



(University of Choice)

**MASINDEMULIROUNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS**

**2023/2024 ACADEMIC YEAR**

**SECOND YEAR SECOND TRIMESTER EXAMINATIONS**

**(MAIN EXAMINATION)**

**FOR THE DEGREE**

**OF**

**BACHELOR OF SCIENCE IN PHYSIOTHERAPY**

**COURSE CODE: BSP 211**

**COURSE TITLE: ELECTROTHERAPY I**

**DATE: WEDNESDAY 6<sup>TH</sup> DECEMBER 2023-----TIME: 8:00AM – 10:00AM**

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**INSTRUCTIONS TO CANDIDATES**

**Answer all Sections**

Sec A: Multiple Choice Questions (MCQ) (20 Marks)

Sec B: Short Answer Questions (SAQ) (40 Marks)

Sec C: Long Answer Questions (LAQ) (40 Marks)

**TIME: 2 Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

**MCQs:20mks (Answer all).**

1. To what depth does superficial heating get to?
  - A. 2cm depth.
  - B. 1cm depth.
  - C. 5 cm depth.
  - D. 2 mm depth.
  
2. What crystals are used in ultrasound?
  - A. Alpha crystals.
  - B. Quartz crystals.
  - C. Titanium crystals.
  - D. None of the above.
  
3. Which one Of the following cannot be used as a coupling media in therapeutic ultrasound?
  - A. Aquasonic gel.
  - B. Distilled water.
  - C. Petroleum jelly.
  - D. Glycerol.
  
4. Which method of application of ultrasound is ideal for uneven surfaces?
  - A. Direct contact.
  - B. Indirect contact.
  - C. Water bath application.
  - D. Water bag application.
  
5. A patient walks into the clinic with a swelling on the wrist, she states that she fell two months ago. What intensity of ultrasound would you use?
  - A. 0.1- 0.3w/cm<sup>2</sup>
  - B. 0.3-0.8w/cm<sup>2</sup>
  - C. 0.2- 0.5 w/cm<sup>2</sup>
  - D. 0.8-1.0w/cm<sup>2</sup>
  
6. Which of the following is not a parameter of therapeutic modalities?
  - A. Frequency .
  - B. Intensity.
  - C. Coupling media.
  - D. Volume of sound.
  
7. Which one best describes the use of ultrasound to move drugs through the skin?
  - A. Phonophoresis.
  - B. Photophoresis.
  - C. Pharmacophoresis.
  - D. None.
  
8. Which one of the following is not an endogenous opioid?
  - A. Endorphin.
  - B. Enkephalins.
  - C. Morphine.
  - D. Dynorphin.

9. Which one is not a parameter of TENs?  
A. Frequency.  
B. Waveforms.  
C. Amplitude.  
D. Coupling media.
10. With regard to high-freq TENs, which one is incorrect?  
A. Chronic pain.  
B. Acute pain.  
C. Immediate pain release.  
D. Large myelinated fibers >100Hz.
11. Small myelinated fibers respond to a frequency of <100Hz  
A. True  
B. False.
12. TENs are only effective when?  
A. The patient can actually feel the stimulus.  
B. Intensity is <1mA.  
C. The batteries are new.  
D. None of the above.
13. The ability of tissue to store electricity is?  
A. Resistance.  
B. Capacitance.  
C. Voltage.  
D. Charge.
14. Which of the following is not true?  
A. Tetany is visible contractions of muscle.  
B. Tetany occurs for most fibers at 50Pulses per second.  
C. Summation occurs at 25pulses per second.  
D. 1 pulse per second results in a twitch.
15. What angle of incidence would you keep an infra-red lamp for maximum absorption:  
A. 0 degrees.  
B. 90 degrees.  
C. 180 degrees.  
D. 20 degrees.
16. Which of the following factors does not affect heat transfer?  
A. Radiation duration.  
B. Distance.  
C. Thermal conductivity.  
D. Size of radiation.
17. Conventional TENs is  
A. High frequency, low intensity stimulation  
B. Low-intensity, high-frequency stimulation  
C. High intensity, low-frequency stimulation  
D. High intensity, high-frequency stimulation

18. Which of the following are least stimulated by electrical impulses?

- A. Type IIa fibers.
- B. Type I fibres.
- C. Type IIb fibres.
- D. None.

19. High intensity and low frequency is seen in?

- A. Conventional TENSs.
- B. Burst TENSs,
- C. Modulated TENSs.
- D. Intense TENSs.

20. 1MHz in ultrasound produces?

- A. Long ultrasound pulses.
- B. Shorter wavelengths.
- C. Faster imaging.
- D. Longer wavelengths.

SAQs: 40mks (answer all).

1. Describe the physiological effects of Infrared Radiation (5mks).

2. a). Differentiate type I muscle fibers from type II muscle fibers. (4marks)

b). Define thermoregulation (1mks).

3. a). Define rebound vasoconstriction. (2mks).

b). Explain the physiological response to thermotherapy (3mks).

4. Discuss in detail the pain gate theory. (5 Marks)

5. Define the following as in therapeutic ultrasound;

a). Sound (1mks).

b). Ultrasonic waves (1mks)

c). Piezo-electric effect (1mks).

d). Acoustic impedance (1mks).

e). State 2 dangers of ultrasound (1mks).

6. Elaborate Role of biophysical agents in orthopedic and neurology (5mks)

7. Briefly explain the mechanisms by which TENS brings about pain relief in patients with acute lower back (5mks).

8. Discuss 4 types of Transcutaneous Electrical Nerve Stimulation (TENS) (5mks)

**LAQs: 40mks (Answer all)**

1. a) While working in the outpatient department, a 13-year-old boy walks in with a stiff painful elbow. He reports having had a supracondylar fracture 6 weeks ago that was reduced surgically. Discuss the best choice of electrotherapy modality that you would use to treat him stating the indications, contraindications, the procedure of how you would use it, and the physiological effects. (15 marks)

b). Describe types of pain (5mks).

2. An athlete comes into your clinic with shoulder and neck pain following an in-play fall. You select a cold spray to aid your treatment since the injury is acute.

a). Discuss the therapeutic and physiological effects of cold sprays (8mks).

b). elaborate other techniques of application in cryotherapy (8mks).

c) Discuss why it is a contraindication to use thermotherapy/moist heat therapy /hot pack in such a case (4mks).