

3.2 *The purpose(s) of the test, definition of the domain, and the test specifications should be stated clearly so that the judgments can be made about the appropriateness of the defined domain for the stated purpose(s) of the test and about the relation of items to the dimensions of the domain they are intended to represent.*

3.3 *The test specifications should be documented, along with their rationale and the process by which they were developed. The test specifications should define the content of the test, the proposed number of items, the item formats, the desired psychometric properties of the items, and the item and section arrangement. They should also specify the amount of time for testing, directions to the test takers, procedures to be used for test administration and scoring, and other relevant information.*

3.5 *When appropriate, relevant experts to the testing program should review the test specifications. The purpose of the review, the process by which the review is conducted, and the results of the review should be documented. The qualifications, relevant experiences, and demographic characteristics of expert judges should also be documented.*

3.11 *Test developers should document the extent to which the content domain of a test represents the defined domain and test specifications.*

14.8 *Evidence of validity based on test content requires a thorough and explicit definition of the content domain of interest. For selection, classification, and promotion, the characterization of the domain should be based on job analysis.*

14.9 *When evidence of validity based on test content is a primary source of validity evidence in support of the use of a test in selection or promotion, a close link between test content and job content should be demonstrated.*

14.14 *The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential worthy performance in an occupation or profession. A rationale should be provided to support a claim that the knowledge and skills being assessed are required for credential-worthy performance in an occupation and are consistent with the purposes for which the licensing or certification program was instituted.*

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## 10. Item Development

The essential building block of any examination is the examination item. The development and validation of examination items is one of the most important steps in examination development. The Joint Commission greatly values item development and validation, and it continues to invest considerable resources into both activities. In this

section of the technical report, the relevant standards are provided in Table 10.1 and sections are devoted to how items are developed and reviewed. Section 11 addresses item analysis and evaluation.

### Who Writes Test Items?

The Joint Commission appoints members to test construction committees. The primary duty of these committees and their members is examination design and item and examination development. Details of the qualifications of the committee members, committee structures, responsibilities, and other relevant information appear in section 12. These details are also described in the *Standing Rules* (Joint Commission on National Dental Examinations, March 2008).

**Table 10.1**  
**Standards Relevant to Item Development and Validation**

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*3.6 The types of items, the response formats, scoring procedures, and test administration procedures should be selected based on the purposes of the test, the domain to be measured, and the intended test takers. To the extent possible, test content should be chosen to ensure that intended inferences from test scores are equally valid for members of different groups of test takers. The test review process should include empirical analyses and, when appropriate, the use of expert judges to review items and response formats. The qualifications, relevant experiences, and demographic characteristics of expert judges should also be documented.*

*3.7 The procedures used to develop, review, and tryout items, and to select items from the item pool should be documented. If the items were classified into different categories or subtests according to the test specifications, the procedures used for the classification and the appropriateness and accuracy of the classification should also be documented.*

*3.8 When item tryouts or field tests are conducted, the procedures used to select the sample(s) of test takers for item tryouts and the resulting characteristics of the sample should be documented. When appropriate, the sample(s) should be as representative as possible of the population(s) for which the test is intended.*

*3.9 When a test developer evaluates the psychometric properties of items, the classical or item response theory (IRT) model used for evaluating the psychometric properties of items should be documented. The sample used for estimating item properties should be described and should be of adequate size and diversity for the procedure. The process by which items are selected and the data used for item selection, such as item difficulty, item discrimination, and/or item information, should also be documented. When*

*IRT is used to estimate item parameters in test development, the item response models, estimation procedures, and evidence of model fit should be documented.*

*7.4 Test developers should strive to identify and eliminate language, symbols, words, phrases, and content that are generally regarded as offensive by members of racial, ethnic, gender, or other groups, except when judged to be necessary for adequate representation of the domain.*

*7.7 In testing applications where the level of linguistic or reading ability is not part of the construct of interest, the linguistic or reading demands of the test should be kept to the minimum necessary for the valid assessment of the intended construct.*

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After the Joint Commission approves the appointment of new test constructors, based on the recommendation of the Committee on Examination Development, a letter is sent to each new test constructor to acknowledge the appointment and familiarize him/her with the test development process. Each test constructor is given the following materials: *Test Item Development Guide*, *Orientation Manual for Dental Test Constructors*, and *National Board Dental Examination Specifications*.

When new test constructors come to their first meeting, the returning test constructors informally discuss the process with new members. These new members are mentored during their initial service as test constructors. The *Test Item Development Guide* (January 2008) describes the different item formats and general guidelines for writing items. The *Orientation Manual for Dental Test Constructors* (January 2008) describes the test construction committee structure, the selection criteria for test constructors, the responsibilities of test constructors, and test construction committee process. The *Test Item Development Guide* is provided to all test constructors and anyone else requesting them through the office of the Joint Commission.

### **Item Formats**

Standard 3.3 refers to identifying item formats in the examination specifications. The National Board examinations use multiple-choice formats. Part I uses both independent items and testlet-based items addressing basic biomedical and dental sciences. For Part II, the case-independent format surveys clinical dental sciences and patient management knowledge pertinent to licensing. The case-dependent format uses case materials consisting of a patient dental/medical history, a dental chart, radiographs, and clinical photographs. These items are used in Part II and serve as stimulus material for a series of case-associated questions. For Parts I and II, the key features of multiple-choice items are a stem pairing a question or statement followed by a list of possible responses. For National Board use, an item has at least three, but not more than five possible responses.

## The Process of Examination Revision

The process of reviewing and revising items for the National Board examinations involves reviewing items and revising unsatisfactory items. Items are unsatisfactory if they are too easy, too difficult, or not discriminatory. In reviewing items, test construction committees (TCCs) look at two key factors: the P (probability value) that represents item difficulty, and R (point-biserial correlation between item and examination performance) that represents discrimination. The Joint Commission accepts a broad range of item difficulties, but an easy item – one that virtually all candidates answer correctly – detracts from accurate measurement. The same is true of items that are too difficult – those that no or few candidates reliably answer correctly. Discrimination of an item indicates the relation between the candidates who choose the correct answer and their rank in scoring on the total number of items. Following are the acceptable ranges of indices for difficulty and discrimination according to the standards approved by the Joint Commission.

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(P): E — Easy; M — Medium; D — Difficult

(R): H — High; M — Medium; L — Low

	Part I (R)	Part II (R)	Parts I and II (P)
H	= 0.26 or higher	H = 0.26 or higher	E = 0.90 or higher
M	= 0.15 – 0.25	M = 0.08 – 0.25	M = 0.40 – 0.89
L	= under 0.15	L = under 0.08	D = 0.00 – 0.39

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For an item to be considered effective, it must produce a difficulty index between 40% and 89%, and a corresponding discrimination index of 0.15 or higher for Part I or 0.08 or higher for Part II. Items that do not meet these standards are eliminated or revised. Scoring differs slightly for Part I and Part II of the National Board examinations. It is important to note that Part I consists of discipline-based and testlet items. Part II consists of discipline-based and case-based items. An item is deleted from scoring when the keyed response has 0.00 or a negative R-value. A negative R indicates that high-scoring candidates are responding to the item incorrectly and that low-scoring candidates are responding to the item correctly. An item is reviewed when: (1) the keyed response has a p-value below .25, or (2) the keyed response has a p-value less than one of the distractors and both the keyed response and the distractor have positive R values.

### Revising Part I and Part II (Component A) Discipline-based Items

The following are steps for revising Part I and Part II independent items.

1. The committee reviews reports on trend statistics and an analysis of item difficulty and discrimination. These two reports, which are generated after a set period, provide information on the results of the examination.
2. The committee reviews statistical characteristics — reliability, standard deviation, and mean.
3. The committee reviews the unsatisfactory items. All items are read aloud by committee members.
4. The committee discusses each item. The facilitator helps to analyze the problematic items. The committee decides whether to retain, revise, or discard the item. The revision process involves rewording the stem or changing distractors.
5. The facilitator notes all changes. Revised items are returned to the item bank. These items are subsequently field tested to see if they can be used in future examinations. Items not meeting the Joint Commission's quality standards are discarded.

#### **Revising Part II (Component B) Case-based Items**

The following are steps for revising Part II case-dependent items.

1. The test development staff determines the number of good items and poor items in a case and presents a summary to the committee.
2. The committee determines whether a case is worth reviewing or revising based on the ratio of good to poor items. If the committee decides to delete a case, then only the case materials (patient history, chart, radiographs, and photographs) are retained for future use.
3. The committee reviews cases that can be improved with modifications. The committee reviews the patient history, dental chart, radiographs, and clinical photographs. Members read all items aloud.
4. The committee discusses each item. The facilitator helps to analyze the problematic items. The committee decides whether to revise, replace, or delete the item. Revision involves rewording the stem or the distractors, or changing the distractors completely. Replacement involves writing an entirely new item. Deletion means eliminating the item from the case.
5. The facilitator notes all changes. Revised cases are saved for future use.

Revising items accomplishes two things, i.e., it replenishes item banks and familiarizes test constructors with the characteristics of acceptable examination items.

## 11. Item Validation

After an item is written, Downing and Haladyna (1997) recommend a series of reviews that improve the quality of the item. Evidence should be presented that qualified personnel have done these reviews. Table 11.1 provides a short list of standards pertaining to item validation.

**Table 11.1**  
**Standards Pertaining to Item Validation**

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*3.6 The type of items, the response formats, scoring procedures, and test administration procedures should be selected based on the purposes of the test, the domain to be measured, and the intended test takers. To the extent possible, test content should be chosen to ensure that intended inferences from test scores are equally valid for members of different groups of test takers. The test review process should include empirical analyses and, when appropriate, the use of expert judges to review items and response formats. The qualifications, relevant experiences, and demographic characteristics of expert judges should also be documented.*

*3.7 The procedures used to develop, review, and tryout items, and to select items from the item pool should be documented. If the items were classified into different categories or subtests according to the test specifications, the procedures used for the classification and the appropriateness and accuracy of the classification should be documented.*

*3.9 When a test developer evaluates the psychometric properties of items, the classical or item response theory (IRT) model used for evaluating the psychometric properties of items should be documented. The sample used for estimating item properties should be described and should be of adequate size and diversity for the procedure. The process by which items are selected and the data used for item selection, such as item difficulties, item discrimination, and/or item parameters in test development, the item response models, estimation procedures, and evidence of model fit should be documented.*

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The *Standards* (AERA, APA, & NCME, 1999) suggest that those items that count toward candidates' scores should exhibit sound psychometric characteristics. Specifically, the item difficulty and discrimination should compare favorably with the item-performance standards set by the Joint Commission. Item statistics result from the analysis of data obtained from the administration of the items to a representative sample of candidates.

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While the statistics are important for determining the value of items, statistics are not available for some items on National Board examinations because they are new and untested.

Items used on each National Board examination include anchor and new items. The function of anchor items is to equate examination forms across administrations since they have reliable performance statistics. New items are considered pretest items in an examination. These pretest items are removed from the final analysis if they do not meet item-performance standards. Test constructors review items with poor performance and either retain, revise, or remove the item from further testing.

### **Evaluating and Revising Weak or Unacceptable Items**

The Joint Commission (Joint Commission on National Dental Examinations, November 1995) has published a document that is intended to help test constructors review unsatisfactorily performing items and then either revise or retire such items. This activity replenishes the item bank and helps the committee members sharpen their ability to evaluate and improve items.

### **Pretest Items**

A pretest item is a new item that is included on a regular administration of the examination but is reviewed for acceptable item statistics before being used as a scored item on a subsequent edition of the examination. The objective of pretesting items is to ensure the use of items with acceptable item statistics. The pretesting of items enhances the quality of the examinations and the reliability of the scores while allowing for the development of a high-quality item pool. To balance the need for using only previously administered items and the need for maintaining acceptable reliabilities, the Joint Commission has set the maximum percentage of pretest items at 15%. Each examination includes at least 85% scored items and up to 15% pretest items.

## **12. Test Design and Development**

The overall design of each examination is a crucial step in test development. Items chosen for each examination must conform to the examination specifications in precise ways. Not only must content requirements be met, but also the difficulty of the examination (based on the average of the item difficulties) must approximate previous and future examination forms. Table 12.1 lists standards that pertain to examination design and development.

**Table 12.1**  
**Standards Relevant to Test Design and Development**

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*3.1 Tests and testing programs should be developed on a sound scientific basis. Test developers and publishers should compile and document adequate evidence bearing on test development.*

*3.7 The procedures used to develop, review, and try out items, and to select items from the item pool should be documented. If the items were classified into different categories of subtests according to the test specifications, the procedures used for the classification and the appropriateness and accuracy of the classification should be documented.*

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*3.11 Test developers should document the extent to which the content domain of a test represents the defined domain and test specifications.*

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Examinations are designed with the full participation of content expert committees and supervised by the staff specialists from the ADA's test development area. This process ensures that the expertise of highly qualified, licensed dentists is fully used in the selection of items and the examination design. The test specialists provide technical support and guidance to ensure that the desired technical qualities of the examination are achieved during this examination design phase.

The Joint Commission convenes several test construction committees. The details of committee member eligibility, recruitment, and service are provided in this section. As noted earlier in this technical report, these committees also write and evaluate test items as part of the item development phase of test development.

### **The Role of a Test Constructor**

The role of a test constructor is based on the purpose of the National Board Dental Examinations. The role of a test constructor is fundamental to the validity of score interpretations and uses. Test constructors are responsible for evaluating and recommending to the Joint Commission, through its Committee on Examination Development, changes to the content specifications that relate to terminology and minor shifts in focus when accompanied by appropriate justification. In addition to updating the specifications, test constructors are responsible for implementing the specifications in the items selected for each examination. This action provides content-related validity evidence. The test constructors also are responsible for constructing a clear, precise, and cohesive group of items for each examination.

Test constructors meet in discipline or case-based committees each year to engage in their test development activities. It is essential to the quality of the examinations that the test constructors use their subject-matter expertise, their familiarity with the curriculum in accredited dental schools, and their awareness of what is important in the practice of general dentistry in the construction of each new examination. Most of this work is done in committee.

### The Nature of Test Construction Committees

The National Board Dental Examinations are developed by several test construction committees consisting of consultants of the Joint Commission. Committee size is based on past committee experience in providing adequate content expertise. The following are the 17 Part I and Part II Test Construction Committees with the number of members appearing at the right:

#### Part I - Basic Biomedical Sciences Committees

Anatomic Sciences -----	5
• 2 gross anatomists	
• 2 histologists (1 embryology expert and 1 neuroanatomy expert)	
• 1 full-time practitioner	
Biochemistry-Physiology -----	5
• 2 biochemists	
• 2 physiologists	
• 1 full-time practitioner	
Microbiology-Pathology -----	5
• 2 microbiologists (1 immunology expert)	
• 2 general pathologists	
• 1 full-time practitioner	
Dental Anatomy and Occlusion -----	4
• 3 dental anatomists	
• 1 full-time practitioner	
Testlet Development -----	9
• 4 full-time practitioners	
• 5 experts in each Part I discipline	

## Part II - Component A (independent items) Committees

Endodontics -----	4
• 3 endodontists	
• 1 full-time practitioner	
Operative Dentistry -----	5
• 4 dentists (1 dental materials expert)	
• 1 full-time practitioner	
Oral and Maxillofacial Surgery–Pain Control -----	4
• 3 oral and maxillofacial surgeons (1 pain control expert)	
• 1 full-time practitioner	
Oral Diagnosis -----	6
• 2 oral pathologists	
• 2 oral and maxillofacial radiologists	
• 1 dentist with advanced education in oral diagnosis	
• 1 full-time practitioner	
Orthodontics–Pediatric Dentistry-----	6
• 3 orthodontists	
• 2 pediatric dentists	
• 1 full-time practitioner	
Patient Management-----	8
• 3 behavioral scientists (1 dentist)	
• 2 dental public health specialists	
• 1 dentist with advanced training in special needs	
• 2 full-time practitioners	
Periodontics -----	4
• 3 periodontists	
• 1 full-time practitioner	
Pharmacology -----	4
• 3 pharmacologists (1 dentist)	
• 1 full-time practitioner	

Prosthodontics -----	6
• 4 prosthodontists (2 fixed prosthodontic experts; 2 removable partial/complete prosthodontics experts)	
• 1 dental materials expert	
• 1 full-time practitioner	

**Part II - Component B (case-dependent items) Committees**

Component B – Case Composition Committee -----	13
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This committee, composed of dental discipline experts and practitioners, prepares the case-based items for Part II of the National Board Dental Examinations.

Case Selection Committee -----	4
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As an adjunct to Component B, this committee does the preliminary work of screening new patient cases and identifying suitable cases for the examinations. In addition, it drafts and reviews the patient histories, dental charts and treatment plans associated with the cases.

Consultant Review Committee -----	2
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To ensure examination coherence and cohesion, this committee reviews the discipline-based and case-based components of the Part II examination.

**Criteria for Dental Test Constructors**

The *Standing Rules* (Joint Commission on National Dental Examinations, March 2008) employs for the selection of consultants to serve on the dental test construction committees. A test constructor is appointed for a one-year term and may be reappointed for a maximum of five consecutive one-year terms. To be considered for appointment, a person must meet certain qualifications and must submit a completed Personal Data Form.

Following are the criteria for test construction committees in Anatomic Sciences, Biochemistry-Physiology, Microbiology-Pathology, Dental Materials, Pharmacology, and Patient Management (Dental Public Health and Behavioral Science):

1. Dentist with a Master’s degree in that biomedical science OR any professional with a doctoral degree in that biomedical science, and
2. Three years of experience, within the last five years, teaching or in research in that biomedical science.

Following are the criteria for test construction committees in Dental Anatomy and Occlusion, Operative Dentistry, Prosthodontics, Oral and Maxillofacial Surgery and Pain Control, Orthodontics-Pediatric Dentistry, Endodontics, Periodontics, and Oral Diagnosis:

1. Dentist,
2. In the case of special areas of dentistry, graduation from an accredited advanced education program in that specialty, and
3. Three years of experience, within the last five years, teaching or in research in the pertinent specialty.

To qualify for consideration in the National Board Dental Examination construction process as a full-time practitioner, a dentist must be practicing dentistry (not necessarily as a specialist) 30 to 40 hours per week for at least 10 years.

### **The Selection of Committee Members**

The Joint Commission annually advertises vacancies on test construction committees. A letter explaining the on-line application materials, consisting of a list of vacancies, selection criteria, and a Personal Data Form is e-mailed to dental schools, state boards of dentistry, constituent dental societies, and other institutions and individuals well in advance of the annual meeting of the Joint Commission. The Joint Commission typically receives an average of 12 applications for each vacant position. All applications are processed by staff and forwarded to the Committee on Examination Development (a standing committee of the Joint Commission), which is responsible for recommending individuals for appointment by the Joint Commission.

Test construction committee members are appointed primarily based on subject matter expertise, although geographic location is considered. Committee membership terms are one year, and a member may be reappointed for a maximum of five consecutive one-year terms. Membership in the American Dental Association is preferred for members of committees in the clinical sciences.

A test construction committee member who has served five consecutive one-year terms is not eligible for re-appointment to the same committee.

### **The Responsibilities of Test Construction Committee Members**

The following list shows the responsibilities of committee members.

1. Submit new items for the National Board item banks, according to Joint Commission guidelines, specifications, and content outlines by the designated time. This requirement applies to members after completion of their first year of committee

service, and the number of new items expected may vary according to the needs of each committee.

2. Attend each test construction meeting for the duration of the session.
3. Construct National Board Dental Examinations according to Joint Commission guidelines, specifications, and content outlines within the designated time frame.
4. Construct additional items for the item banks when necessary.
5. Assign ownership of all examination materials to the American Dental Association/Joint Commission on National Dental Examinations by agreeing to the terms of the Copyright Assignment.
6. Inform the Joint Commission of changes in the standard curricula, and suggest modifications in examination specifications and content outlines.
7. Consider special issues and make recommendations at the request of the Joint Commission.
8. Safeguard the security and confidentiality of the National Board examinations by declining any arrangement to assist with review courses or reviewing books pertaining to the examinations while serving as a test constructor, and for at least one year following the final term of appointment.
9. Comply with the American Dental Association's policy on professional conduct. The policy includes prohibitions against sexual harassment, as well as other forms of unlawful conduct.

*An Orientation Manual for Dental Test Constructors* (Joint Commission on National Dental Examinations, January 2008) provides basic information to new test constructors.

### **How National Board Dental Examinations Are Developed**

The Part I comprehensive National Board Dental Examination contains 400 items – approximately 320 discipline-based and 80 testlet-based. The Part II comprehensive examination contains 500 items—400 discipline-based items and 100 case-based items. Part I and Part II discipline-based committees meet once per year, usually for three days. The Part I testlet development committee meets three times per year. The Part II component B (case-based) committee meets at least twice per year. Each committee is charged with constructing a specific examination or portion of an examination. The Part II Case Selection Committee meets once per year, usually for two days, and the Review Committee meets twice per year, usually for two days.

Test construction meetings typically begin with a review of the statistical characteristics of examinations administered since the last meeting. These characteristics

include reliability, mean, and standard deviation of examination scores. Individual item statistics are also reviewed. These statistics include the difficulty of the item, the proportion of candidates choosing each option, and the point-biserial correlation between each response and the total score, which is the discrimination index. Items that produce statistics below the standards set by the Joint Commission are reviewed.

Next, test constructors review the *National Board Dental Examination Specifications* (Joint Commission on National Dental Examinations, 2008) to ensure that discipline areas continue to reflect current practice and teachings in the majority of U.S. dental schools. Then test constructors finalize the draft examinations by reviewing all items, according to the *Test Item Development Guide* and the examination specifications.

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The final step of the meeting is to draft new examinations using both new items and existing items with acceptable statistics performances. Following the meetings, test construction consultants and staff conduct final reviews.

### **Results of Test Design**

Several tables provide results of the examination design effort relative to the examination specifications provided in Appendices A and B. The Joint Commission seeks clinical application of all items and directs all test construction committees to emphasize problem solving rather than simple recall of facts in the construction of examinations. While finalizing items, all committees identify each item's clinical applicability and cognitive level. For Part I, the test constructors assert that dentists will use the basic biomedical and dental sciences knowledge as a foundation for daily practice. Therefore, each item in a basic science discipline has a direct or an indirect clinical application. The distribution of items by clinical applicability and cognitive level for two computer-based editions of the comprehensive Part I examination administered in 2008 is shown in Tables 12.2 and 12.3, respectively.

**Table 12.2**  
**Distribution of Part I Items by Clinical Applicability and Cognitive Level**  
**Computer-based Examination Version A\***

Discipline	Clinical Applicability	Understanding	Application	Reasoning
Anatomic Sciences	30	60	34	6
Biochemistry-Physiology	28	50	43	7
Microbiology-Pathology	36	51	45	4
Dental Anatomy	100	40	56	4

\* This summary is based on one of the editions of the 2008 computer-based, comprehensive Part I examination.

**Table 12.3**  
**Distribution of Part I Items by Clinical Applicability and Cognitive Level**  
**Computer-based Examination Version B\***

Discipline	Clinical Applicability	Understanding	Application	Reasoning
Anatomic Sciences	36	63	33	4
Biochemistry-Physiology	27	53	44	3
Microbiology/Pathology	38	57	41	2
Dental Anatomy	100	50	46	4

\* This summary is based on one of the editions of the 2008 computer-based, comprehensive Part I examination.

## **Distribution of Basic Science and Multidisciplinary Examinations**

When the comprehensive Part II was first developed in the early 1990s, the Joint Commission required that each Part II examination include items that require knowledge of the basic sciences (minimum 30%) and other clinical disciplines (minimum of 30%). For example, an item on tooth extraction might be categorized under Pharmacology and Oral Surgery because of the medication and technique involved in the procedure. Classification of items according to disciplines and cognitive level is done by committees during the final phase of test construction.

The distributions of items by category and cognitive level for two 2008 Part II examination versions are shown in Tables 12.4 and 12.5.

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**Table 12.4**  
**Distribution of Part II Items by Category and Cognitive Level**  
**Computer-based Examination Version A- 2008**

Part II Disciplines	Single Discipline Items	Multidisciplinary Items			Cognitive Level		
		Other Clinical Discipline	Basic Science	Behavioral Science	Reasoning	Application	Understanding
COMPONENT A							
Operative Dentistry (44)	14	21	9	32	10	2	14
Pharmacology (31)	26	2	3	9	21	1	26
Prosthodontics (49)	34	7	8	35	9	5	34
Oral and Maxillofacial Surgery and Pain Control (47)	8	11	28	24	23	0	8
Orthodontics -- Pediatric Dentistry (52)	21	22	9	33	16	3	21
Endodontics (31)	3	22	6	24	3	4	3
Periodontics (50)	12	28	10	26	20	4	12
Oral Diagnosis (45)	9	7	29	28	4	13	9
Patient Management (51)	51	0	0	46	5	0	51
Total -- Component A (400 Items)	178	120	102	257	111	32	178
COMPONENT B (100 Items)	64	28	8	72	21	7	64
TOTALS (500)	242	148	110	329	132	39	242
Percent (100 %)	48.40	29.60	22.00	65.80	26.40	7.80	48.40

**Table 12.5**  
**Distribution of Part II Items by Category and Cognitive Level**  
**Computer-based Examination Version B- 2008**

Part II Disciplines	Single Discipline Items	Multidisciplinary Items			Cognitive Level		
		Other Clinical Discipline	Basic Science	Behavioral Science	Reasoning	Application	Understanding
COMPONENT A							
Operative Dentistry (44)	17	23	4	38	6	0	17
Pharmacology (31)	24	5	2	18	12	1	24
Prosthodontics (49)	30	9	10	37	6	6	30
Oral and Maxillofacial Surgery and Pain Control (47)	10	9	28	45	2	0	10
Orthodontics -- Pediatric Dentistry (52)	19	22	11	35	11	6	19
Endodontics (31)	6	18	7	16	10	5	6
Periodontics (50)	10	28	12	32	16	2	10
Oral Diagnosis (45)	11	9	25	27	4	14	11
Patient Management (51)	49	2	0	47	3	1	49
Total – Component A (400 Items)	176	125	99	295	70	35	176
COMPONENT B (100 Items)	56	20	24	48	31	21	56
TOTALS (500)	232	145	123	343	101	56	232
Percent (100 %)	46.40	29.00	24.60	68.60	20.20	11.20	46.40