



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCE
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY
END OF MAY-AUGUST 2024 TRIMESTER EXAMINATIONS**

UNIT CODE: PHT 221

**UNIT NAME: ELECTROPHYSICAL AGENTS (EPA)
(Conductive and thermal agents)**

DATE: Monday/ 05 AUGUST

TIME: TWO HOURS

START: 11:15 AM STOP: 1:15AM

INSTRUCTIONS (physical exams)

- 1. Do not write on this question paper**

(Marks and questions distribution as per program curriculum.)

INSTRUCTIONS (Online examinations)

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This online exam shall take 2 Hours
4. Late submission of the answers will not be accepted
5. Ensure your web-camera is on at all times during the examination period
6. No movement is allowed during the examination
7. Idling of your machine for 5 min or more will lead to lock out from the exam
8. The Learning Management System (LMS) has inbuilt integrity checks to detect cheating
9. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
10. In case you have any questions call the invigilator for this exam on Tel. 0705833434 and or the Head of Department on Tel 0720491032
11. For adverse incidences please write an email to: amiu.examinations@amref.ac.ke

1. When therapeutic electromagnetic radiation from Laser therapy is applied on the skin, the following happens?

- A. The blood flow gets disturbed.
- B. The skin becomes hard.
- C. The nerve function ceases.
- D. Pain is relieved.
- E. All the above answers are correct.

2. Physiological responses of heat from Laser: heat increases the extensibility of collagen tissue and decreases joint stiffness. Achievement of this goal is dependent of all the factors below except one of the factors. Which is not a factor?

- A. Amount of the time the tissue is heated.
- B. The type of modality used in treatment.
- C. The depth of the tissue heated.
- D. The degree of heat achieved.
- E. All of the above.

3. Mr. Hamisa came to the physiotherapy department through self referral with complaints of dizziness and blurred vision. He has low back and is forcing his way to get therapy. After assessment, what will be your suitable recommendation:

- A. You refer Mr. Hamisa to another physiotherapist.
- B. You abuse Mr. Hamisa and chase him away.
- C. You continue with therapy Mr. Hamisa.
- D. You advice Mr. Hamisa to be reviewed by clinician.
- E. A & B are true.

4. Using the case above, what best describes Mr. Hamisa's situation.

- A. Indication.
- B. Hypersensitive patient.
- C. Convulsion.

D. Contraindication.

5. The following are the steps/methods of applying Therapeutic Ultraviolet rays, which sequence is correct?

- A. Create rapport, thorough assessment of the patients, thermal sensation test & commence treatment.
- B. Thorough assessment, create rapport, commence treatment & thermal sensation test.
- C. Thermal sensation tests, thorough assessment, create rapport & commence treatment.
- D. Create rapport, thorough assessment; commence treatment & thermal sensation test.
- E. Commence treatment, create rapport, thorough assessment & thermal sensation test.

6. Which unit is considered a measure of frequency when using electrical stimulation?

- A. Microseconds.
- B. Hertz.
- C. Kilo grams.
- D. Volts.
- E. Amperes.

7. The following are types of electrical stimulation currents used for therapeutic purposes, which one if not?

- A. Galvanic currents.
- B. Russian currents.
- C. Interferential currents.
- D. Constant currents
- E. None of the above.

8. A 79 year old female presents to outpatient rehabilitation services 6 weeks following a CVA with right hemiplegia. She complains of right shoulder pain working on functional upper extremity movements and has severe shoulder pain when practicing bed mobility activities such as rolling and scooting. On examination, it is observed that the humeral head is inferiorly displaced. Which of the following would be the MOST appropriate for her condition?

- A. Transcutaneous Electrical Nerve Stimulation (TENS).
- B. Functional Electrical Stimulation (FES).
- C. Short Wave Diathermy (SWD).
- D. Interferential Current Stimulation (IFC).
- E. A & B are correct answer.

9. The following are contraindication for TENS machine except?

- A. When the cause of the pain is not known or is not diagnosed.
- B. Pregnancy.
- C. Urine incontinence.
- D. Epilepsy or certain types of heart disease.
- E. Cancer.

10. The following are caution for using electrical stimulation except?

- A. Place electrode pads over the front or side of the neck, close to eyes or in the mouth.
- B. Use over areas of normal sensation.
- C. Use with water wet electrodes.
- D. Do not use when driving or operating machinery.
- E. Apply dry electrodes.

11. A patient is referred for physical therapy following a fix of the femur 6 months ago. The cast has been removed, but the patient is unable to voluntarily contract the quadriceps. The Physiotherapist decides to apply electrical stimulation to the quadriceps muscle. The BEST choice of electrode size and placement is:

- A. Large electrodes closely spaced.
- B. Small electrodes closely spaced.

- C. Large electrodes widely spaced.
- D. Small electrodes widely spaced.
- E. Small electrodes.

12. Refer to the question above, what pattern of application of the electrical stimulation would be most appropriate?

- A. Primary pattern of application.
- B. Alternative pattern of application.
- C. Homogenous pattern of application.
- D. Alternative pattern followed by primary pattern of application.
- E. Kneipp pattern.

13. A patient poorly tolerates the sudden increase in force that occurs when transitioning from off time to on time during neuromuscular electrical stimulation. Which action would minimize the impact of this transition?

- A. Decrease the treatment duration.
- B. Modify the waveform.
- C. Utilize a ramp.
- D. Increase the phase duration.
- E. Increase treatment time.

14. A therapist uses iontophoresis to treat a patient with a fungal infection. Which substance would be the most beneficial to utilize?

- A. Copper sulfate.
- B. Calcium chloride.
- C. Lidocaine.
- D. Zinc oxide.
- E. Prednisolone.

15. Which of the following substances administered with iontophoresis can be used to treat Myositis ossificans?

- A. Acetic acid.
- B. Dexamethasone.
- C. Magnesium sulfate.
- D. Zinc oxide.
- E. Amoxicillin.

16. To minimize the risk of burns while using electrical stimulation while using iontophoresis method, what would the therapist do?

- A. Increase the intensity of the electrical currents.
- B. Reduce the medication on the pads.
- C. Increase the medication on the electrodes.
- D. Change the electrodes.
- E. Use many electrodes.

17. A therapist uses electrical stimulation to treat a blood pressure patient diagnosed with lateral epicondylitis. Which of the following would be the most necessary to monitor during the session?

- A. Blood pressure.
- B. Respiration rate.
- C. Heart rate.
- D. Skin.
- E. Pulse rate.

18. Imagine you're working in clinic and your next evaluation is Mr. Boikanyo. He Says: "I can't feel anything in my fingertip. It's crazy. Well I can probably manage, but when you're a quarterback and it's your right hand, you're certainly concerned as far as being able to do your job."

Your examination reveals:

- Hypo reflexive deep tendon reflex.

- Positive upper limb tension test.
- Decreased force production when throwing a football.

What plexus is affected?

- A. Brachial plexus.
- B. Lumbar plexus.
- C. Thoracic plexus.
- D. Sacral plexus.
- E. Coccyx plexus.

19. Refer to the question above, what is the best physical therapy intervention for this patient?

- A. Ultraviolet rays.
- B. Laser therapy.
- C. Electrical stimulation.
- D. None of the above.

20. Refer to the question above, what would not be the best health promotion advice?

- A. Always have small breaks during working period when the pain is on.
- B. Always have exercises when working.
- C. Use an arm support while at work to minimise movement during work.
- D. Have the limb immobile for 3 months.
- E. Do vigorous exercises.

21. Light therapy is also known as?

- A. Phototherapy.
- B. Photosynthesis.
- C. Idiocias.
- D. None of the above.

E. Electrotherapy.

22. What does the acronym LASER stand for?

- A. Light Amplification by Stimulated Emission of Radiation.
- B. Lower amplification by stimulated emission of radiation.
- C. Lower light amplification by stimulated emission of radiation.
- D. None of the above.
- E. A & B are true.

23. A laser CANNOT be used?

- A. To treat glaucoma.
- B. To measure distance.
- C. To read bar codes.
- D. To reverse heart-attack damage.
- E. A & D are true.

24. What is the synonym of laser machine include all of the following except?

- A. Therapeutic Laser.
- B. Low Level Laser Therapy.
- C. Low Power Laser Therapy.
- D. B & C are true.
- E. None of the above.

25. The following are true about laser machine, which one is not?

- A. Laser light waves penetrate the skin with no heating effect, no damage to skin & no side effects.
- B. Laser light waves penetrate the skin with heating effects, damage to the skin and have some side effects.

C. Laser light directs bio-simulative light energy to the body's cells which convert into chemical energy to promote natural healing & pain relief.

D. Optimizes the immune responses of blood & has anti-inflammatory & immunosuppressive effects.

E. All the above.

26. The following are effects of laser therapy except?

A. Bio-stimulation.

B. ATP-production.

C. Decrease macrophage activity.

D. A, b & C are true.

E. None of the above.

27. The following are levels of laser therapy except?

A. 1 = incapable of producing damaging radiation levels (laser printers & CD players).

B. 2 = low-power visible lasers (400-700 nm wavelength, 1 mW)

C. 3 = medium-power lasers - needs eye protection

3a – up to 5 mW.

D. 3b** –high-power lasers– presents fire hazard (exceeds 500 mW).

E. 3a – up to 5 Mw.

28. The following are components of laser machine?

A. Lasing medium.

B. Pumping device.

C. Optical resonant cavity.

D. All the above components are not part of the laser machine.

E. A, B & C are components of Laser machine.

29. The following are the recommended parameters for treatment while using laser machine, which one is untrue

- A. Open wounds – 0.5-1.0 J/cm².
- B. Intact skin – 2.0-4.0 J/cm² .
- C. Average treatment- 2/cm².
- D. Average treatment – 6 /cm².
- E. All the above.

30. What happens when you use high dosage of LASER?

- A. You may have a bio-suppressive effect or just a non optimal effect.
- B. The healing of a wound will take a shorter time than normally.
- C. Very high doses on healthy tissues will damage them.
- D. Very high doses on healthy tissues will have better effects on the patient.
- E. None of the above.

31. The following groups of modalities are deep penetrating modalities, which is not?

- A. Laser.
- B. Microwave diathermy.
- C. Ultrasound.
- D. Short wave diathermy.
- E. All the above.

32. While using the LASER machine, what should you do when you a get a yellow screen/system error?

- A. Ignore the alarm and continue.
- B. Turn off the regenerator at the main power on the side of the unit. Let it rest for a minimum of 30 seconds, then turn back on. If the issue persists refer to the troubleshooting guide (insert link) for the most common error codes or contact customer support.
- C. Leave it on for some minutes and resume therapy.

- D. Return the equipment to the manufacturer.
- E. None of the above.

33. The following modalities emit infrared heat except?

- A. Cryotherapy.
- B. Infrared lamp.
- C. Ultraviolet rays.
- D. Laser light therapy.
- E. Hot pack.

34. Ultraviolet rays is divided into, the following classes, which one is wrong?

- A. UV-A: 200-280 nm.
- B. UV-A: 320-400 nm.
- C. UV-B: 280-320 nm.
- D. UV-C: 200-280 nm.
- E. All the above.

35. Choose the false statement about Ultraviolet rays

- A. The UV-B energy is the most dangerous type of Ultraviolet rays compared to UV-A & UV-C.
- B. The UV-C energy is potentially more dangerous, but it decreases dramatically as ozone increases.
- C. The UV-B is also strongly absorbed, but a small fraction reaches the surface.
- D. The UV-A is only weakly absorbed by ozone, with some scattering of radiation near the surface.
- E. A & B are false.

36. Choose the false statement about Ultraviolet rays.

- A. 5-10% of the sun's energy is in the UVR range (180-400 nm).
- B. UVA 6.3% of sunlight during summer; UVB 0.5%.
- C. Both UVA & UVB can be involved in sunburn and skin diseases.
- D. A, B & C are true.
- E. None of the above.

37. The following is a way of artificial production of Ultraviolet rays, which sequence is correct?

- A. Passage of electric current thru gas (vaporized mercury), collision with the electrons flowing between the lamp's electrodes, mercury atoms become excited, excited electrons return to particular electronic states in the mercury atom, Release some of the energy they have absorbed, radiation.
- B. Radiation, passage of electric current thru gas (vaporized mercury), collision with the electrons flowing between the lamp's electrodes, mercury atoms become excited, excited electrons return to particular electronic states in the mercury atom, Release some of the energy they have absorbed.
- C. Passage of electric current thru gas (vaporized mercury), mercury atoms become excited collision with the electrons flowing between the lamp's electrodes, excited electrons return to particular electronic states in the mercury atom, Release some of the energy they have absorbed, radiation.
- D. All the above.
- E. None of the above.

38. The following are components of the low pressure mercury vapor discharge tubes, which one is not?

- A. Tube or envelope made of quartz or special glass to allow UVR to pass through.
- B. Metal electrodes sealed in the ends of the tube.
- C. Electric circuit to regulate electric current.
- D. B & C are true.
- E. Low-pressure mercury discharge tubes with a phosphor coating on the inside.

39. The following are physiological effect after exposure to ultraviolet rays. Which one is negative effect?

- A. Pigmentation which results from formation of melanin in deep regions of the skin & a mp; migration of melanin noticeable about 2 days after exposure.
- B. Wound healing- using UVB at 260-280 nm.
- C. Systemic lupus erythematosus can be triggered or exacerbated.
- D. Increase production of RBC.
- E. Decrease wound healing.

40. The following are indications of Ultraviolet rays, which one is it?

- A. Tuberculosis.
- B. Pellagra.
- C. Vitiligo.
- D. Headache.
- E. None of the above.

41. The following are true about the calculation of Ultraviolet rays. Choose the MOST appropriate answer

- A. E1 is progressed by 25% of the preceding dose.
- B. E2 is progressed by 50% of the preceding dose.
- C. E3 is progressed 50% of the preceding dose.
- D. E3 is progressed by 75% of the preceding dose.
- E. All the above.

42. UVR can be produced if the temperature is high enough and pressure is low?

- A. False.
- B. True.
- C. All the above.

- D. Both true and false.
- E. None of the above.

43. The following are types of apparatus are used for emission of Ultraviolet rays except?

- A. Kromayer lamp.
- B. Fluorescent lamp.
- C. Luminous Lamp.
- D. Hot packs.
- E. Medium pressure mercury arc lamp (Alpine Sunlamp).

44. The following are true about the Kromayer lamp, except?

- A. Wavelengths of the rays produced are concentrated at 366 nm but a wide range of both UVA & UVB are produced.
- B. It requires pre-heating of 5 minutes before use.
- C. A medium pressure mercury vapor designed to be used in contact with the tissue (i.e. treatment of localized pressure areas and ulcers).
- D. A & B are true.
- E. None of the above.

45. The following are true about the Florescent lamp except?

- A. Low-pressure mercury discharge tubes with a phosphor coating on the inside.
- B. Absorbs short UVR which causes excitation of the phosphor atoms and remission at a longer wavelength.
- C. They give considerable UVA & UVB output; NO UVC.
- D. None of the above.
- E. C & D are true.

46. The following diagram below illustrates?

- A. Kromayer lamp.
- B. Florescent lamp.
- C. Alpine sun lamp.
- D. PUVA lamp.
- E. None of the above.

47. The following are true about the apparatus below. Which one is true?

- A. Generally used for treatment of generalized skin conditions like pellagra.
- B. When using the apparatus, the main switch should be kept off.
- C. Both A & B are True.
- D. Usually applied at a distance of 45-50 cm.
- E. None of the above.

48. The apparatus above is called?

- A. Fluorescent lamp.
- B. Medium pressure mercury arc lamp (Alpine Sunlamp).
- C. Low pressure mercury vapor discharge tubes.
- D. Kromayer lamp.
- E. All the above.

49. The following are components of the low pressure mercury vapor discharge tubes, which one is not?

- A. Tube or envelope made of quartz or special glass to allow UVR to pass through.
- B. Metal electrodes sealed in the ends of the tube.
- C. Electric circuit to regulate electric current.
- D. Low-pressure mercury discharge tubes with a phosphor coating on the inside.
- E. A & C are false.

50. Minimal erythema dose is?

- A. It is the smallest UVR dose to result in erythema.
- B. It is never detected by eye between 8-24 hrs. After exposure.
- C. It is the largest UVR dose to result in erythema.
- D. A & B are untrue.
- E. Both A & B are true.

SECTION B

51. Discuss 5 contraindications for therapeutic ultrasound? (10 marks)

52. Discuss the 4 stages of tissue response after application of ice therapy? (10 marks)

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