%	7.6%	257
280	10.4%	10.0%	10.3%	348
290	12.5%	8.3%	11.3%	380
300	11.5%	9.2%	10.8%	365
310	11.3%	12.5%	11.7%	393
320	9.0%	10.7%	9.5%	321
330	7.9%	6.5%	7.4%	251
340	5.5%	8.6%	6.5%	218
350	4.3%	6.8%	5.0%	170
360	2.9%	5.0%	3.5%	119
370	2.6%	4.7%	3.2%	109
380	1.5%	3.0%	1.9%	65
390	0.8%	1.5%	1.0%	35
400	0.2%	0.2%	0.2%	6
Percentage	70.17%	29.83%	100.00%	3373
Mean	304.22	313.97	307.12	
SD	33.21	35.72	34.26	
Count	2367	1006	3373	

**Table 10**  
**Optometry Admission Test**  
**2017**  
**Biology Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.7%	6.8%	0.0%	1.0%	1.6%	1.2%	39
210	0.0%	1.2%	0.7%	0.0%	0.5%	0.0%	0.7%	24
220	4.3%	1.4%	2.1%	0.0%	1.4%	1.6%	1.4%	47
230	0.0%	2.1%	6.2%	0.0%	2.8%	1.6%	2.6%	86
240	4.3%	1.9%	6.8%	0.0%	2.9%	4.9%	2.8%	91
250	4.3%	3.5%	2.7%	10.0%	4.0%	9.8%	3.9%	128
260	4.3%	5.7%	5.5%	20.0%	7.3%	1.6%	6.6%	214
270	4.3%	5.9%	8.9%	0.0%	6.4%	6.6%	6.3%	206
280	0.0%	7.0%	8.9%	0.0%	7.3%	8.2%	7.2%	236
290	34.8%	9.3%	10.3%	0.0%	10.2%	8.2%	10.0%	326
300	4.3%	7.0%	7.5%	10.0%	7.2%	3.3%	7.1%	230
310	4.3%	8.6%	9.6%	10.0%	9.4%	8.2%	9.1%	297
320	8.7%	7.9%	11.0%	10.0%	8.6%	16.4%	8.6%	281
330	4.3%	5.9%	6.2%	10.0%	7.1%	1.6%	6.5%	212
340	13.0%	6.5%	2.1%	10.0%	4.1%	3.3%	4.9%	159
350	0.0%	5.7%	1.4%	0.0%	5.6%	1.6%	5.3%	173
360	4.3%	5.9%	2.1%	10.0%	4.9%	4.9%	5.2%	168
370	4.3%	2.5%	0.7%	0.0%	2.1%	4.9%	2.2%	73
380	0.0%	2.7%	0.0%	0.0%	2.3%	4.9%	2.4%	77
390	0.0%	2.2%	0.7%	0.0%	1.9%	0.0%	1.9%	61
400	0.0%	6.4%	0.0%	10.0%	2.8%	6.6%	4.0%	130
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	299.57	311.89	282.26	313.00	304.32	306.56	305.95	
SD	37.47	47.09	41.70	47.85	44.19	49.66	45.57	
Count	23	1110	146	10	1908	62	3258	

**Table 11**  
**Optometry Admission Test**  
**2017**  
**General Chemistry Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	4.3%	0.6%	4.1%	0.0%	0.8%	3.3%	1.0%	32
210	0.0%	0.3%	2.1%	0.0%	0.5%	0.0%	0.5%	15
220	0.0%	0.6%	2.1%	0.0%	1.0%	1.6%	1.0%	31
230	0.0%	1.0%	4.1%	0.0%	1.4%	0.0%	1.4%	44
240	4.3%	1.5%	9.6%	0.0%	3.1%	0.0%	2.8%	92
250	13.0%	3.6%	4.8%	0.0%	5.1%	1.6%	4.6%	149
260	4.3%	5.7%	8.9%	10.0%	7.0%	11.5%	6.7%	219
270	0.0%	5.2%	10.3%	10.0%	6.2%	6.6%	6.0%	197
280	0.0%	6.3%	9.6%	30.0%	7.0%	6.6%	6.9%	225
290	13.0%	7.0%	8.9%	10.0%	9.3%	4.9%	8.4%	275
300	13.0%	8.9%	8.2%	0.0%	10.0%	14.8%	9.6%	314
310	17.4%	8.0%	7.5%	10.0%	8.1%	8.2%	8.1%	264
320	4.3%	9.2%	6.8%	10.0%	7.8%	4.9%	8.1%	265
330	8.7%	6.8%	4.1%	0.0%	6.8%	3.3%	6.6%	215
340	4.3%	5.5%	2.1%	0.0%	5.9%	9.8%	5.6%	183
350	0.0%	6.4%	1.4%	10.0%	5.2%	1.6%	5.4%	175
360	8.7%	6.4%	1.4%	0.0%	4.7%	4.9%	5.1%	167
370	0.0%	3.2%	2.7%	0.0%	2.1%	1.6%	2.5%	82
380	0.0%	3.9%	0.7%	0.0%	1.7%	4.9%	2.4%	79
390	0.0%	2.8%	0.7%	10.0%	2.5%	4.9%	2.5%	83
400	4.3%	6.9%	0.0%	0.0%	3.7%	4.9%	4.7%	152
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	300.00	318.15	280.68	303.00	306.38	311.15	309.27	
SD	44.92	45.53	41.45	40.57	44.08	48.79	45.29	
Count	23	1110	146	10	1908	62	3258	

**Table 12**  
**Optometry Admission Test**  
**2017**  
**Organic Chemistry Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	1.1%	3.4%	0.0%	1.6%	0.0%	1.5%	48
210	4.3%	1.0%	4.1%	0.0%	1.0%	1.6%	1.2%	38
220	4.3%	1.3%	4.1%	0.0%	1.7%	1.6%	1.7%	55
230	0.0%	1.3%	5.5%	0.0%	2.4%	3.3%	2.1%	69
240	8.7%	3.2%	4.8%	0.0%	3.6%	4.9%	3.6%	116
250	4.3%	3.2%	7.5%	10.0%	5.6%	9.8%	4.9%	161
260	8.7%	5.4%	7.5%	0.0%	6.8%	4.9%	6.3%	206
270	8.7%	8.6%	13.7%	20.0%	10.6%	8.2%	10.0%	327
280	8.7%	6.7%	8.2%	0.0%	6.3%	9.8%	6.6%	214
290	13.0%	8.4%	7.5%	10.0%	11.7%	16.4%	10.5%	341
300	8.7%	8.5%	7.5%	0.0%	8.0%	0.0%	7.9%	259
310	4.3%	6.1%	4.8%	10.0%	7.9%	9.8%	7.2%	234
320	13.0%	8.5%	4.8%	0.0%	6.4%	4.9%	7.1%	230
330	4.3%	7.8%	3.4%	10.0%	6.3%	1.6%	6.6%	216
340	4.3%	6.3%	8.9%	10.0%	5.2%	3.3%	5.7%	186
350	0.0%	5.3%	3.4%	20.0%	4.3%	4.9%	4.6%	151
360	0.0%	2.5%	0.0%	0.0%	1.3%	3.3%	1.7%	54
370	4.3%	3.4%	0.0%	0.0%	3.6%	4.9%	3.4%	110
380	0.0%	2.9%	0.0%	10.0%	1.6%	0.0%	2.0%	64
390	0.0%	2.5%	0.0%	0.0%	1.2%	1.6%	1.6%	51
400	0.0%	6.0%	0.7%	0.0%	3.0%	4.9%	3.9%	128
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	285.22	310.03	278.01	314.00	297.97	297.05	301.12	
SD	39.30	47.16	41.62	42.74	44.41	47.55	45.89	
Count	23	1110	146	10	1908	62	3258	

**Table 13**  
**Optometry Admission Test**  
**2017**  
**Reading Comprehension Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.0%	0.7%	0.0%	0.2%	0.0%	0.1%	4
210	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	2
220	0.0%	0.2%	0.7%	0.0%	0.1%	1.6%	0.2%	5
230	0.0%	0.4%	3.4%	0.0%	0.4%	0.0%	0.5%	16
240	0.0%	1.0%	4.1%	0.0%	0.4%	0.0%	0.8%	25
250	4.3%	1.4%	3.4%	10.0%	1.7%	0.0%	1.7%	55
260	4.3%	2.4%	4.8%	0.0%	2.2%	0.0%	2.4%	77
270	4.3%	3.7%	7.5%	0.0%	2.9%	9.8%	3.5%	114
280	8.7%	5.7%	8.9%	0.0%	4.7%	3.3%	5.2%	169
290	17.4%	8.0%	11.6%	10.0%	7.0%	8.2%	7.6%	249
300	0.0%	10.7%	10.3%	10.0%	10.0%	6.6%	10.1%	329
310	8.7%	9.5%	13.0%	10.0%	10.4%	14.8%	10.3%	335
320	4.3%	11.7%	8.9%	30.0%	10.1%	9.8%	10.6%	345
330	13.0%	7.8%	4.8%	0.0%	7.8%	3.3%	7.6%	248
340	13.0%	9.0%	8.2%	10.0%	10.6%	6.6%	9.9%	323
350	8.7%	9.1%	5.5%	10.0%	9.8%	8.2%	9.3%	304
360	4.3%	5.9%	2.7%	10.0%	5.8%	9.8%	5.8%	189
370	0.0%	2.7%	0.7%	0.0%	4.8%	8.2%	3.9%	127
380	0.0%	3.4%	0.0%	0.0%	4.2%	4.9%	3.7%	121
390	0.0%	1.6%	0.0%	0.0%	1.4%	3.3%	1.4%	47
400	8.7%	5.5%	0.7%	0.0%	5.7%	1.6%	5.3%	174
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	317.83	323.14	298.42	316.00	326.75	325.57	324.13	
SD	40.22	37.71	35.67	31.69	37.47	38.45	37.92	
Count	23	1110	146	10	1908	62	3258	

**Table 14**  
**Optometry Admission Test**  
**2017**  
**Physics Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	1.4%	9.6%	0.0%	1.3%	3.3%	1.7%	55
210	4.3%	1.3%	3.4%	0.0%	1.8%	1.6%	1.7%	55
220	4.3%	2.4%	6.2%	10.0%	3.2%	0.0%	3.1%	100
230	8.7%	3.3%	4.1%	10.0%	4.1%	9.8%	4.0%	131
240	8.7%	5.0%	12.3%	10.0%	8.8%	6.6%	7.6%	247
250	8.7%	5.0%	9.6%	20.0%	6.7%	4.9%	6.3%	204
260	17.4%	8.9%	13.7%	0.0%	9.8%	11.5%	9.7%	317
270	0.0%	9.1%	11.0%	10.0%	11.0%	8.2%	10.2%	332
280	8.7%	9.5%	10.3%	0.0%	9.6%	6.6%	9.5%	310
290	13.0%	9.0%	7.5%	20.0%	9.2%	4.9%	9.1%	295
300	17.4%	7.3%	5.5%	0.0%	7.8%	6.6%	7.5%	245
310	4.3%	9.2%	3.4%	0.0%	7.1%	8.2%	7.6%	248
320	0.0%	6.4%	0.7%	0.0%	5.4%	4.9%	5.5%	178
330	4.3%	5.7%	2.1%	0.0%	4.0%	9.8%	4.6%	150
340	0.0%	4.3%	0.0%	0.0%	3.4%	3.3%	3.5%	115
350	0.0%	3.9%	0.7%	0.0%	2.1%	1.6%	2.6%	85
360	0.0%	2.9%	0.0%	10.0%	1.7%	3.3%	2.1%	67
370	0.0%	1.3%	0.0%	10.0%	1.1%	1.6%	1.1%	37
380	0.0%	1.1%	0.0%	0.0%	0.8%	0.0%	0.8%	27
390	0.0%	1.0%	0.0%	0.0%	0.5%	3.3%	0.7%	23
400	0.0%	2.2%	0.0%	0.0%	0.7%	0.0%	1.1%	37
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	268.70	292.77	257.19	277.00	281.95	286.07	284.50	
SD	31.95	43.16	33.15	51.87	39.86	45.87	41.59	
Count	23	1110	146	10	1908	62	3258	

**Table 15**  
**Optometry Admission Test**  
**2017**  
**Quantitative Reasoning Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.0%	2.7%	0.0%	0.2%	0.0%	0.2%	7
210	0.0%	0.2%	2.7%	0.0%	0.3%	0.0%	0.3%	11
220	0.0%	0.4%	3.4%	0.0%	0.5%	1.6%	0.6%	19
230	0.0%	0.6%	3.4%	0.0%	0.6%	0.0%	0.7%	24
240	0.0%	0.7%	6.8%	0.0%	1.6%	0.0%	1.5%	49
250	8.7%	2.3%	7.5%	0.0%	3.4%	3.3%	3.3%	106
260	4.3%	3.2%	6.2%	0.0%	3.6%	6.6%	3.7%	119
270	4.3%	6.1%	8.2%	10.0%	7.7%	8.2%	7.2%	233
280	13.0%	6.5%	10.3%	10.0%	8.4%	3.3%	7.8%	254
290	13.0%	8.4%	11.6%	20.0%	9.3%	6.6%	9.1%	296
300	0.0%	11.7%	11.0%	10.0%	10.9%	9.8%	11.1%	361
310	17.4%	9.4%	11.0%	20.0%	10.5%	13.1%	10.3%	335
320	8.7%	7.7%	4.1%	20.0%	9.9%	13.1%	9.0%	293
330	13.0%	8.7%	2.7%	0.0%	8.0%	6.6%	8.0%	261
340	8.7%	6.7%	4.8%	10.0%	6.3%	9.8%	6.5%	211
350	8.7%	4.5%	2.7%	0.0%	5.3%	1.6%	4.9%	159
360	0.0%	5.9%	0.0%	0.0%	3.2%	6.6%	4.0%	131
370	0.0%	3.7%	0.7%	0.0%	3.4%	3.3%	3.3%	108
380	0.0%	3.5%	0.0%	0.0%	2.4%	3.3%	2.7%	87
390	0.0%	2.9%	0.0%	0.0%	1.2%	0.0%	1.7%	54
400	0.0%	6.8%	0.0%	0.0%	3.3%	3.3%	4.3%	140
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	303.91	320.58	280.14	303.00	310.94	313.44	312.81	
SD	30.71	41.71	37.27	21.11	38.82	38.55	40.54	
Count	23	1110	146	10	1908	62	3258	

**Table 16**  
**Optometry Admission Test**  
**2017**  
**Total Science Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.4%	6.2%	0.0%	0.6%	1.6%	0.8%	25
210	4.3%	0.5%	3.4%	0.0%	1.1%	0.0%	1.0%	33
220	4.3%	1.3%	4.8%	0.0%	1.0%	1.6%	1.3%	43
230	0.0%	2.0%	7.5%	0.0%	2.4%	1.6%	2.5%	80
240	8.7%	3.4%	6.2%	0.0%	4.8%	6.6%	4.5%	145
250	0.0%	5.1%	6.2%	20.0%	6.7%	8.2%	6.2%	201
260	13.0%	6.0%	11.6%	0.0%	7.8%	6.6%	7.3%	239
270	8.7%	6.7%	7.5%	20.0%	9.5%	4.9%	8.4%	273
280	8.7%	8.2%	13.0%	0.0%	10.0%	14.8%	9.6%	312
290	4.3%	7.9%	8.2%	10.0%	9.0%	9.8%	8.6%	280
300	17.4%	8.5%	5.5%	20.0%	9.5%	3.3%	9.0%	292
310	8.7%	7.8%	7.5%	0.0%	8.1%	8.2%	8.0%	260
320	13.0%	8.2%	5.5%	10.0%	5.3%	3.3%	6.4%	207
330	0.0%	6.0%	4.8%	0.0%	5.4%	6.6%	5.6%	181
340	0.0%	5.3%	0.7%	0.0%	4.6%	4.9%	4.6%	150
350	8.7%	6.1%	0.7%	0.0%	4.2%	4.9%	4.7%	154
360	0.0%	3.8%	0.7%	0.0%	2.8%	0.0%	3.0%	97
370	0.0%	3.0%	0.0%	10.0%	2.1%	3.3%	2.4%	77
380	0.0%	3.0%	0.0%	0.0%	2.2%	0.0%	2.3%	75
390	0.0%	3.0%	0.0%	10.0%	1.3%	3.3%	1.8%	60
400	0.0%	3.8%	0.0%	0.0%	1.5%	6.6%	2.3%	74
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	285.22	307.90	268.84	301.00	295.79	299.51	298.72	
SD	37.28	45.50	37.74	47.48	42.04	49.11	44.03	
Count	23	1110	146	10	1908	62	3258	



**Table 17**  
**Optometry Admission Test**  
**2017**  
**Academic Average Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
210	0.0%	0.0%	0.7%	0.0%	0.1%	1.6%	0.1%	3
220	0.0%	0.0%	2.1%	0.0%	0.2%	0.0%	0.2%	6
230	4.3%	0.3%	4.1%	0.0%	0.5%	0.0%	0.6%	20
240	4.3%	0.8%	6.8%	0.0%	1.3%	0.0%	1.4%	45
250	0.0%	2.5%	8.9%	0.0%	2.6%	1.6%	2.8%	91
260	4.3%	4.4%	9.6%	10.0%	4.8%	4.9%	4.9%	160
270	8.7%	5.9%	11.6%	10.0%	8.4%	8.2%	7.7%	251
280	13.0%	9.1%	11.6%	10.0%	10.7%	13.1%	10.3%	334
290	4.3%	10.7%	8.9%	10.0%	11.9%	13.1%	11.3%	369
300	17.4%	9.2%	11.6%	10.0%	11.4%	13.1%	10.7%	350
310	17.4%	11.9%	13.0%	10.0%	11.4%	8.2%	11.6%	379
320	13.0%	8.6%	4.8%	20.0%	10.3%	4.9%	9.4%	307
330	8.7%	8.6%	4.1%	0.0%	7.0%	8.2%	7.4%	242
340	0.0%	6.8%	1.4%	0.0%	6.9%	4.9%	6.5%	211
350	0.0%	6.4%	0.7%	10.0%	4.6%	8.2%	5.1%	166
360	4.3%	4.8%	0.0%	10.0%	3.2%	0.0%	3.6%	117
370	0.0%	4.9%	0.0%	0.0%	2.4%	6.6%	3.2%	104
380	0.0%	3.2%	0.0%	0.0%	1.4%	1.6%	1.9%	63
390	0.0%	1.5%	0.0%	0.0%	0.8%	1.6%	1.0%	34
400	0.0%	0.5%	0.0%	0.0%	0.1%	0.0%	0.2%	6
Percentage	0.71%	34.07%	4.48%	0.31%	58.56%	1.87%	100.00%	3258
Mean	296.52	313.68	280.14	306.00	305.52	307.05	307.13	
SD	30.09	35.54	29.85	32.73	32.69	36.16	34.33	
Count	23	1110	146	10	1908	62	3258	

**Table 18**  
**Optometry Admission Test**  
**2017**  
**OAT Scores by Examinees of Hispanic Origin**

Score	BIO	GCH	OCH	RCT	PHY	QRT	SCI	AA
200	2.7%	2.1%	1.8%	0.3%	3.0%	1.2%	2.1%	0.0%
210	0.9%	1.2%	1.8%	0.0%	3.0%	1.5%	2.7%	0.3%
220	1.5%	1.5%	1.8%	0.0%	4.2%	2.1%	2.4%	0.9%
230	6.3%	2.1%	4.2%	0.6%	7.8%	0.9%	3.0%	1.8%
240	3.3%	5.1%	5.7%	1.5%	11.4%	3.6%	6.9%	3.6%
250	2.7%	5.7%	9.0%	2.1%	8.4%	7.8%	9.0%	3.9%
260	9.0%	9.3%	5.1%	6.3%	9.9%	4.8%	10.2%	7.5%
270	7.2%	7.8%	12.3%	4.5%	12.0%	11.1%	7.8%	11.7%
280	7.8%	10.2%	5.4%	7.2%	6.9%	12.3%	10.8%	14.2%
290	10.2%	7.8%	9.0%	10.2%	10.8%	11.1%	8.1%	10.8%
300	10.8%	7.2%	7.8%	10.8%	6.0%	10.2%	7.5%	12.0%
310	7.8%	6.3%	7.5%	9.9%	4.8%	6.9%	8.4%	9.3%
320	8.7%	5.7%	8.1%	12.0%	3.3%	6.9%	5.4%	7.5%
330	4.5%	6.0%	5.4%	7.2%	3.9%	6.0%	4.5%	6.3%
340	5.4%	6.6%	6.0%	7.2%	1.8%	3.6%	2.7%	5.1%
350	2.4%	4.2%	4.2%	8.4%	0.3%	2.4%	4.5%	2.1%
360	2.7%	4.5%	0.6%	3.3%	0.6%	1.5%	0.9%	0.9%
370	1.2%	1.2%	1.2%	3.0%	0.9%	1.8%	0.9%	1.2%
380	1.5%	1.5%	1.2%	2.1%	0.0%	1.8%	0.3%	0.6%
390	0.9%	2.1%	0.6%	0.3%	0.3%	0.9%	0.6%	0.0%
400	2.1%	1.5%	0.9%	2.7%	0.3%	1.2%	0.9%	0.0%
Mean	292.98	295.78	288.61	312.41	269.04	292.35	282.80	292.47
SD	43.74	45.02	42.05	36.67	37.19	39.89	40.80	31.62
Count	332	332	332	332	332	332	332	332

BIO=Biology, GCH=General Chemistry, OCH=Organic Chemistry, RCT=Reading Comprehension Test, PHY=Physics, QRT=Quantitative Reasoning Test, SCI=Total Science and AA=Academic Average.

**Table 19.**  
**Total Lifetime OAT Administrations for Candidates Testing in 2017**

Category	Count
1 <sup>st</sup> Admin	2423
2 <sup>nd</sup> Admin	649
3 <sup>rd</sup> Admin	232
4 <sup>th</sup> Admin	69
5 <sup>th</sup> Admin	8
6 <sup>th</sup> Admin	5
7 <sup>th</sup> Admin	1
Exams given in 2017	3387*

\*This represents the total number of examinees who tested in 2017. Tables 2-9 reflect the number of examinations taken by applicants who answered the question on gender (3,373), while tables 10-17 reflect the number of examinations taken by applicants who answered the question on ethnic identification (3,258).

## Part Three: Content Specifications

### Survey of Natural Sciences: Biology

40 items

#### 1.1 Cell and Molecular Biology

- 1.1.1 Origin of Life
- 1.1.2 Cell metabolism (including photosynthesis / enzymology)
- 1.1.3 Cellular processes
- 1.1.4 Thermodynamics
- 1.1.5 Organelle structure and function
- 1.1.6 Mitosis/ Meiosis
- 1.1.7 Cell structure
- 1.1.8 Experimental cell biology
- 1.1.9 Biomolecules
- 1.1.10 Integrated Relationships

#### 1.2 Diversity of Life: Biological Organization and Relationship of Major Taxa (Six-Kingdom, Three-Domain System)

- 1.2.1 Plantae
- 1.2.2 Animalia
- 1.2.3 Protista
- 1.2.4 Fungi
- 1.2.5 Eubacteria (Bacteria)
- 1.2.6 Archae
- 1.2.7 Integrated Relationships

#### 1.3 Structure and Function of Systems

- 1.3.1 Integumentary
- 1.3.2 Skeletal
- 1.3.3 Muscular
- 1.3.4 Circulatory
- 1.3.5 Immunological
- 1.3.6 Digestive
- 1.3.7 Respiratory
- 1.3.8 Urinary
- 1.3.9 Nervous/senses
- 1.3.10 Endocrine
- 1.3.11 Reproductive
- 1.3.12 Integrated Relationships

#### 1.4 Developmental Biology

- 1.4.1 Fertilization
- 1.4.2 Descriptive embryology
- 1.4.3 Developmental mechanisms
- 1.4.4 Integrated Relationships

#### 1.5 Genetics

- 1.5.1 Molecular genetics
- 1.5.2 Human genetics
- 1.5.3 Classical genetics
- 1.5.4 Chromosomal genetics
- 1.5.5 Genetic technology
- 1.5.6 Integrated Relationships

#### 1.6 Evolution, Ecology, and Behavior

- 1.6.1 Natural selection
- 1.6.2 Population genetics/Speciation
- 1.6.3 Population and community ecology
- 1.6.4 Ecosystems
- 1.6.5 Animal behavior (including social)
- 1.6.6 Integrated Relationships

## Survey of Natural Sciences: General Chemistry

30 items

### 1. Stoichiometry and General Concepts

- A. Percent composition
- B. Empirical formulae
- C. Balancing equations
- D. Moles and molecular formulas
- E. Molar mass
- F. Density
- G. Calculations from balanced equations

### 2. Gases

- A. Kinetic molecular theory of gases
- B. Dalton's gas law
- C. Boyle's gas law
- D. Charles's gas law
- E. Ideal gas law

### 3. Liquids and Solids

- A. Intermolecular forces
- B. Phase changes
- C. Vapor pressure
- D. Structures
- E. Polarity
- F. Properties

### 4. Solutions

- A. Polarity
- B. Properties
  - 1. Colligative
  - 2. Non-colligative
- C. Forces
- D. Concentration calculations

### 5. Acids and Bases

- A. pH
- B. Strength
- C. Brønsted-Lowry reactions
- D. Calculations

### 6. Chemical Equilibria

- A. Molecular
- B. Acid/base
- C. Precipitation
- D. Calculations
- E. Le Chatelier's principle

### 7. Thermodynamics and Thermochemistry

- A. Laws of thermodynamics
- B. Hess's law
- C. Spontaneity
- D. Enthalpies and entropies
- E. Heat transfer

### 8. Chemical Kinetics

- A. Rate laws
- B. Activation energy
- C. Half-life

### 9. Oxidation-Reduction Reactions

- A. Balancing equations
- B. Determination of oxidation numbers
- C. Electrochemical calculations
- D. Electrochemical concepts and terminology

### 10. Atomic and Molecular Structure

- A. Electron configuration
- B. Orbital types
- C. Lewis-Dot diagrams
- D. Atomic theory
- E. Quantum theory
- F. Molecular geometry
- G. Bond types
- H. Sub-atomic particles

### 11. Periodic Properties

- A. Representative elements
- B. Transition elements
- C. Periodic trends
- D. Descriptive chemistry

### 12. Nuclear Reactions

- A. Balancing equations
- B. Binding energy
- C. Decay processes
- D. Particles
- E. Terminology

### 13. Laboratory

- A. Basic techniques
- B. Equipment
- C. Error analysis
- D. Safety
- E. Data analysis

## Survey of Natural Sciences: Organic Chemistry

30 items

### 1. Mechanisms: Energetics and Structure

- A. Elimination
- B. Addition
- C. Free radical
- D. Substitution mechanisms
- E. Other

### 2. Chemical and Physical Properties of Molecules

- A. Spectroscopy
  - 1.  $^1\text{H}$  NMR
  - 2.  $^{13}\text{C}$  NMR
  - 3. Infrared
  - 4. Multi-spectra
- B. Structure
  - 1. Polarity
  - 2. Intermolecular forces (solubility, melting/boiling point, etc.)
- C. Laboratory Theory and Techniques (i.e. TLC, separations, etc.)

### 3. Stereochemistry (Structure Evaluation)

- A. Chirality
- B. Isomer relationships
- C. Conformations

### 4. Nomenclature

- A. IUPAC rules
- B. Functional groups in molecules

### 5. Individual Reactions of the Major Functional Groups and Combinations of Reactions to Synthesize Compounds

- A. Alkene/Alkyne
  - 1. General
  - 2. One-step
  - 3. Multi-step

- A. B. Aromatic
  - 1. General
  - 2. One-step
  - 3. Multi-step
- B. C. Substitution/Elimination
  - 1. General
  - 2. One-step
  - 3. Multi-step
- C. D. Aldehyde/Ketone
  - 1. General
  - 2. One-step
  - 3. Multi-step
- D. E. Carboxylic acids and derivatives
  - 1. General
  - 2. One-step
  - 3. Multi-step
- E. F. Other
  - 1. General
  - 2. One-step
  - 3. Multi-step

### 6. Acid-Base Chemistry

- A. A. Ranking Acidity/Basicity
  - 1. Structure Analysis
  - 2. pH/pKa data analysis
- C. B. Prediction of products and equilibria

### 7. Aromatics and Bonding

- A. Concept of aromaticity
- B. Resonance
- C. Atomic/molecular orbitals
- D. Hybridization
- E. Bond angles/lengths

## Reading Comprehension

The Reading Comprehension Test contains three science-based reading passages and requires no prior knowledge of the topics covered, other than basic undergraduate preparation in science. The test measures the ability to comprehend, organize, analyze, and remember the information presented.

Each reading passage is 1,000-1,500 words in length and is followed by 12-20 questions, which can be answered using information provided in the passage. The total number of items for all three passages is 50 items.

### Physics

**40 items**

- |                           |                                       |
|---------------------------|---------------------------------------|
| 1. Units and Vectors      | 9. Fluid Statics                      |
| 2. Linear Kinematics      | 10. Thermodynamics and Thermal Energy |
| 3. Statics                | 11. Electrostatics                    |
| 4. Dynamics               | 12. D.C. Circuits                     |
| 5. Rotational Motion      | 13. Optics                            |
| 6. Energy and Momentum    |                                       |
| 7. Simple Harmonic Motion |                                       |
| 8. Waves                  |                                       |

## **Quantitative Reasoning**

**40 items**

### 6.1. Algebra

- 6.1.1. Equations and expressions
- 6.1.2. Inequalities
- 6.1.3. Exponential notation
- 6.1.4. Absolute value
- 6.1.5. Ratios and proportions
- 6.1.6. Graphical analysis

### 6.4. Probability and Statistics

### 6.7. Data Analysis and Sufficiency

### 6.8. Quantitative Comparison

### 6.9. Applied Mathematics (Word) Problems



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