

## **Laser Certification Test(s) Question Bank**

### **INSTRUCTIONS FOR LASER QUESTION-BANK SUBMISSIONS:**

1. Select one or more Objective areas (as listed here) to submit questions.
2. Select the best category (as listed here) under that Objective area.
3. Select one or more certification categories for which the question is directed or might be appropriate (i.e. Laser Safety Officer, Laser Operator / Ophthalmic) using the abbreviations listed here. If all categories, just list all.
4. Write the question along with 4 possible answers, with only one being correct. Mark the correct answer.
5. Write a feedback response to this question that the examinee will see if they get the question wrong. The simplest way to do this is write one brief response that says why the correct answer is correct. An alternative is to write a separate response for each of the 4 answers, discussing specifically why that one is wrong and the correct one is right. The software can display the response either way.
6. Include your name and date with any submissions

All questions submitted to the NCLE will become the property of the NCLE and Professional Medical Education Association to use as needed in the question bank(s) and exam(s). Your name will be attached to the record in the question bank to identify you as the original source of the question. Submitters will also be provided general recognition on the NCLE website and printed materials. Once submitted the exact wording and content of the question(s) is to be kept confidential and not disclosed to any other individual or organization, in order to maintain the integrity of the examination process.

The questions will go through a review process to verify the correct response (of course) and to review the question for its wording and the merits of the incorrect responses on the question. It is possible that the question may be edited or modified in some way as it is placed in the question bank.

Questions are initially validated through the fact that they are written and reviewed by laser experts with the most experience in these fields. The NCLE also now has over 3 years of testing experience in validation of the questions contained in the CLRT examination – many of which are applicable to the other examinations as well. The software that is currently being used for the question banks and scoring will continually monitor and report specific test question statistics for ongoing validation of questions both by the question itself and as it relates to the background or area of the individual taking the examination.

#### **Tips on writing single answer, multiple choice test questions:**

Question writers should strive to achieve a fair balance between the extremes of making a question so “tricky” that even experts might stumble over it, to the other extreme of being so obviously easy that even someone with no background could effectively guess just

based on the way the question is written. The question, its correct response, and the distracting incorrect responses, should strive to determine a credible base level of competency in the safe use and operation of medical lasers, and managing a safety program.

The question should be directed toward a concept or practice that you believe is relevant and important to knowledgeable laser use in their area. It should be worded as clearly as you can make it, avoiding intentionally tricky wording or subtleties.

Your selection of the correct and incorrect responses should serve to weed out those that have little or no knowledge of the content area of the question. You should avoid creating incorrect responses that are obviously frivolous or silly, but you could list answers that are obviously incorrect to anyone with some knowledge of the area, but not so obvious to someone with no knowledge of that area. Good distracting incorrect responses may include terminology that could have the “ring of truth” to it, but would still be obviously incorrect to those with a good working knowledge of that area. The correct response should be plainly stated, with no tricky wording in the response, but not so obviously correct that it jumps out to anyone just by reading the question, even with little knowledge of the area. You can include True & False as two of the choices, but you’d also include two other written choices in that question.

In the exam creation process (from the question bank) we will be able to create links between various questions so that when various forms of the exams are created they may exclude certain other questions from appearing in the same test together (one question might inadvertently give the answer to the other question), they might always include a certain combination of questions together, or any combination.

**OBJECTIVES & CATEGORIES** – these are the main areas for sorting in the testing software. They were determined by the areas of training required by ASLMS and the recommendations in ANSI, and numbered 1-7 here. The categories that follow, lettered a,b..., further organize the question bank into content areas. Examples of what might be placed in a category are given in parenthesis below the category. The software has the ability to further classify subcategories if needed. There is a further classification – the certification target – that will be mentioned below as a way to further separate questions as to the targeted examinee (i.e. a nurse laser safety officer versus a biomedical engineer for repair). Once questions are so classified various test forms may be automatically generated by specifying the % of questions in each Objective / Category, and mastery levels will be provided back to the examinee after scoring based upon these classifications.

The areas of testing for the various Laser Certifications basically boil down to the areas of (1) Laser Concepts (2) Tissue Effects, and (3) Safety, as described by the ASLMS and ANSI. For the purpose of creating more specific questions the NCLE has further broken these areas into the following Objectives and Categories.

1. Laser & Energy Concepts
  - a. Physics (conceptual physics)  
(electromagnetic spectrum, spontaneous & stimulated emission, laser media, laser characteristics)
  - b. Optics Principles  
(focus & defocus, refraction, fiber divergence, depth of field)
  - c. Energy Concepts  
(watts, joules, spot sizes, power & energy densities, fluence & pulsing)
  - d. History  
(Einstein, Shawlow, Townes, Maimon, Goldman)
  - e. Equipment Considerations  
(i.e. delivery systems, typical configurations, power/energy modalities, components)
  - f. Identification of laser types by wavelengths
  
2. Laser – Tissue Interaction
  - a. Thermal (cutting, ablating, photocoagulating)  
(absorption lengths, scattering, color or chromophore selectivity, heat confinement & pulsing)
  - b. Disassociation
  - c. Acoustical (shock waves)
  - d. Photochemical
  - e. Stimulative (nondestructive use of light)  
(Low Level Laser Therapy, rejuvenation, tissue welding, etc)
  
3. Laser Safety
  - a. Eye-Skin Hazards  
(MPE's, retinal vs corneal hazards, burns, specular & diffuse reflections)
  - b. Non-Beam Hazards  
(gases, dyes, plume, electrical, fire, etc.)
  - c. Hazard Evaluation & Control  
(NHZ and LTCA control areas, Laser Classification)
  - d. Safety Practices (Procedural Controls)  
(controlled access, laser key, smoke evac., assessing risk in the clinical environment, test firing, standby, fiber calibrations, signs, glasses)
  - e. Administrative Controls  
(Education/Training, Audits, LSO duties, Credentialing, Documentation)
  - f. ANSI, Regulations, Agencies  
(ANSI Z 136.3 standards, Regulatory & Advisory agencies, JCAHO, OSHA, ASLMS,)
  
4. Repair Questions (for engineering & repair level testing only)
  - a. Optical Principles - svc
  - b. Optics Cleaning
  - c. Resonators & Tubes
  - d. Power Supplies
  - e. Flashlamps
  - f. Cooling Systems
  - g. Alignment procedures
  - h. Power Measurement (Power/Energy measurement & Calibrations)

- i. Component Identification (of components & function by laser type)
- j. Case Studies - troubleshooting
- k. Safety Practices (specific to service)

5. Anatomy & Physiology

\*Note – Objectives 6 & 7 will not be included on the current (2004) Laser Certification examinations, because they are non-clinical certifications. The NCLE current certifications are not to be used as an indication of clinical competency. These Objective areas are listed here for possible future use in question banks since these areas are required by the ASLMS for advanced hands-on types of laser training.

6. Clinical Applications

- i. Indications
- ii. Contra-Indications
- iii. Techniques
- iv. Complications & their management

7. Pre & Post-operative care (procedure specific)

**CERTIFICATION CATEGORIES –**

These constitute the types of Certifications that are offered through the NCLE, and the abbreviations listed here are utilized in the testing software to direct specific questions to the appropriate examinations. For example a question that might be listed under the Objective of “Laser & Energy Concepts” and 1<sup>st</sup> Category of “Optical Principles” for Biomedical Engineers might be too technical to include under that same Objective & Category for nurses taking the exam for Certified Laser Operator / Surgical. This allows questions to be shared in the question bank where appropriate, or limited to specific exams.

<b>Testing Software Abbreviation</b>	<b>Credentials Abbreviation<sup>1</sup></b>	<b>Description</b>
R	CLRT	<b>Certified Laser Repair Technician</b> For biomedical engineers working on laser equipment. 155 questions – 4 hours
SO	CLSO/M	<b>Certified Laser Safety Officer / Medical</b> For Laser Safety Officers that may be nurses, biomedical engineers, industrial hygienists, technicians, administrators, etc. serving as the health care facility LSO. 155 questions – 4 hours
OS	CLO/S	<b>Certified Laser Operator / Surgical</b> For laser operators working in surgical type environments that include main and outpatient surgeries, endoscopies, etc., to include office type settings where minor surgical procedures are performed. 100 questions – 3 hours
OO	CLO/O	<b>Certified Laser Operator / Ophthalmic</b> For laser operators working in ophthalmic clinic and office type settings utilizing ophthalmic lasers that are primarily slit lamp based, but can include other delivery mechanisms. 100 questions – 3 hours
OA	CLO/A	<b>Certified Laser Operator / Aesthetic</b> For laser operators working primarily in a dermatological type setting using various lasers for different aesthetic procedures such as veins, pigmented lesions, tattoos, vascular lesions, hair removal, skin resurfacing & rejuvenation, etc. It is more encompassing than the Hair Removal certification listed below, and is meant to reflect a broader basis of aesthetic laser use in a medical environment and would generally include medical professionals such as nurses, surgical technologists, physician assistants, etc. 100 questions – 3 hours
OH	CLO/H	<b>Certified Laser Operator / Hair Removal</b> For laser operators working primarily in the limited area of Laser Hair Removal in either a medical, medical spa or cosmetic business type setting, and include more nonmedical personnel such as office assistants, electrologists, aestheticians, cosmetologists, etc.. 100 questions – 3 hours
OD	CLO/D	<b>Certified Laser Operator / Dental</b> For laser operators working primarily in dental clinics and offices. The Academy of Laser Dentistry currently offers their own certification, and this category is included here to develop a question bank in this area and possible work with the ALD.
OV	CLO/V	<b>Certified Laser Operator / Veterinary</b> For laser operators working in veterinary settings. This is essentially equivalent to the Laser Operator / Surgical, except in a different environment. 100 questions – 3 hours

<sup>1</sup> The abbreviations and certification names are the trademark and property of National Council on Laser Excellence, a wholly owned division of the nonprofit Professional Medical Education Assn, Inc.

**Question Submission form.** Type or clearly print. Name only needs entered once. Make copies as needed. If you want to enter this information yourself on your own word processing program please do so, just include all the information requested here. **PLEASE MARK THE CORRECT ANSWER.**

Name of submitter: \_\_\_\_\_ Date \_\_\_\_\_

Question:

Answer 1:

Answer 2:

Answer 3:

Answer 4:

Objective (from 1-5):

Category (a, b, c, etc):

Feedback Response (to student if they get it wrong):



Question:

Answer 1:

Answer 2:

Answer 3:

Answer 4:

Objective (from 1-5):

Category (a, b, c, etc):

Feedback Response (to student if they get it wrong):