



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2023/2024 ACADEMIC YEAR

FINAL QUALIFYING EXAMINATIONS

OF

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

COURSE CODE: BSP 435

COURSE TITLE: THERAPEUTICS SCIENCES

DATE: WEDNESDAY 6TH DECEMBER 2023

TIME: -8:00AM – 10:00AM

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: 3 Hours

MMUST observes ZERO tolerance to examination cheating

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EXERCISE THERAPY

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ) 20 MARKS

1. Frenkel's exercises are devised to improve co-ordination by use of sight, sound and touch in case of ataxia due to _____.
 - A. Cerebellar lesion
 - B. Loss of kinesthetic sensation
 - C. Spastic paralysis
 - D. Flaccid paralysis

2. Angie Western, 35, was referred to you by her doctor for the treatment of carpal tunnel syndrome. Her symptoms appeared about 1 month ago and worsened last week. She cannot type for more than 10 minutes before the pain becomes overwhelming. She has difficulty using utensils and reports that she often drops things. Your assessment confirms carpal tunnel syndrome. During the testing and treatment, you notice that AF and PR ROM elicit moderate bilateral numbness and tingling. As self-care, you prescribe:
 - A. Endurance resistance exercise for the forearm flexors
 - B. Strength resistance exercise for the forearm flexors
 - C. Stretching for the forearm flexors within a comfortable range
 - D. Muscle setting for the forearm flexors to reduce pain
 - E. C & D

3. Which of the following best defines muscle strength?
 - A. Ability of muscle to contract repeatedly against a load
 - B. Work produced by a muscle per unit of time
 - C. Produce or control forces imposed during functional activities
 - D. Force generated during a single maximum effort

4. Of the following, which is the most effective way to improve muscle endurance?
 - A. Have the patient train on an isokinetic dynamometer at fast speeds only
 - B. Have the patient train using dynamic exercise against submaximal loads over progressively longer time periods
 - C. Have the patient exercise against maximal resistance for a limited number of repetitions
 - D. Have the patient train by using isometric exercises against resistance

5. Mrs. B. is an 87-year-old resident of Western Hills Skilled Nursing Facility. She sustained a compression fracture of the T12 vertebra several weeks ago when she inadvertently sat down forcefully on a hard chair. Incorporating resistance training that focuses on eccentric exercises of her quadriceps and gluteal muscles in weight-bearing positions (e.g., controlled squatting and partial lunges) represents what principle of therapeutic exercise?
 - A. Specificity of training
 - B. Reversibility of training
 - C. Overflow principle

- D. Overload principle
6. Which of the following is a contraindication to implementing resistance exercise?
- A. Risk of pathological fracture due to osteoporosis
 - B. Joint instability
 - C. Acute pain or inflammation
 - D. If muscle soreness occurs after a bout of exercise
7. Within 1 week of beginning resistance exercise of the shoulder external rotators as a component of a rehabilitation program after a shoulder injury, your patient, Mr. K., is able to increase the level of resistance by using a heavier grade of elastic tubing. This improvement in muscle performance is due primarily to which of the following adaptive changes?
- A. Increased recruitment of motor units
 - B. Increased oxygen to the muscle
 - C. Hypertrophy of muscle fibers
 - D. Fiber-type transformation from slow twitch to fast twitch
8. Following surgery and 8 weeks of rehabilitation for carpal tunnel syndrome, you notice that the patient's thenar eminence is almost the same size as that of the uninvolved hand. This change is due to which of the following adaptive changes?
- A. Increased recruitment of motor units
 - B. Hyperplasia of muscle fibers
 - C. Hypertrophy of muscle fibers
 - D. Fiber type transformation
9. Each of the following is an indication that muscle fatigue is occurring when a patient is exercising against resistance except:
- A. Muscular tremor occurs during the exercise
 - B. Temporary loss of sensation in the exercising muscles
 - C. The patient may not be able to complete the available ROM against the initial level of resistance applied
 - D. The patient may attempt to use a substitute motion and muscle group to perform the exercise
10. It has been shown that after resistance exercise to exhaustion, recovery from exercise (recovery from fatigue) occurs most efficiently if:
- A. The fatigued muscle rests completely during recovery
 - B. Cold is applied to the fatigued muscle
 - C. The patient performs low-intensity, active exercise using the fatigued muscle
 - D. The muscle is passively stretched during recovery
11. Which components of a resistance exercise program should be modified (manipulated) during the program to produce training-induced improvement in muscle endurance?
- A. Position of the patient and load
 - B. Sets and mode of exercise

- C. Load and repetitions
 - D. Repetitions and mode of exercise
12. Your goal is to improve lower extremity proprioception, balance, and strength. Which of the following closed-chain exercises is the most challenging?
- A. Have the patient stand on one foot on a piece of foam and maintain his balance
 - B. Have the patient kneel in an upright position on a piece of foam and shift his weight from side to side
 - C. Have the patient stand on the floor on one leg and maintain his balance
 - D. Have the patient stand on the floor with weight equally distributed on both feet and throw and catch a ball
13. You are having a patient perform manual resistance exercise of the lower extremity using a PNF diagonal pattern. In which of the following lower extremity patterns is ankle dorsiflexion coupled with eversion resisted?
- A. D1 flexion
 - B. D1 extension
 - C. D2 flexion
 - D. D2 extension
14. You have a patient assume a prone-lying position and prop symmetrically on his forearms. You apply manual resistance in several directions at the shoulder girdles as you ask the patient to hold (maintain) the symmetrical position. This technique is known as:
- A. Agonist-contraction
 - B. Rhythmic stabilization
 - C. Recurrent facilitation
 - D. Repeated contractions
15. Of the following, which is the best definition of an "8 RM"?
- A. The number of repetitions of a particular exercise a patient can perform in 8 seconds against a specific load (amount of resistance)
 - B. The number of sets (bouts) of a specific exercise a patient can perform for 8 repetitions
 - C. The greatest amount of resistance (load) a patient can lift or lower through the available ROM in 8 seconds
 - D. The greatest amount of resistance (load) a patient can lift or lower through the available ROM for 8 repetitions (no more, no less).
16. Examples of plyometric activities for the upper extremities could include any of the following except:
- A. Wall push-ups
 - B. Clap push-ups
 - C. Catching and throwing a weighted ball
 - D. Dribbling a ball against the wall

17. Mitchell technique of relaxation is based on the principle of _____
- A. Reciprocal innervations
 - B. Autogenic inhibition
 - C. Cue controlled relaxation
 - D. Released only
18. While descending the stairs, the therapist must stand _____.
- A. Behind the patient
 - B. Behind the patient towards the weaker side
 - C. In front of the patient
 - D. In front of the patient towards the weaker side
19. In which of the PRE the load remains constant during the training session
- A. Delorme
 - B. Watkin
 - C. Zinovief
 - D. Mcqueen
20. In regard to ballistic stretching, it is true that:
- A. After each ballistic stretch the final stretch position is held for 10-15 s.
 - B. Stress relaxation is greater after a ballistic than static stretch.
 - C. For a given magnitude of stretch, passive force increases to a higher level after a ballistic than static stretch.
 - D. None of the above are true.

SAQ

1. Describe half kneeling position and its muscle work (5 marks)
2. Describe open and closed kinematics (5 marks)

SOFT TISSUE MANIPULATION FQE 2023

SECTION A: MCQs (10mks).

1. The sequence and direction of Swedish massage strokes are most adapted to which anatomical and physiological situation?
 - A. Subcutaneous adipose tissue.
 - B. Autonomic nervous system.
 - C. Lymph drainage and venous return.
 - D. Muscle attachments.

2. Which one of the following is not a percussion manipulation technique?
 - A. Shaking.
 - B. Clapping.
 - C. Hacking.
 - D. Pounding.

3. Which of the following factors DOES NOT delay normal natural lymphatic drainage?
 - A. surgery,
 - B. pregnancy,
 - C. infection,
 - D edema and adhesions
 - E. active exercises

4. Which is NOT a type of myofascial structure.
 - A. plantar fascia
 - B. thoracolumbar fascia

C. erector femoris fascia

D. tensor fascia band

5. The following is contraindicated for myofascial release

A. Heart disease.

B. Visceral conditions.

C. Acute injuries.

D. Both A and B.

6. The sequence and direction of Swedish massage strokes are most adapted to which anatomical and physiological situation?

A. Subcutaneous adipose tissue.

B. Autonomic nervous system.

C. Lymph drainage and venous return.

D. Muscle attachments.

7. Which of the following is a form of therapy in which energy from the recipient is rebalanced promoting health and healing

A. Reflexology.

B. Lymphatic drainage.

C. Therapeutic touch.

D. Acupressure.

8. Which massage technique is best for the knee region?

A. Effleurage.

B. Friction massage.

C. Clapping.

D. Kneading.

9. To break down adhesion that prevents normal motion, this technique can be used in sub-acute and chronic stages of healing.

- A. Effleurage
- B. Rhythmic mobilization
- C. Myofascial release
- D. Cross-fiber friction

10. Which one of the following is not a percussion manipulation technique?

- A. Shaking.
- B. Clapping.
- C. Hacking.
- D. Pounding

SECTION B: SAQs (10mks). S T M EXAM DEC 2023

1. Explain the contraindications of myofascial release .5mk
2. What are the functions of phagocytes and lymphocytes in relation to lymphatic system drainage? 5mks

E.P.A

SECTION A: MCQs

1. Indications of cold therapy include all of the following, EXCEPT?
 - a. Muscle spasm
 - b. Inflammation
 - c. Regenerating peripheral nerve
 - d. Pain
2. Physiological responses to heat: heat increases the extensibility of collagen tissue and decreases joint stiffness. Achievement of this goal is dependent on all of the following factors EXCEPT.
 - a. Amount of time the tissue is heated
 - b. The type of modality used in treatment
 - c. The depth of the tissue heated
 - d. The degree of stretch applied after heat
3. Deep heating modalities are contraindicated in patient with?
 - a. Superficial sensory impairment
 - b. Deep sensory impairment
 - c. Implants
 - d. All of the above
 - e. None of the above
4. Ali was diagnosed with metastatic osteosarcoma of L5 vertebral bone 6 months ago. He complains of diffuse acute back pain. All of the following modalities are best suited to relieve Ali's pain, which one is NOT.
 - a. Therapeutic ultrasound with a transducer head of 1MHZ
 - b. Short wave diathermy with large flexible electrodes
 - c. Laser therapy
 - d. All of the above

5. The purpose of conventional TENS is usually to;
 - a. Stimulate large diameter, low threshold afferents (A-beta) and small diameter, high threshold afferents (A-delta)
 - b. Stimulate large diameter, low threshold afferents (A-beta) without simultaneously stimulating small diameter, high threshold afferents (A-delta)
 - c. Generate muscle twitches in order to activate small diameter muscle afferents
 - d. Stimulate small diameter, higher threshold afferents (A-delta) without simultaneously stimulating large diameter, low threshold afferents (A-beta)
 - e. Directly stimulate neurons in the spinal cord
6. Prior to treatment using heat therapy/ cold therapy, body temperature of the patient must be put into consideration. Which one of the following statements is true about body temperature?
 - a. Core temperature of the body is relatively unstable and kept within a narrow range of 37 degrees Celsius.
 - b. Shell temperature of the body varies according to the temperature of the core and external environment.
 - c. Core temperature of the body varies according to the temperature of the shell and external environment.
 - d. Shell temperature of the body is relatively stable and kept within a narrow range of 37 degrees Celsius.
7. The following are indications of spinal traction, EXCEPT?
 - a. Unstable vertebrae
 - b. Herniated disc
 - c. Spinal nerve impingement
 - d. Narrowing of intervertebral foramen
8. A patient with an idiopathic acute tenderness, edema and loss of function in multiple joints of the hands and foot visited Physiotherapy department for treatment using E.P.As. Which one of the following is a suitable Physiotherapy action plan?
 - a. Relieve pain and edema using cryotherapy and then improve range of motion of affected joint by free active exercises.
 - b. Assure the patient of his condition and advise him to rest for at least 5 days for the symptoms to resolve
 - c. Refer the patient to a physician for further examination and accurate diagnosis.
 - d. Relieve patient symptoms by applying heat therapy to the affected joints.

9. Which one of the following is not a hemodynamic effect of heat therapy?
- Inflammation
 - Perspiration
 - Vasodilation
 - Release of prostaglandins
10. When using luminous infrared radiation in treatment of Bell's palsy, all of the following factors must be put into consideration, Except?
- Distance of the luminous infrared lamp should be placed 30 cm away from the side of the face to be treated.
 - Duration of treatment should not exceed 10 minutes since facial nerve is very sensitive to heat therapy.
 - The infrared lamp should be placed at a right angle to the area treated.
 - The eye on the affected side should be covered by a clean moist cotton wool prior to radiation exposure.
11. Changing the ultrasound transducer from 1 MHz to 3 MHz would generally produce?
- Faster imaging.
 - Deeper penetration.
 - Shorter wavelengths.
 - Long ultrasound pulses.
12. Which of the following modality is best used in the treatment of wounds?
- Iontophoresis
 - Laser therapy
 - Therapeutic Ultrasound
 - None of the above
13. In management of incomplete tear of tendon Achilles, therapeutic ultrasound is MOST effective in which one of the following healing phases?
- Regeneration phase
 - Remodelling phase
 - Inflammatory phase
 - All of the above.
14. Which of the following is NOT a method of application of hydrotherapy?
- Deep immersion
 - Whirlpool
 - Hubbard tank
 - Contrast bath
15. Joseph, a valley baller sustained a medial collateral ligament sprain of the right knee while playing volleyball. 6 hours later, he was referred to a physiotherapist for further examination and possible treatment. Which of the following should not be part of treatment plan?
- Rest
 - Heat

- c. Compression
 - d. Ice
16. The following are indications of cold therapy EXCEPT?
- a. Muscle spasm
 - b. Inflammation
 - c. Regenerating peripheral nerve
 - d. Multiple sclerosis
 - e. pain
17. Benson, a 12-year-old boy sustained a displaced supracondylar fracture of the left humerus. The fracture was reduced and immobilized in a cast. He developed elbow stiffness as a result of prolonged immobilization. He was referred to you for rehabilitation with the main goal of improving the joint range of motion using E.P.A and arthrokinematics techniques. Which one of the following modalities is best suited to the above condition?
- a. Short wave diathermy
 - b. Therapeutic ultrasound
 - c. Cryotherapy
 - d. Paraffin wax
 - e. None of the above.
18. Which of the following modes of heat transfer may be used in cryotherapy?
- a. Conduction and convection
 - b. Convection and conduction
 - c. Convection and evaporation
 - d. Conduction and evaporation
19. The following are methods of application of paraffin wax EXCEPT?
- a. Glove method
 - b. Dip immersion
 - c. Paint application
 - d. Deep wrap
 - e. Brush method
20. The following are the effects of cold on blood flow. Which one is NOT
- a. Increased blood viscosity
 - b. Cold-induced vasodilation
 - c. Lewis Hunting reaction
 - d. Decreased blood viscosity

SECTION B: SAQs

1. Briefly explain the mechanisms by which TENS brings about pain relief in patients with acute Lumbago (5mks).
2. Highlight the therapeutic and physiological effects of therapeutic ultrasound in management of grade one Achilles tendon rupture (5mks)

BIOMECHANICS & KINESIOLOGY

SECTION A MCQS 10 MARKS

1. Which one of the following is the main prime mover of shoulder flexion?
 - A. Anterior fibers of deltoid
 - B. Coracobrachialis
 - C. Long head of biceps brachii
 - D. Pectoralis major
2. Scapular winging happens along which axis?
 - A. Lateral axis
 - B. Vertical axis
 - C. AP axis
 - D. Horizontal axis
3. Which one of the following is not true about the biomechanics of lumbar flexion?
 - A. Compression of anterior fibers
 - B. Stretching of posterior fibers
 - C. Nucleus pulposus moves posteriorly
 - D. There is a shear stress for annulus
4. The following are biomechanical changes of a forward head posture except?
 - A. Shifting of the CoG
 - B. Upper body drifts backward
 - C. The hips tilt forward
 - D. The hips tilt backward
5. In closed kinetic chain pelvic motions, the following movements happens in frontal plane except?
 - A. Side bending
 - B. Left hip joint adduction
 - C. Right hip joint abduction
 - D. Hip flexion
6. A basketball player presents to you after sustaining an injury. The ankle was forced into inversion while plantar flexed upon landing on an opponent's foot. Which ligament is most likely injured?
 - A. Calcaneofibular
 - B. Anterior tibiofibular
 - C. Tibiocalcaneal
 - D. Anterior talofibular
7. What is the mechanism of injury for a herniated intervertebral disc in the lumbar region of the spine?
 - A. Repeated compressive loading of the spine
 - B. Repeated or prolonged hip extension
 - C. Sustained contraction of the erector spinae
 - D. Repeated or prolonged flexion of the lumbar spine



8. The close pack position of hip is
- A. Flexion, Adduction, Medial rotation
 - B. Flexion, Adduction, Lateral rotation
 - C. Extension, Abduction, Medial rotation
 - D. Extension, Adduction, Medial rotation
9. A pathologic increase in the angle of torsion is called _____?
- A. Coxa vara
 - B. Coxa valga
 - C. Anteversion
 - D. Retroversion
10. If the right hip abductor is paralysed, the person standing on the left leg the pelvis _____
- A. Will drop to the right side
 - B. Will drop to the left side
 - C. Will not drop
 - D. There will be a contralateral hip drop

SECTION B

- 1. Discuss in details the terminal phase of stance phase in gait 5 marks
- 2. Clinically explain the functional position of the wrist (5 Marks)