**Part II (Clinical Science)**

Clinical Science tests/measures a candidate’s application of the knowledge of Basic Science to the prevention, diagnosis, treatment and management of clinical conditions within the scope of optometric practice.

Clinical Science is composed of six major subject areas, four of which parallel the four Basic Science subject areas. Conditions identified in parenthesis () are provided as examples for clarification, and are not an exhaustive list of conditions to be tested under the specified category. The subject areas and their relative emphases are shown below.

<table>
<thead>
<tr>
<th>A. Systemic Conditions - 70 Items (16%)</th>
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<tr>
<td>1. General Health</td>
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<td>2. Neurological System</td>
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<td>3. Musculoskeletal System</td>
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<td>4. Skin and Hair</td>
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<td>5. Head and Neck</td>
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<td>6. Hematopoietic System</td>
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<td>7. Immunologic System</td>
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<td>8. Cardiovascular System</td>
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<td>9. Renal and Urogenital System</td>
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<td>10. Gastrointestinal System</td>
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<td>11. Liver and Biliary Tract</td>
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<td>12. Endocrine/Metabolic System</td>
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<td>16. Mental Illness and Behavioral Disorders</td>
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<td>17. Infectious Diseases</td>
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<td>18. Congenital/Hereditary Conditions</td>
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<th>B. Ocular Disease/Trauma - 180 Items (41%)***</th>
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<tr>
<td>1. Orbit, Adnexa, Lacrimal System</td>
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<td>2. Cornea/External Disease</td>
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<td>3. Glaucoma</td>
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<td>4. Lens/Cataract</td>
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<td>5. Uveitis, Sclera/Episclera</td>
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<td>6. Retina/Vitreous</td>
<td>19-29</td>
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<tr>
<td>7. Neuro-Ophthalmic Disorders</td>
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### C. Refractive/Oculomotor/Sensory Integrative Conditions 125 Items (29%)

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<td>7. Anomalies of Accommodation and Accommodative Vergence</td>
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<td>8. Refractive Correction Applications</td>
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### D. Perceptual Conditions - 33 Items (8%)

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<td>4. Anomalies of Color Vision (Inherited, Acquired)</td>
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### E. Public Health - 15 Items (3%)

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<tr>
<td>1. Epidemiology</td>
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<tr>
<td>2. Biostatistics and Measurement</td>
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<tr>
<td>3. Environmental Vision</td>
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<tr>
<td>4. Health Care Policy and Administration</td>
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### F. Legal and Ethical Issues - 12 Items (3%)

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<td>1. Licensure and Governmental Regulation of Optometry</td>
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<td>2. Standards of Professional Ethics</td>
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<td>3. Patient Records</td>
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<td>4. Confidentiality of Patient Information</td>
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<td>5. Professional Liability</td>
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<tr>
<td>6. Visual Disability</td>
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**TOTAL** | 435
* On Clinical Science items, it is assumed that normative values for the following should be known by the candidate:

- Serum glucose: fasting and random
- Total cholesterol and HDL cholesterol
- Westergren sedimentation rate
- Vital signs (i.e., blood pressure, pulse rate, respiratory rate, body temperature)

When data for any of the above are presented in a Clinical Science item, the data will be presented without any normative values in parentheses. However, when laboratory data other than those mentioned above are presented in a Clinical Science item, the data will be accompanied by normative values in parentheses.

** The number of items indicates that actual number for each of the six major subject areas, and a range for each content area within a subject. The range specifies the minimum and maximum number of items in each content area that will be administered on the test. The percentage of items indicates the actual percentage for each of the six major subject areas, rounded to the nearest integer.

*** Candidates will receive a subscore that is equivalent to a performance score on the stand-alone Treatment and Management of Ocular disease (TMOD®) examination required by over 40 states for therapeutic privileges. This subscore is based on 90 treatment/management items embedded within the Ocular Disease/Trauma section. There is no need for a candidate who passes the TMOD® exam embedded in Clinical Science to take the stand-alone TMOD® examination unless specifically required by the state board(s) of the state(s) to which the candidate plans to apply for licensure. The content of the equivalent embedded and stand-alone TMOD® tests includes the use of both topical and oral medications for the treatment of ocular diseases, and requires knowledge of the interaction between ocular and systemic systems.
A. Systemic Conditions - 70 Items (16%)
"Systemic conditions" applies the knowledge of Basic Science to the detection and management of systemic conditions as they may relate to the practice of optometry. This includes a general understanding of the common signs, symptoms, diagnoses, and courses of systemic diseases, and a general knowledge of treatments prescribed by other health care practitioners for common conditions that could impact the optometrist's patient. Systemic conditions are composed of 18 major subdivisions, the general knowledge of which is the responsibility of the optometrist as a licensed primary health care provider.

1. General Health (5-9 Items)
   A. Epidemiology
   B. Detailed history with regards to differential diagnosis of fatigue, weight loss, fever, headache, dizziness, and malaise
   C. Presentations involving abnormal body habitus and demeanor
   D. Deviation from physical developmental norms and standards for all ages
   E. Common systemic side effects of medications
   F. Principles of basic cardiac life support
   G. Preventative medicine
   H. Medical laboratory tests for screening
   I. Probable diagnoses and general treatment approaches

2. Neurological System (3-5 Items)
   A. Epidemiology
   B. Detailed assessment of the signs and symptoms associated with non-ocular neurological conditions (e.g., myasthenia gravis, multiple sclerosis, CVA, neoplasia, parkinsonism)
   C. Medical laboratory tests and diagnostic imaging
   D. Probable diagnoses and general treatment approaches

3. Musculoskeletal System (1-3 Items)
   A. Epidemiology
   B. Symptoms and signs of the various arthritic syndromes (e.g., SLE, JRA, RA, ankylosing spondylitis)
   C. Medical laboratory tests and diagnostic imaging
   D. Probable diagnoses and general treatment approaches

4. Skin and Hair (1-3 Items)
   A. Epidemiology
   B. Skin manifestation of systemic disorders
   C. Skin lesions in the phakomatoses
   D. Common dermatoses including allergic manifestations
   E. Benign, premalignant, and malignant skin lesions
   F. Medical laboratory tests
   G. Probable diagnoses and general treatment approaches

5. Head and Neck (2-6 Items)
   A. Epidemiology
   B. Symptoms and signs of diseases of the nasopharynx, sinuses, salivary glands, lymph nodes, carotid and temporal arteries, skin and temporomandibular joint
   C. Auscultation of carotid arteries, skull and orbits for bruits and venous hum
   D. Potential significance of dysarthria, dysphagia, dysphonia and hoarseness
   E. Medical laboratory tests and diagnostic imaging
   F. Probable diagnoses and general treatment approaches
6. Hematopoietic System (2-4 Items)
   A. Epidemiology
   B. Symptoms and signs of common blood disorders (e.g., anemias, pancytopenia, thrombocytopenia, leukopenia, leukocytosis, thrombocytosis, hyperviscosity syndromes, neoplasias including leukemia, lymphoma, multiple myeloma)
   C. Medical laboratory tests and diagnostic imaging
   D. Probable diagnoses and general treatment approaches

7. Immunologic System (3-7 Items)
   A. Epidemiology
   B. Symptoms and signs of immunodeficiency syndromes (e.g., AIDS)
   C. Symptoms and signs of hypersensitivity reactions
   D. Symptoms and signs of common granulomatous diseases (e.g., sarcoidosis)
   E. Medical laboratory tests and diagnostic imaging
   F. Probable diagnoses and general treatment approaches

8. Cardiovascular System (4-10 Items)
   A. Epidemiology
   B. Risk factors for atherosclerotic heart disease
   C. Symptoms and signs of coronary artery disease
   D. Significance of palpitations, syncope, murmurs, dyspnea and claudication
   E. Pulse and blood pressure: norms, indications, and techniques for evaluation
   F. Signs and symptoms of heart failure
   G. Medical laboratory tests and diagnostic imaging (e.g., echocardiography and duplex ultrasonography)
   H. Probable diagnoses and general treatment approaches

9. Renal and Urogenital System (3-7 Items)
   A. Epidemiology
   B. Symptoms and signs of urogenital and renal disorders (e.g., sexually transmitted diseases, glomerulonephritis, cystitis, pyelonephritis)
   C. Symptoms and signs of renal failure
   D. Medical laboratory tests
   E. Probable diagnoses and general treatment approaches

10. Gastrointestinal System (2-4 Items)
    A. Epidemiology
    B. Symptoms and signs of common gastrointestinal disorders (e.g., inflammatory bowel disease, peptic ulcer disease, pancreatitis, malabsorption syndromes, neoplasia)
    C. Medical laboratory tests and diagnostic imaging
    D. Probable diagnoses and general treatment approaches

11. Liver and Biliary Tract (1-3 Items)
    A. Epidemiology
    B. Symptoms and signs of liver disorders (e.g., cirrhosis, hepatitis, liver failure)
    C. Biliary tract disorders
    D. Medical laboratory tests and diagnostic imaging
    E. Probable diagnoses and general treatment approaches

12. Endocrine/Metabolic System (5-9 Items)
    A. Epidemiology
    B. Symptoms and signs of endocrine disorders (e.g., hypothalamic-pituitary dysfunction, thyroid dysfunction, diabetes mellitus, abnormal calcium metabolism, adrenal dysfunction, pheochromocytoma)
    C. Medical laboratory tests and diagnostic imaging
    D. Probable diagnoses and general treatment approaches
13. Reproductive System (1-3 Items)
   A. Epidemiology
   B. Symptoms and signs of pregnancy
   C. Complications of pregnancy (e.g., pre-eclampsia, eclampsia)
   D. Use of medications and abuse of drugs
   E. Implication of breast feeding
   F. Medical laboratory tests and diagnostic imaging
   G. Probable diagnoses and general treatment approaches

14. Respiratory System (4-10 Items)
   A. Epidemiology
   B. Symptoms and signs of respiratory disorders (e.g., COPD, asthma, respiratory failure)
   C. Significance of common respiratory symptoms (e.g., cough, hemoptysis, wheezing, shortness of breath)
   D. Symptoms and signs of anaphylaxis
   E. Medical laboratory tests, diagnostic imaging, and spirometry
   F. Probable diagnoses and general treatment approaches

15. Nutrition (1-3 Items)
   A. Epidemiology
   B. Symptoms and signs of nutritional abnormalities (e.g., hypo- and hyper-vitaminosis, malnutrition, obesity)
   C. Eating disorders (e.g., anorexia, bulimia)
   D. Medical laboratory testing
   E. Probable diagnoses and general treatment approaches

16. Mental Illness and Behavioral Disorders (1-3 Items)
   A. Epidemiology
   B. Symptoms and signs of mental illness (e.g., depression, suicide, anxiety, schizophrenia, bipolar disorder)
   C. Symptoms and signs of behavioral disorders (e.g., substance abuse; child, spouse and elder abuse)
   D. Psychological tests
   E. Probable diagnoses and general treatment approaches

17. Infectious Diseases (3-5 Items)
   A. Epidemiology
   B. Symptoms and signs of common infectious diseases (e.g., tuberculosis, subacute bacterial endocarditis, sepsis, opportunistic infections)
   C. Medical laboratory tests and diagnostic imaging
   D. Probable diagnoses and general treatment approaches

18. Congenital/Hereditary Conditions (1-3 Items)
   A. Epidemiology
   B. Symptoms and signs of common genetic disorders (e.g., Down syndrome, cystic fibrosis, congenital anomalies)
   C. Symptoms and signs of common congenital disorder (e.g., fetal alcohol syndrome, rubella, syphilis, toxoplasmosis)
   D. Medical laboratory tests and diagnostic imaging
   E. Probable diagnoses and general treatment approaches
**B. Ocular Disease/Trauma - 180 Items (41%)**

"Ocular disease/trauma" applies the knowledge of Basic Science to the prevention, diagnosis, treatment and management of ocular pathologic conditions that can present to the optometrist by patients seeking primary eye care. It is composed of 7 major subdivisions, each having a common 4-part format (epidemiology, history and symptoms; observation, inspection, recognition of signs, and techniques and skills required; pathophysiology and diagnosis; treatment and management options, and prognosis). Treatment options include the use of both topical and systemic medications for ocular disease. A list of the generic/brand name equivalents, containing most but not all of the commonly prescribed medications, is provided on this web site and will also be reproduced in front of the test booklet.

1. **Orbit, Adnexa, Lacrimal System (22-34 items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis

2. **Cornea/External Disease (42-60 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis, including peri-operative care for laser or refractive surgery patients

3. **Glaucoma (20-30 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis

4. **Lens/Cataract (5-11 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis

5. **Uveitis, Sclera/Episclera (18-28 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis

6. **Retina/Vitreous (19-29 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis

7. **Neuro-Ophthalmic Disorders (16-26 Items)**
   - A. Epidemiology, history and symptom inventory
   - B. Observation, inspection, recognition of signs, and techniques and skills
   - C. Pathophysiology and diagnosis
   - D. Treatment and management options, and prognosis
C. Refractive/Oculomotor/Sensory Integrative Conditions - 125 Items (29%)

"Refractive/oculomotor/sensory integrative conditions" applies the knowledge of Basic Science to the
diagnosis, treatment and management of those refractive, oculomotor and/or sensory integrative
conditions that can present to the optometrist by patients seeking primary eye care. It is composed of
8 major subdivisions, the first 7 having a common 3-part format (epidemiology, history and
symptoms; observation and recognition of clinical signs, and techniques and skills required; diagnosis,
treatment and management, and prognosis) with the final subdivision dealing with the use of
refractive correction applications to manage the conditions in this section.

1. Anomalies of Refraction: Ametropia (21-27 Items)
   C. Epidemiology, history and symptom inventory
   D. Observation and recognition of clinical signs, and techniques and skills including determination of:
      1. Interpupillary distance
      2. Visual acuity
      3. Corneal curvature and thickness
      4. Objective static and dynamic refractive status, including automatic refractive devices
      5. Standard subjective refraction procedures, including astigmatic dials, crossed cylinders,
         stenopaeic slit, fogging methods, bichrome, and accommodation balance (equalization)
         techniques
      6. Binocular subjective refraction procedures, including Turville Infinity Balance and
         vectographic (Polaroid) techniques
      7. Cycloplegic subjective and objective techniques
      8. Automatic computer assisted subjective procedures, laser refraction and variations in
         procedures for the various ametropias
   E. Diagnosis, treatment and management using spectacle and contact lenses (see also (8) below),
      and prognosis

2. Anomalies of Refraction: Presbyopia (8-10 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs, and techniques and skills for determining the near
      add including:
      1. Amplitude of accommodation
      2. Crossed cylinders
      3. Trial lenses
      4. PRA/NRA
   C. Diagnosis, treatment and management with spectacle and contact lenses (see also (8) below),
      and prognosis

3. Anomalies of Refraction: Aphakia, Pseudophakia, and Aniseikonia (5-9 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs and phenomena associated with aphakia and
      pseudophakia:
      1. Magnification
      2. Field of view
      3. Spatial distortion
      4. Convergence demands
      5. Sensitivity to glare
   Techniques and skills for determining, evaluating and/or verifying:
      1. Types and characteristics of intraocular lenses and aphakic spectacle and contact
         lenses
      2. Intraocular lens power
      3. Special refraction techniques
      4. Aphakic lens prescriptions
C. Observation and recognition of clinical signs, and techniques and skills associated with aniseikonia including:
   1. Detection of aniseikonia
   2. Measurement of aniseikonia

D. Diagnosis, treatment and management with spectacle and contact lenses (see also (8) below), and prognosis

4. Low Vision (10-14 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs, and techniques and skills for determining a correction:
      1. Visual acuity
      2. Special refraction techniques
      3. Visual fields
      4. Reading skills
      5. Effects of illumination
      6. Magnification determination
      7. In-office evaluation with low vision devices
   C. Diagnosis, treatment and management of low vision patients, and prognosis
      1. Analysis and interpretation of personal, social, vocational, and psychological patient needs and factors
      2. Prescribing low vision devices (e.g., simple magnifiers, telescopes, loupes, and microscopes) with reference to magnification, full field of view, and working distance
      3. Patient education and training
      4. Roles and relationships with other disciplines
      5. Prognostic factors and follow-up care (see also (8) below)

5. Sensory Anomalies of Binocular Vision/Strabismus (16-20 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs, and techniques and skills to test:
      1. Monocular fixation
      2. Amblyopia
      3. Sensory fusion and stereopsis
      4. Anomalous correspondence
      5. Suppression
   C. Diagnosis, treatment and management procedures, and prognosis
      1. Spectacle and contact lens applications, including prisms (see also (8) below)
      2. Vision therapy

6. Anomalies of Eye Movements (10-14 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs, and techniques and skills to test:
      1. Comitance
      2. Deviations and measurements thereof
      3. Diplopia
      4. Motor fusion
      5. Paralytic syndromes
      6. Fixation disparity
      7. Nystagmus
   C. Diagnosis, treatment and management of eye movement anomalies, and prognosis
      1. Spectacle and contact lens applications, including prisms (see also (8) below)
      2. Vision therapy
7. Anomalies of Accommodation and Accommodative Vergence (10-14 Items)
   A. Epidemiology, history and symptom inventory
   B. Observation and recognition of clinical signs, and techniques and skills to test:
      1. Amplitude range, facility of accommodation
      2. Analysis of accommodation and vergence relationships
   C. Diagnosis, treatment and management of accommodation and accommodative vergence anomalies, and prognosis
      1. Spectacle and contact lens applications, including prisms and AC/A applications
         (see also (8) below)
      2. Vision therapy

8. Refractive Correction Applications (28-34 Items)
   A. Treatment and management of refractive/oculomotor/sensory integrative conditions using spectacle lenses:
      1. Ametropic spectacle lens prescriptions
      2. Lens problems of aberrations, weight, thickness, limits of field, ghost images, magnification, jump and displacement
      3. Frame and lens design, including types of single vision and multiple focal lenses, kinds of lens materials, base curves and cylinder forms, character and placement of multifocals, optical centers, and frame specifications.
      4. Evaluation of lenses and frames, via lensometer, lens gauge, and observation, for optical center positioning, powers, and other specifications of design
      5. Fitting and adjusting frames
      6. Patient counseling information associated with the dispensing of prescriptions for different ametropias
   B. Treatment and management of refractive/oculomotor/sensory integrative conditions using contact lenses:
      1. Lens types and materials: hard lenses; haptics; lathe-cut, molded, and spin-cast soft lenses
      2. Optics of contact lenses: curves, zones, widths and tear lens effects, sagittal depth; center and edge thickness; flex, asphericity and toric designs
      3. Basic theories and methods of fitting: lens design, specifications of orders, lens verification and evaluation, insertion and removal techniques, design of wearing schedules, fluorescein evaluation and fitting criteria
      4. Patient selection based upon history, analysis of primary care data, correlations of data, facial physiognomy, and contraindications; and management based upon education and patient handling and control
      5. Contact lens selection from presently available types and forms of lenses
      6. Care of lenses; handling; cleaning; preservatives available; disinfection methods and solutions
      7. Follow-up care; adaptation, physiologic and post-fitting complications, allergic responses, lens changes and mechanical problems
      8. Bifocal and astigmatic contact lenses; types, basis of selection and adaptation, techniques of fitting, and care for each
      9. Specially designed lenses and fitting procedures for keratoconus and irregular corneas, sports vision, diseased and traumatic corneas, cosmetic (prosthetic) use, iris color changes and color vision deficiencies
   C. Laser or surgical management of refractive conditions:
      1. Patient selection criteria
      2. Patient counseling information
      3. Peri-operative patient care
**D. Perceptual Conditions - 33 Items (8%)**

"Perceptual conditions" applies the knowledge of Basic Science to the prevention, diagnosis, treatment and management of those perceptual anomalies that can present to the optometrist by patients seeking primary eye care. It is composed of 4 major subdivisions: Anomalies of Child Development; Anomalies of the Aging Patient; Anomalies Secondary to Acquired Neurological Impairment; and Anomalies of Color Vision.

1. **Anomalies of Child Development (10-14 Items)**
   A. Epidemiology; history and signs/symptoms manifest by patients in the age ranges noted below in (B)
   B. Clinical techniques and tests to assess the development of an infant (birth to 18 months), toddler (18-36 months), pre-schooler (3-5 years), and school-age child
      1. Fine and gross motor development
      2. Speech-language development
   C. Clinical characteristics of children who deviate from normal patterns of development, and epidemiology of developmental disorders
   D. Vision problems which may be associated with deviations from normal patterns of development
   E. Tests used by optometrists to determine a child’s level of visual-perceptual development
      1. Visual attention and discrimination
      2. Visual-motor integration
      3. Intersensory integration
      4. Bilateral integration and laterality
   F. Role of the optometrist and other disciplines in screening, evaluating, managing and referring children who deviate from normal patterns of development

2. **Anomalies of the Aging Adult (10-14 Items)**
   A. Clinical characteristics of changes in perceptual function (non-visual) associated with aging
      1. Hearing
      2. Coordination
      3. Cognition
      4. Psycho-social status
   B. Symptom profiles, clinical procedures, and tests identifying changes in vision function of the aging patient
   C. Diagnosis, treatment, and management of aging patients
   D. Assessment of the need for referral and consultation with other disciplines

3. **Anomalies Secondary to Acquired Neurological Impairment (4-8 Items)**
   A. Adaptations to clinical techniques and tests to allow the assessment of the visual abilities of patients with acquired systemic conditions (CVA, multiple sclerosis, etc.) and traumatic brain injury (TBI) which result in neurological impairment and subsequent vision perceptual dysfunction
      1. Non-concomitancy
      2. Field loss and neglect
      3. Loss of accommodation
      4. Loss of fusion
      5. Vision perception-motor deficiencies
   B. Role of the optometrist in screening, evaluating, managing and referring patients within the multi-disciplinary rehabilitation team concerning sequelae of neurological impairment
   C. Modification of optometric treatment for the patient with acquired neurological impairment
      1. Lenses and prisms
      2. Forms of occlusion (nasal, temporal, full, etc.)
      3. Vision therapy
      4. Counseling and education of patients and their families
4. Anomalies of Color Vision (Inherited, Acquired) (2-4 Items)
   A. Inherited anomalies of color vision
      1. Classification
      2. Inheritance patterns
      3. Color vision tests (e.g., pseudoisochromatic tests, arrangement tests, anomaloscope)
   B. Acquired anomalies of color vision
      1. Classification
      2. Etiology
      3. Color vision tests
   C. Conditions for color vision testing
   D. Societal implications of color vision anomalies
      1. School
      2. Vocational requirements
      3. Patient interest
   E. Patient management strategies
      1. Counseling
      2. Special aids
E. Public Health* - 15 Items (3%)

"Public health" is the application of knowledge to the identification of society's health needs, and government and private initiatives that address those needs. It includes the optometrist's responsibilities in health promotion and in managing primary health and eye care conditions in populations of people who need optometric services. It is composed of 4 major subdivisions, each dealing with health concerns related to groups of patients, as contrasted with individual direct patient care issues.

1. Epidemiology (4-7 Items)
   A. Quantitative measures
      1. Incidence
      2. Prevalence
      3. Odds ratio
      4. Relative risk
      5. Indices of health
   B. Screening concepts
      1. Sensitivity
      2. Specificity
      3. Predictive value
      4. Yield
   C. Major epidemiological studies
      1. Orinda Vision Screening Study (1957-1959)
      2. Framingham Eye Study
      3. NIH/NEI studies
      4. Baltimore Eye Study
      5. Beaver Dam Eye Study
   D. Research design
      1. Sampling and randomization
      2. Observational vs. experimental studies
      3. Case-control vs. cohort studies
      4. Prospective vs. retrospective studies
      5. Cross-sectional studies
      6. Research ethics
   E. Morbidity and mortality in the United States
      1. General morbidity and mortality patterns
      2. General distribution of eye and vision disorders
      3. Legal blindness in the United States (age-specific causes, age-specific rates)

2. Biostatistics and Measurement (2-3 Items)
   A. Measures of central tendency and variability
   B. Parametric vs. nonparametric measures
   C. Statistical significance
   D. Causal inference
   E. Validity and reliability
   F. Bias

3. Environmental Vision (1-3 Items)
   A. Visual demands and ocular hazards
      1. Work
      2. Home
      3. Recreation
   B. Materials and/or procedures designed for safety or to improve visual performance
      1. Work
      2. Home
      3. Recreation
   C. Influence of environmental changes on visual performance
4. **Health Care Policy and Administration (4-6 Items)**

   A. Organization of health services
      1. Levels of care (primary, secondary, tertiary)
      2. Types of providers (skills and credentials of other providers, referral patterns among providers)
      3. Types of practice (solo/private, group, interdisciplinary)
      4. Delivery settings (offices/clinics, hospitals, health departments, co-management centers, long-term care facilities)
      5. Alternative delivery and managed care systems (HMOs, IPAs, PPOs, VSPs)

   B. Planning and regulation
      1. Federal, state and local government
      2. Private agencies
      3. Professional associations

   C. Health economics and financing
      1. National health care expenditures
      2. Cost of eye and vision care
      3. Payment mechanisms (fee for service, capitation, prospective payment, retrospective reimbursement, resource based relative value systems)
      4. Cost control measures
      5. Insurance and government sponsored programs

   D. Health care personnel
      1. Supply and distribution
      2. Utilization and productivity

   E. Health promotion, disease prevention and community optometry
      1. Levels of prevention (primary, secondary, tertiary)
      2. Infection control
      3. Population trends and emerging needs
      4. Eye and vision care needs of high-risk populations
      5. School and community screening programs

   F. Quality assurance
      1. Monitoring and evaluation (structure, process, outcome)
      2. Utilization review (retrospective, concurrent, prospective)
      3. Public and private programs

*Note:* Test items on the content areas of Public Health will be integrated within and across the four major Clinical Science subdivisions (Systemic Conditions; Ocular Disease/Trauma; Refractive/Oculomotor/Sensory Integrative Conditions; Perceptual Conditions) where appropriate and relevant.
F. Legal and Ethical Issues* - 12 Items (3%)

"Legal and Ethical Issues" is the application of fundamental legal and ethical principles to optometric responsibilities in patient care and management. It is composed of 4 major subdivisions, each dealing with a specific issue that can affect optometric practice.

1. Licensure and Governmental Regulation of Optometry (2-4 Items)
   A. State laws, regulations, and administrative agencies
      1. Powers and duties of state boards of optometry (licensure and discipline)
   B. Federal laws, regulations, and administrative agencies
      1. Food and Drug Administration (FDA)
      2. Occupational Safety and Health Administration (OSHA)
      3. Drug Enforcement Administration (DEA)
      4. Americans with Disabilities Act (ADA)
      5. Title VII of the Civil Rights Act (discrimination and harassment)
      6. Visual disability
      7. Health Insurance Portability and Accountability Act (HIPAA)

2. Standards of Professional Ethics (1-2 Items)
   A. Basic principles of health care ethics
   B. Standards of professional conduct
   C. The Optometric Oath

3. Doctor-patient relationship (3-6 Items)
   A. Confidentiality of patient information
      1. Doctor-patient privilege
      2. Liability of optometrists
         a. Defamation
         b. Invasion of privacy
         c. Breach of confidentiality
   B. Patient records
      1. Ownership
      2. Entries and corrections
      3. Documentation of patient management
      4. Federal Trade Commission (FTC) eyeglass prescription release requirements
      5. Release of information
      6. Retention of records

4. Professional Liability (2-4 Items)
   A. Doctor-patient relationship
   B. Malpractice
   C. Ophthalmic materials (ANSI standards)
   D. Equipment and premises
   E. Employees (vicarious liability)
   F. Informed consent
   G. Management of general and ocular emergencies

*Note: Test items on the content areas of Legal and Ethical Issues will be integrated within and across the four major Clinical Science sub-divisions (Systemic Conditions; Ocular Disease/Trauma; Refractive/Oculomotor/Sensory Integrative Conditions; Perceptual Conditions) where appropriate and relevant.
CLINICAL SCIENCE
TEST BLUEPRINT SUMMARY

Below is a summary of the Test Blueprint used by the Examination Development Committees when constructing the Clinical Science examination. This provides candidates with summary information on the distribution of test items by subject area, and by cognitive skill in clinical application in Clinical Science.

<table>
<thead>
<tr>
<th>Clinical Application</th>
<th>Epidemiology/History/Symptoms</th>
<th>Clinical Signs/Techniques (Clinical Testing)</th>
<th>Diagnosis/** Management/Treatment/Prognosis</th>
<th>Public Health</th>
<th>Legal and Ethical Issues</th>
<th>Total Number of Items</th>
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<tbody>
<tr>
<td>Part II (Clinical Science)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>A. Systemic Conditions</td>
<td>18-30</td>
<td>22-38</td>
<td>11-21</td>
<td>1-2</td>
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<td>72</td>
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<tr>
<td>B. Ocular Disease/Trauma</td>
<td>13-25</td>
<td>17-33</td>
<td>122-150</td>
<td>7-9</td>
<td>8-10</td>
<td>197</td>
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<tr>
<td>C. Refractive/Oculomotor/Sensory Integrative Conditions</td>
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<td>41-55</td>
<td>54-72</td>
<td>4-6</td>
<td>1-3</td>
<td>132</td>
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<tr>
<td>D. Perceptual Conditions</td>
<td>6-10</td>
<td>8-12</td>
<td>11-19</td>
<td>0-1</td>
<td>0-1</td>
<td>34</td>
</tr>
</tbody>
</table>

* Of this total, the 15 items in Public Health and the 12 items in Legal and Ethical Issues, while displayed here against A, B, C, and D, are referenced in the Content outline under E, and F, respectively. Consequently, the item totals in the Content Outline for A, B, C, and D are less than those indicated above, as the items for Public Health and Legal and Ethical Issues are not included.

** For Ocular Disease/Trauma, Diagnosis includes Clinical Pathophysiology.