



Professional Medical Education Assn., Inc

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www.LaserTraining.org

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Medical Laser Safety Officer Accredited Post Test

Provider approved by the California Board of Registered Nursing Provider #CEP 12386 for up to 16.1 Contact Hours

Note: Most State Boards of Nursing accept another State Board’s approval for granting credits. Check with the Board of Nursing in your state for clarification. Certificates of Completion will be provided.

INSTRUCTIONS: Online / Home Study Course

Attached is the post test for the Medical Laser Safety Officer course. You may complete and return the test, and upon successful completion (70% correct answers) we will return to you a Certificate of Laser Training accredited for 16.1 Contact Hours. The exam is “open book”, but if for any reason you need to retake it, then there is no limit on the number of retakes at no additional charge. Return the completed answer sheet (not the actual tests) to us via fax at 305-946-0232, or scan and email to Info@LaserTraining.org. Make sure you include this registration sheet. Viewing the online lectures alone will be insufficient to pass this exam. You must view the lectures but also read all the chapters in the course manual. A Medical Laser Safety Officer is the same for both Medical or Aesthetic Users.

Include on this application all of your information exactly as you would like it to appear on the certificate. If a fee is due (The original certificates are prepaid, it’s the add ons that might need additional payment) the Certificates will be mailed upon receipt of payment. If you are part of a multi-user purchase of the program, please list the original purchaser’s name so that we can confirm your eligibility for the Certificate. We keep a record of Certificates that have gone out for each purchase.

* __Yes __No, I have previously completed the Surgical Laser Principles & Safety and am skipping questions 1-63.

Original BUYERS name: _____ City _____ ST _____ Zip _____ Country Information (if outside the U.S.) _____

Your name (as it should be printed on the Certificate) _____

Tel# _____ E-mail: _____

Mail Certificate to address: _____

City _____ State _____ Zip _____

(Note: Outside the U.S. we’ll send a color PDF file of the signed Certificate to you, unless requested otherwise)

If payment is due please include either a check made payable to Professional Medical Education Assn., or credit card information for the charge as listed below.

Payment: __Check enclosed (US Bank); __ Am Express; __ Discover; __ Visa; __ Mastercard

Credit Card # _____ Exp date _____ 3 Digit Security Code on back _____

Name on Card _____ Signature _____

*Don’t forget to check on Laser Certifications at www.LaserCertification.org (Certifications being a separate issue from “Certificates of Laser Training”)

*NOTE TO USERS WHO HAVE ALREADY TAKEN OUR 4 HOUR “SURGICAL LASER PRINCIPLES AND SAFETY” COURSE, and passed that exam: That 4 hour course is the first portion of this more complete Medical Laser Safety Officer course, and you do not need to retake those questions if you’ve already done so. If you have previously completed that course and exam, you may skip the first 63 questions and just answer the remaining.

Test Name _____

Your Name: _____ Date: _____ (many tests are less than 155 questions)

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**Medical Laser Safety Officer
V110104**

Name _____ Date _____

(use the blank answer sheet for your answers)

1. **What is the difference between Spontaneous and Stimulated Emission of Light?**
 - a. Stimulated emission gives rise to an organized coherent output, while spontaneous does not.
 - b. Spontaneous emission produces more powerful beams of light than Stimulated
 - c. Stimulated emissions must always use electricity, but spontaneous uses another light source
 - d. The individual photons emitted through Stimulation are much brighter than spontaneous

2. **What are three unique characteristics of laser light?**
 - a. Monochromatic, Powerful and Collimated
 - b. Collimated, Coherent and Monochromatic
 - c. Coherent, Collimated and Powerful
 - d. Laser light always burns, always blinds, and is very bright

3. **Pick one individual who contributed toward development of laser medicine**
 - a. Leo Geovanni
 - b. Leon Goldman
 - c. Arthur Anderson
 - d. Joseph Marconi

4. **Why are lasers called "monochromatic" even though they may emit multiple lines of colors.**
 - a. The statement is false; they do only emit one color of light
 - b. They do emit different colors, but each color is a pure, narrow bandwidth
 - c. Monochromatic only means it emits one beam of light, even if it's multi-colored
 - d. The statement is false; it is monochromatic but lasers are infrared so colors don't apply

5. **Pick one area of medical application where the pure color of light is most important to its use.**
 - a. General Surgery
 - b. Urology – bladder tumors
 - c. Ophthalmology
 - d. Photodynamic Therapy

6. **What is the difference between a collimated beam of light and a divergent one.**
 - a. there is no difference, both divergent and collimated beams spread out
 - b. the beam spread from collimated beams is minimized compared to divergent ones
 - c. the beam spread from divergent beams is minimized compared to collimated ones
 - d. Collimated beams of light are always from laser, and divergent ones always from other light sources.

7. **What is the wavelength & color of the Nd:Yag Laser:**
 - a. 488 & 515nm Blue Green
 - b. 10,600 nm Far Infrared
 - c. 1064 nm near infrared
 - d. 532 nm Green

8. **Why can laser beams be more highly focused (small spots) than regular light sources.**
 - a. The lenses used by lasers are more powerful than other lenses
 - b. The laser is a very fine beam anyway so may be focused to smaller spots
 - c. Collimated beams from lasers have parallel rays of light so focus to smaller spots
 - d. The high power outputs allow more light to be focused into a smaller area.

9. **What does L-A-S-E-R stand for?**
 - a. Laser And Stimulated Emission of Radiation
 - b. Light And Sound Emittors of Radiation
 - c. Laser Amplification by Solid-State Electronic Remissions
 - d. Light Amplification by Stimulated Emission of Radiation

10. **Pick the laser which is customarily delivered through an articulated arm**
 - a. Nd:Yag
 - b. CO2
 - c. Alexandrite
 - d. Argon

11. **What is the primary difference between the control of the spot size with bare fiber delivery (free beam applications) compared to the focusing lens of a CO2 laser.**
 - a. Both use focusing lenses to achieve the small spots for surgical cutting & ablation
 - b. The CO2 laser uses a handpiece lens while the fiber uses a microlens on its tip
 - c. Both are focused to small spots at the focal points of the lens
 - d. The CO2 laser has a focal point, the bare fiber's spot keeps getting bigger with distance

12. **Depth of field of a focused (CO2) laser beam is defined as:**
 - a. the distance from the laser lens to the smallest spot
 - b. the distance around the focal point, where the spot size remains essentially unchanged.
 - c. the distance the laser beam will travel through tissue
 - d. the focal point of the laser lens

13. **What are factors that determine power density of any laser beam**
 - a. TEM structure of the beam and peak power delivered
 - b. Spot size & Power
 - c. Power and Pulse duration
 - d. Wavelength and Power

14. **Where is the smallest spot of laser beam from a transmitting fiber.**
- 1 cm from the tip
 - just at the tip of the fiber itself, since it diverges and does not focus
 - the spot stays pretty much the same small spot since the beam is collimated
 - At the focal point of that particular transmitting fiber.
15. **Which best defines a true laser pulse?**
- an automatic timer or shutter which emits light consistently in controlled intervals, like 0.1 second pulses.
 - a compression of laser energy which momentarily emits power at a higher rate than the laser otherwise could in the continuous wave mode.
 - a burst of laser energy which creates shock waves
 - high power outputs of any type
16. **Which factor changes power density more rapidly?**
- spot size changes
 - laser power changes
 - Pulse width changes
 - wavelength changes
17. **Through which instrument(s) (device or attachment) may the CO₂ laser be delivered to tissue?**
- Flexible bronchoscope
 - Micromanipulator
 - Laparoscope
 - Both B & C
18. **The depth of field of a focused CO₂ laser beam is greatest with the use of:**
- a 125 mm focusing handpiece
 - a 15mm spot size aesthetic handpiece
 - a 400 mm laser lens used on an operating microscope
 - a 50mm handpiece lens
19. **The laser wavelength which is most highly absorbed by water is:**
- The Ho:Yag (Holmium Yag)
 - The Nd:Yag (Neodymium Yag)
 - The CO₂ (Carbon Dioxide)
 - The He:Ne (Helium Neon)
20. **The laser wavelength which scatters most through tissue and causes the most diffuse coagulation injury is the:**
- The Ho:Yag (Holmium Yag)
 - The continuous wave Nd:Yag (Neodymium Yag)
 - The continuous wave CO₂ (Carbon Dioxide)
 - The HeNe (Helium Neon)
21. **Which laser is a non-thermal instrument:**
- 308nm Excimer laser for cardiology
 - 193nm Excimer laser for ophthalmology
 - 2.9u Er:Yag laser for dermatology
 - CO₂ laser for skin resurfacing

22. **How does light from a free beam laser heat tissue?**
- light creates a "photo-effect" within cells to vaporize them
 - light is absorbed by the tissues, which generates heat
 - the laser beam is hot and heats tissues when it shines on them
 - lasers all use cold-cutting capabilities with no heat generation
23. **The primary advantage of using pulsed laser energy on tissue is:**
- The procedure takes less time
 - The procedure is better tolerated by the patient
 - Thermal damage from the laser impact is more highly limited
 - Reimbursement rates are better for higher pulse powers
24. **Sapphire or contact tips, when added to the Nd:Yag laser, change the otherwise widespread coagulation created by that laser to very precise effects, by:**
- Acting as fine focusing lenses to increase power density
 - Acting as a thermal knife to convert laser energy absorbed by the tip, to conduction heat of the sapphire tip - a hot knife.
 - slowing down the procedure so that very low powers may be used
 - changing the wavelength so that laser now cuts
25. **The primary way to surgically change the tissue effect of any fiberoptically delivered laser (free beam) is:**
- to move the handpiece faster or slower
 - to repeatedly have the laser nurse alter the power output of the unit
 - to keep changing the wavelengths of light emitted
 - to alter the distance of the fiber tip from tissue, thereby changing power density
26. **Identify the laser below which relies on acoustical shock wave formation to create its tissue effects:**
- yellow light pulsed dye laser for dermatology, vascular lesions
 - Q-switch pulsed Nd:Yag laser for ophthalmology, "secondary" cataracts
 - CW Nd:Yag laser for urology,
 - Argon laser for ophthalmology, retinal photocoagulation
27. **Which laser application involves photochemical reactions, but does not involve either heat or shock wave generation from the laser:**
- laser assisted prostate resection in urology
 - photodynamic therapy to treat cancer or for skin rejuvenation
 - yellow light pulsed dye laser use in dermatology
 - fragmentation of kidney stones by pulsed dye laser, green light
28. **Which of the following laser pulses exhibit the highest flux? (assume same spot sizes)**
- 1.5 joules delivered in 400 microseconds - 0.0004 seconds
 - 1.5 joules delivered in 1/20 of a second - 0.05 seconds
 - 1.5 joules delivered in 1/10 of a second - 0.2 seconds
 - 1.5 joules delivered in 1 second - 1.0 second

29. **With surgical lasers, the use of low laser power, when combined with larger spot sizes, can create unseen excessive burning of adjacent tissues, especially if char is allowed to form.**
- True
 - False
 - irrelevant question, power & spot size do not contribute to burning
 - True for infrared lasers only
30. **Aesthetic / Surgical laser systems which can vaporize or photocoagulate tissues are classified by ANSI as:**
- Class I systems
 - Class II systems
 - Class III systems
 - Class IV systems
31. **The laser which presents a burn hazard only to the surface of the eye and not to the retina is:**
- CO₂ laser
 - Nd:Yag laser
 - Argon laser
 - Pulsed dye laser, yellow
32. **Which wavelength labeling of safety glasses offers protection for a KTP laser?**
- 10.6 micron
 - 1.06 micron (1064nm)
 - 488 to 515 nm
 - 532 nm
33. **For which type of laser does the glass optics in microscopes offer protection to the user, in lieu of safety glasses:**
- CO₂ laser
 - Nd:Yag laser
 - Argon laser
 - Pulsed dye laser, yellow
34. **Which one type of endotracheal tube is to be avoided when using the laser (most likely the CO₂ laser) directly in the airway: (Per A.N.S.I.)**
- Red rubber, wrapped with metal foil
 - PVC, polyvinylchloride
 - Silicone rubber
 - all metal Norton tubes
35. **Which laser presents the highest risk of igniting dry materials, like dry 4x4 sponges:**
- CO₂ laser
 - Nd:Yag laser
 - Argon laser
 - Pulsed dye laser, yellow

36. **Select the laser below which does NOT present a retinal burn hazard:**
- CO2 laser
 - Nd:Yag laser
 - Alexandrite laser
 - Pulsed dye laser, yellow
37. **What should be done to preclude damage to a flexible endoscope?**
- Fire the laser as it is advanced through the channel to clear it
 - If the fiber gets stuck push hard to ensure it clears the channel
 - Mark the fiber, or view directly on video to ensure it's outside the channel before firing.
 - Flush the channel with saline while firing to absorb the heat of the laser.
38. **What should be done when using the Ho:Yag laser, through rigid arthroscopes (for joint endoscopy) to preclude damage to the optics in the rigid scope:**
- Flush continuously with saline to absorb the heat
 - ensure that the fiber tip doesn't come too close to the telescope optic
 - Use only the laser resistant scopes
 - Have the telescope black anodized to reduce reflections
39. **Fiberoptic lasers such as the Nd:Yag present a fire or burn hazard to dry materials in which one of the following scenarios:**
- When the laser fiber is fired at a dry towel in the field, but 9-12 inches away from the tip.
 - When the laser fiber is fired at a dry towel across the room from the laser fiber.
 - When the laser fiber is fired into a dry towel while the fiber tip is resting in the towel.
 - When the laser fiber is fired at a dry towel several inches away from the tip, while a contact fiber or tip is being used.
40. **For which laser does the glass in the windows of the room offer protection to viewers outside the room, so that NO additional window coverings are required:**
- CO2 laser
 - Nd:Yag laser
 - Alexandrite laser
 - Pulsed dye laser, yellow
41. **When moistening sponges in an operative field as a precaution for laser use, which materials are both safe and adequate to prevent the sponges from igniting:**
- Saline
 - Sterile distilled water
 - blood
 - All of the above
42. **For which laser can pools of irrigating solution serve as a backstop to the laser beam:**
- CO2 laser
 - Nd:Yag laser
 - Argon laser
 - Pulsed dye laser, yellow

43. **What characteristic of anodizing instruments causes its reflectivity of laser beams to be significantly reduced:**
- the dulled surface of the instrument it creates
 - the black coloration on the instruments surface
 - a special process which changes the nature of the metal causing it to absorb all of the incident laser energy.
44. **Which one of the following statements regarding the real radiation risks of the laser "environment" to pregnant women is most true:**
- Pregnant women should avoid working around lasers during the first trimester.
 - Pregnant women should avoid working around lasers during their entire term of pregnancy.
 - Laser "radiation" presents no risks to women in any stage of pregnancy.
 - Pregnant women should simply wear the radiation dosage tags to monitor
45. **Which item below is NOT a responsibility of the laser assistant, functioning under the authority of the laser safety officer, during a laser procedure:**
- Post appropriate Laser Danger signs on the door(s) to the room
 - Ensure that the correct laser safety glasses are available and worn
 - Inform the operating physician of the correct laser power and other laser settings to use for the procedure.
 - Ensure compliance with the institutions safety policies and procedures
46. **Which wavelength labeling of safety glasses offers protection for a Pulsed Dye Yellow Light laser?**
- 10.6 micron
 - 1.06 micron (1064nm)
 - 585 nm
 - 2.1 micron
47. **Which wavelength labeling of safety glasses offers protection for a Ho:Yag laser?**
- 10.6 micron
 - 1.06 micron (1064nm)
 - 585 nm
 - 2.1 micron
48. **Which Optical Density of safety glasses offers the highest degree of protection from a Nd:Yag laser?**
- 7.0
 - 1064 nm
 - 10.6 microns
 - 4.0

49. **Which organizations provide guidelines for laser safety/training:**
- A. American Hospital Association (AHA)
 - B. American National Standards Institute (ANSI)
 - C. American Society for Laser Medicine & Surgery (ASLMS)
 - D. Both B & C
50. **Who provides voluntary laser certification for nurses, operators & technicians?**
- A. The FDA
 - B. ANSI (American National Standards Institute)
 - C. The Laser Training Institute
 - D. National Council on Laser Excellence (NCLE)
51. **What best describes the ANSI safety regulations?**
- A. They are federally required safety regulations with the force of law
 - B. They are only suggestions from a volunteer agency and have no regulatory impact.
 - C. They are voluntary standards by themselves, but are used as a reference by other agencies such as OSHA and The Joint Commission for enforcement.
 - D. They apply only to higher powered industrial lasers and do not apply to medical nor aesthetic lasers.
52. **Most Aesthetic/Medical lasers are classified as which ANSI Hazard Class of Laser?**
- A. Class 1
 - B. Class 2
 - C. Class 3
 - D. Class 4
53. **All of the following are responsibilities of the LSO, EXCEPT:**
- A. Ensure that warning signs are posted
 - B. Ensure that physicians use appropriate power and exposure settings
 - C. Ensure that the entire staff has been properly trained in Laser Safety
 - D. Ensure that the lasers are properly maintained and serviced.
54. **How often are formal Laser Safety Audits required to be conducted within a facility to be in compliance with ANSI recommendations?**
- A. Every 6 months
 - B. As determined by the LSO but recommended every year
 - C. No requirements
 - D. Each time the Laser Safety Officer position changes
55. **All Service Technicians should have:**
- A. An authorized service technician certificate from the manufacturer
 - B. A degree from a laser technical school
 - C. Documented laser safety training and education
 - D. Laser Repair Certification
56. **Which is a non-beam laser hazard?**
- A. Laser Plume
 - B. Skin burns
 - C. Retinal eye injury
 - D. Corneal burn

57. **Which hazard is probably greater with aesthetic / medical laser use?**
- A. Direct hazards of the laser beam
 - B. Improperly performed procedures & use of the laser
 - C. Non-beam laser hazards such as electrical, etc.
 - D. Long term, unknown complications from laser use.
58. **The NHZ (Nominal Hazard Zone) requires that:**
- A. All personnel wear safety eyewear upon entering the room
 - B. All personnel wear safety eyewear only when inside the NHZ boundary
 - C. All personnel must follow all control measures within the NHZ
 - D. Both B & C
59. **How often must the alignment of the laser beam be checked against its aiming beam? (when the laser uses a different color beam as an aiming beam)**
- A. Every Six months
 - B. Every Year
 - C. Every Case
 - D. Only during Periodic Maintenance (PM)
60. **Who determines the boundaries of the Nominal Hazard Zone**
- A. The operating physician
 - B. The Laser Safety Officer
 - C. The Laser Assistant or Operator in the room
 - D. No one, it is already set as the entire room for medical/aesthetic use
61. **Which organization can levy large fines against an institution/office for violation of laser safety standards?**
- A. ASLMS ,
 - B. OSHA
 - C. Joint Commission
 - D. FDA-CDRH
62. **What are the requirements for the Laser Treatment Controlled Area (LTCA, or the Laser Room)**
- A. Safety Eyewear must be made available upon entry to this room
 - B. Safety Eyewear must be worn when entering this room
 - C. Only authorized personnel are to enter this room
 - D. Both A & C
63. **All Health Care Facilities, including Hospitals, Clinics, MediSpas, Offices, etc. MUST appoint a Laser Safety Officer if lasers are used in the facility.**
- A. True
 - B. False
 - C. True for Hospitals and Surgical Facilities only
 - D. True for industrial laser settings only

* The previous 63 questions are from the Surgical Laser Principles and Safety Course and Test. If you already took that course and completed the exam then you do not need to complete them again for this. If you did, then skip those and start here with question #64 to the end. Make sure that you've marked on your application that you've already taken it, and we'll confirm that in your file.

64. **To prevent an accidental eye injury from lasers that are considered retinal hazards, the most important safety practice is to:**
- a) Use electronic safety filters & shutters on all of your instruments
 - b) Wear your laser safety glasses. They will protect against even direct impacts
 - c) Never allow the output of the laser to point toward anyone's face
 - d) Screen personnel beforehand with base-line eye exams
65. **A.N.S.I. (American National Standards Institute) Z136.3 safety standard covers the safe use of lasers in health care facilities and which of the following clinical practice and safe clinical use guidelines:**
- a) Recommended treatment parameters for various laser procedures
 - b) Maximum Permissible Energy settings allowed for any given procedure
 - c) Indication and Contra-indication criteria for patient selection for specific procedures
 - d) None – A.N.S.I. does not address clinical treatment safety nor parameters
66. **Which form of patient eye protection would provide the most secure form of protection for any laser wavelength or IPL device used on or around the face?**
- a) Laser safety glasses of the same O.D. and wavelength protection as used by the laser operator.
 - b) Anodized metal eye shields
 - c) Plastic sun-tanning eye goggles
 - d) Provided that the device is not fired onto the eyelid, having the patient close their eyes while working around the face is sufficient protection
67. **According to ANSI 136.3, the Laser Safety Eyewear requirement for personnel entering the room where the laser procedure is performed (Laser Treatment Controlled Area, or LTCA) is:**
- a) Safety eyewear must be worn upon entering the laser room (LTCA)
 - b) Safety eyewear must be made available, but need not be worn if outside the Nominal Hazard Zone (NHZ)
 - c) Safety eyewear must be worn upon entering the room when performing open laser cases (non endoscopic), regardless of the designation of the NHZ
 - d) Safety eyewear need not be worn by personnel entering the laser room if they are wearing prescription glasses with glass lenses
68. **Laser Safety glasses must, by ANSI recommendation (best answer):**
- a) Have color coded frames to differentiate for which laser they are used
 - b) Have the wavelength and optical density (OD) both labeled on the glasses
 - c) State the type of laser for which they are designed
 - d) Be power transmittance tested yearly to ensure effectiveness

69. **M P E is an abbreviation for:**
- a) Maximum Permissible Exposure
 - b) Maximum Patient Exposure
 - c) Minimum Permissible Exposure
 - d) Maximum Preventable Exposure
70. **The two Standards for Laser Safety that are applicable the use of lasers in *Health Care* facilities are:**
- a) ANSI Z136.5, ANSI Z136.3
 - b) ANSI Z136.3, ANSI Z136.2
 - c) ANSI Z136.3, IEC 60825
 - d) ANSI Z136.1, ANSI Z136.3
71. **The power of a 10 Joule pulse delivered over one second is**
- a) 10 nanometers
 - b) 10 Watts
 - c) 10 Watts/square meter
 - d) 10 joules/square centimeter
72. **Laser Safety Eyewear should be chosen for the following factors**
- a) OD, comfort, wavelength
 - b) NOHD, OD, fluence
 - c) MPE, AEL, NOHA
 - d) NHZ, OD, LTCA
73. **To protect against viruses in laser generated plume particulates, ANSI requires that:**
- A. "Laser Masks" that filter particles to less than 0.3 microns be used by all personnel in the room.
 - B. Appropriate local exhaust ventilation techniques be utilized.
 - C. Personnel wear double surgical masks to provide more efficient filtering.
 - D. Local exhaust ventilation be used in conjunction with either the "Laser Masks" or "Double Masks".
74. **Who is responsible for ensuring that Service and Maintenance of the Lasers are done by qualified people at proper intervals and that documentation is maintained (per ANSI)?**
- A. Manufacturer who sold the equipment to the facility
 - B. Business or Practice Owner
 - C. Laser Safety Officer
 - D. 3rd Party Service group that contracts for the service

75. **The major difference between an industrial Laser Safety Officer and a Medical Laser Safety Officer is:**
- A. Medical Laser Safety Officers require a medical, nursing or allied health background, in addition to Laser Safety Training.
 - B. The laser classification scheme for medical Laser Safety Officers is designed to minimize the need for measurements and calculations, which must otherwise be made by the industrial Laser Safety Officer.
 - C. Requirements and duties for both medical and industrial laser safety officers, in both ANSI 136.1 and 136.3 standards, are identical.
 - D. Industrial Laser Safety Officers have more stringent requirements because high powered industrial lasers are in a higher ANSI laser hazard class than most medical/aesthetic laser systems.
76. **According to ANSI, who maintains administrative control of laser safety matters within a medical/aesthetic facility?**
- A. Chairman of the Laser Safety Committee.
 - B. Administrator or Business Owner of the Facility
 - C. Medical or Surgical Director of the Facility
 - D. Laser Safety Officer
77. **The Laser Treatment Controlled Area (LTCA), or laser room, may be occupied by:**
- A. Any personnel. Those actually working within the Nominal Hazard Zone must additionally receive documented training in Laser Safety.
 - B. Appropriately trained personnel, authorized by the LSO
 - C. No requirements exist on who may occupy the room, only on those who operate the laser.
 - D. Anyone, provided that they wear the Laser Safety Eyewear upon entry.
78. **What does “R” in the acronym L-A-S-E-R stand for?**
- A. Reaction
 - B. Refraction
 - C. Radiation
 - D. Radian
79. **The evaluation of the total laser hazard by the medical Laser Safety Officer and their subsequent selection of control measures to be applied are determined by:**
- A. The Capability of the laser's energy to injure personnel or the patient.
 - B. The personnel who may be exposed within the Nominal Hazard Zone
 - C. The delivery system used which is important in defining the extent of the Nominal Hazard Zone.
 - D. All of variables listed here influence the control measures applied.

80. **The difference in protection (attenuation) from an Optical Density (O.D.) of 4 compared to 6 is a factor of**
- A. 2
 - B. 10
 - C. 100
 - D. 1
81. **Which of the following is NOT a function of the ANSI based Laser Safety program as administered by the Laser Safety Officer?**
- A. Education of authorized personnel.
 - B. Application of protective measures for control of laser hazards.
 - C. Certification and Credentialing of all personnel entering and/or working within the Nominal Hazard Zone.
 - D. Adoption of clinical laser treatment protocols by procedure.
82. **What is the purpose of a collimating laser handpiece?**
- A. To generate a uniform larger spot size so there is no dramatic focus or defocus with distance.
 - B. To collimate the beam prior to focusing, so that a smaller spot may be achieved.
 - C. To generate various treatment patterns on the target.
 - D. To provide a continuously variable defocus capability.
83. **Using your "informed judgment" as a Laser Safety Officer, which laser use presents the greatest *practical* hazard for retinal eye injury of personnel?**
- A. The Pulsed Dye yellow light laser for dermatological use.
 - B. The CO₂ laser for closed endoscopic use
 - C. The CW Nd:Yag laser for closed endoscopic use.
 - D. Er:Yag laser for fractional skin ablations.
84. **How is a Laser Safety Officer (LSO) selected for a facility?**
- A. The facility selects among Certified Laser Safety Officers from a list provided either by OSHA or ANSI, or the national Certification Agencies.
 - B. Each department where a laser is utilized appoints a Laser Safety person for those departmental applications. (in larger health care facilities)
 - C. The LSO is anyone so appointed by the Facility.
 - D. The LSO must be the most experienced laser technician or operator at the Facility.

85. **Detailed Laser Service manuals complete with specific alignment and calibration procedures, must be provided to laser owners and others upon request to the manufacturer or distributor of the laser at the reasonable cost of reproduction, and is required by law through:**
- A. ANSI 136.3, Manufacturer's Procedures requirements
 - B. Code of Federal Regulations (CFR's)
 - C. State laws on registration and calibration of laser equipment
 - D. OSHA requirements for calibration of medical laser equipment
86. **Detailed training in laser safety, according to ANSI, shall be provided to:**
- A. Laser Safety Officers only
 - B. Both Laser Safety Officers & Laser Operators
 - C. Laser Operators only
 - D. All Health Care Personnel responsible for all perioperative activities related to laser operations.
87. **Filters and Tubing from Smoke Evacuators shall be (best answer):**
- A. Marked as to the number of uses so they may be changed at the manufacturer's recommended interval.
 - B. Treated as a possible biohazard and disposed of properly.
 - C. Changed for each new laser case.
 - D. Used filters may be gas sterilized and tubing soaked in a sterilizing solution prior to re-use.
88. **According to ANSI 136.3, indirect viewing of the laser procedure through video (i.e. closed circuit TV) is an acceptable alternative to the wearing of laser safety eyewear for personnel in the procedure room (LTCA):**
- A. True - but only for the person performing the procedure. Other personnel must wear the safety eyewear.
 - B. True - especially when multiple wavelengths of lasers are utilized making the use of safety eyewear awkward.
 - C. True - but only for lasers that present surface corneal burn hazards
 - D. False - under any circumstances.

89. **As a Laser Safety Officer you have determined that it is technically safe to define the NHZ for Ho:Yag laser urology procedures as confined to the bladder as long as you have a dedicated laser assistant to place the laser in standby when not in use. Use your judgment to choose the "safest" scenario below in which to define the NHZ as only within the body cavity in which the fiber is confined:** (The scenario is surgical, but the principle is applicable to all health care users)
- A. In open procedures
 - B. In endoscopic bladder procedures where a dedicated laser assistant is defined
 - C. In endoscopic bladder procedures where laser operation is rotated among the circulator and available personnel
 - D. In endoscopic bladder procedures where the laser operation is by the Circulating Nurse, who is also a Certified Laser Operator
90. **What does ANSI require to control the Laser Plume (LGAC)?**
(but only when smoke is actually generated).
- A. Use of .3u viral surgical face masks for personnel
 - B. Exhaust ventilation with a smoke evacuator
 - C. Applying creams and salves to prevent emission from the LGAC
 - D. Room ventilation with fans to remove smoke from the room.
91. **The Laser Safety Committee:**
- A. Is administratively required by ANSI
 - B. Is appointed by the Laser Safety Officer
 - C. *May* be formed to govern laser activity when diversity of laser usage warrants.
 - D. When formed, *must* be comprised of the LSO, and the chief of each of the sections utilizing the medical/surgical lasers.
92. **What is the relevance of the "Aversion Response" time of humans to bright light in terms of Laser Eye Safety?**
- A. An "Eye-Safe" Laser Hazard classification depends partly on whether the MPE of that specific visible laser system can only be achieved in a time frame longer than the aversion response time.
 - B. The aversion response provides a level of practical protection against inadvertent eye damage, but is not used at all in any hazard classification.
 - C. The aversion response provides a level of practical protection against inadvertent eye damage from infrared lasers only, and this partly determines the Laser Hazard Classification.
 - D. The aversion response provides a level of practical protection against inadvertent eye damage from both infrared and visible light lasers, and this partly determines the Laser Hazard Classification.

93. **According to ANSI 136.3, the Nominal Hazard Zone (NHZ) is considered:**
- A. The entire room in which the laser procedure is performed.
 - B. The area around the laser output where a skin burn could occur or materials could catch fire.
 - C. The distance from the laser output where you could cause an eye or skin burn if the laser were fired directly at that person.
 - D. The space in which the level of radiation (laser energy) exceeds the applicable MPE during normal operation.
94. **During laser cases, operational portable fire extinguishers (according to ANSI) should be located:**
- A. On the Laser or on the smoke evacuator cart by the laser.
 - B. Prominently positioned within the room where the procedure is performed.
 - C. Anywhere in the general area of the facility as long as the laser operator knows where it is located (immediately available).
 - D. Within immediate reach of the Laser Operator or Assistant.
95. **What statement is most true about the use of rental lasers and contracted laser use in a facility where the rental company provides the laser & technician to run it?**
- A. Laser rentals still fall within the administrative responsibility of the facility, and the facility's own Laser Safety Officer and its safety policies apply.
 - B. Laser rental companies provide their own technician which serves as the Laser Safety Officer for a case, and no additional facility policies nor LSO are required.
 - C. Laser Rentals are a contractual service offered by that company, and ANSI standards do not apply to the facility – only that company.
 - D. The facility laser safety policies apply only to personnel and staff working for that facility, and not to outside agencies that supply equipment and personnel.
96. **ANSI 136.3 requires that technicians servicing medical lasers:**
- A. be laser certified or certification eligible
 - B. have training on laser repair, and on laser safety
 - C. have training that has been approved by the manufacturer
 - D. be licensed in their state to perform medical laser service.

97. **Which best describes the period of applicability for versions of the ANSI standards for Health Care Facilities?**
- A. They are federal standards and once acquired by the facility and reviewed by the LSO for compliance of their safety program, no further updates are required.
 - B. They are federal law and the LSO must stay updated on any legislative changes.
 - C. They are updated on an annual basis and the facility is required to obtain the new standards each year.
 - D. They are periodically updated every few years, and the LSO is required to obtain the new standards and stay current with the changes.
98. **Which of the following agency takes precedence on the requirements of laser operators, assistants and equipment registration for health care lasers?**
- A. State licensing or registration requirements.
 - B. A.N.S.I. Federal Laser Safety Standards
 - C. A.S.L.M.S. (American Society for Laser Medicine & Surgery)
 - D. O.S.H.A. (Occupational Safety and Health Administration)
99. **Which best describes the differences in Administrative requirements and applicable ANSI standards between an LSO in a major Hospital vs a small aesthetic office practice.**
- A. ANSI standards apply to both settings but are more complex for larger hospital environments than simple office aesthetic settings, in terms of requirements.
 - B. No differences.
 - C. Different ANSI standards apply to large hospital settings than small aesthetic laser office practices.
 - D. ANSI standards for Safe Use of Lasers in Health Care Facilities applies only to hospitals and medical practices, and not small aesthetic laser practices.
100. **What is the difference between a “Laser Certification” and “Certificate of Laser Training”.**
- A. They are simply different ways to say the same thing – no difference.
 - B. A Certificate of Training is evidence of formal training. Certifications are voluntary professional credentials that indicate a higher level of measured knowledge, but are generally not a requirement to use lasers.
 - C. A Laser Certification is a Certificate issued by the Laser Manufacturer that provides authorization for the user to legally perform procedures using that equipment.
 - D. A Certificate of Laser Training is a legal certificate issued by various States that attests to the fact that the bearer has obtained appropriate training directly from the State.