# KMCT COLLEGE OF ALLIED HEALTH SCIENCES
# MUKKOM, KOZHIKODE, KERALA.
# DEPARTMENT OF PHYSIOTHERAPY.
# SECOND YEAR BPT

## EXERCISE THERAPY- QUESTION BANK

## ESSAY- 15 MARK

1. Describe various PNF techniques of facilitation for mobility.
2. Describe the technique of moblising the ankle joint.
3. Discuss the various physiological changes that occurs during aerobic exercises.
4. What is Proprioceptive Neuromuscular Facilitation? Write about its principles and techniques of facilitation to improve mobility and strength.
5. Define Stretching. Explain the determinants, techniques, contraindications and effects of stretching.
6. Define Asanas and Pranayamas. Write about its principles, types and Contraindications.
7. Describe the physiology of balance and the components of balance.
8. Explain relaxation and write about Jacobson's relaxation.
9. Write an essay on Aerobic exercises
10. Define Anthropometry. Explain principles, techniques uses & limitations of Anthropometric Measurements
11. What are the principles & grades of mobilization? Explain the techniques of mobilization for shoulder joint
12. Define balance. Describe in detail the evaluation of impaired balance and balance re-training
13. What are the indications and principles of massage? Describe in detail physiological and therapeutic uses of manipulations in massage
14. How is limb length measured? What are the different types of crutches? Write in detail about various crutch gaits

15. Explain starting positions in detail with the muscle activity for each
16. Explain the principles of aerobic exercise training. Mention the effects of this training on the various system of the body
17. Define massage, classify massage with indications and contraindications
18. Describe the physiology of balance and the components of balance.
19. Explain the technique of strengthening the biceps brachii from grade 1 to grade 5
20. Classify strengthening exercise, write in detail about progressive resisted exercise
21. Explain in detail principles, types and uses of goniometry
22. Define balance. Write any two tests of balance. Treatment for balance retraining for patients with balance dysfunction
23. Explain in detail about suspension therapy, principles, and types of suspension therapy
24. Write in detail about posture- types, kinetics and kinematics, add the postural control mechanism
25. Describe in detail the postural mechanisms. What are the principles and techniques of postural re education.
26. Define active movement. Classify active movements
27. Explain levers, its orders and the application of levers in physiotherapy
28. Define Hydrotherapy. Explain in detail about principles, indication, contra-indication, procedure, physiological and therapeutic effects
29. Define Posture. Discuss in detail various factors involved in maintenance of good posture. Add a note on postural donations.
30. Describe in detail the various techniques of general and local relaxation
31. Define Lever. Discuss in detail the types and uses of Lever in Physiotherapy.
32. Discuss in detail the physiological and therapeutic effects of free exercises.
33. Define Posture, discuss in detail posture reflex mechanism.
34. What is Group exercise and write in detail the types of group exercise and its advantages?

35. Define proprioceptive neuromuscular facilitation. What is repeated contraction. Explain the applications of repeated contraction and its effects and uses

36. What is hydrotherapy. Write about the indications, precautions, effects and uses of hydrotherapy in detail.

37. Explain the principles of aerobic exercise training. Mention the effects of this training on the various systems of the body

38. What are the principles and grades of mobilization. Explain the techniques of mobilization for shoulder joint

39. Define stretching. Discuss the procedure of stretching of hamstring muscles

40. How do you prepare a below knee amputee for crutch walking

41. Describe the principles of joint goniometry. Mention the types of goniometers and their uses. Mention the normal range of motion available at hip joint in all plane

42. What are the basic neurophysiologic principles that govern proprioceptive neuromuscular facilitation. Add a note on rhythmic initiation technique

43. Explain in detail about the principles, grades, indications, contraindications, effects and uses of mobilization

44. What is Jacobson's relaxation. Mention the basic conditions for general relaxation. Explain about the support providing relaxation in various lying positions with diagrams

45. List out the basic functional activities trained on the mat. Explain the procedure of rolling, its purposes and uses with appropriate diagrams

46. What are the causes for decrease in muscle performance. Describe the principles guiding training program targeting to improve muscle performance.

47. Define posture. Mention common postural deviations and describe corrective measures for kyphotic posture

48. Explain in detail the principles of suspension therapy. Describe the technique for shoulder internal and external rotation movements.

49. List the various techniques used in massage. Describe the therapeutic effects for each

50. Explain the principles and different types of walking aids in detail

51. Define massage and classify the various techniques used in massage. Explain the therapeutic effect for each.
52. What are group exercises. Explain the merits and demerits of group exercises.Add a note on the organisation of group exercises
53. Explain the factors predisposing to poor posture. Discuss the technique of postural re-education. Add a note on patient education
54. Discuss the principles, indications and limitations of manual muscle testing
55. Discuss in detail regarding the causes of immobility and describe the effects and uses of passive movements
56. Define passive movements and explain its uses, principles & limitations

## SHORT ESSAY

1. Describe how would you measure the range of movement of supination and pronation using goniometer.
2. Describe the ranges of muscle work with examples.
3. Describe the technique of petrissage.
4. Describe the various derived positions in kneeling position.
5. Discuss the various methods for improving standing balance.
6. Examples for free exercises with diagrams for spinal extensors.
7. What is yoga? Mention its basic principles.
8. Discuss with the examples close kinetic chain exercises for shoulder.
9. What is hydrotherapy and describe the principle of hydrotherapy.
10. Explain factors which pre disposes to poor postures.
11. What are the indications and principle for resisted exercises?
12. Physiological uses of massage.
13. Describe the techniques of muscle testing for shoulder extensors.
14. Describe circuit training.

15. What are Starting positions andits uses?
16. Write a note on Static and Dynamic Power tests with examples.
17. Write a note on Co-ordination tests.
18. Write about Pulmonary Function Test and its importance.
19. Write a note on Jacobsons relaxation technique.
20. What are the uses and limitations of Goniometry?
21. Define Free exercises. Write about types and uses of free exercises.
22. Define Resisted exercises. Write in brief about its principles and uses.
23. Define Functional Re-education and write a note on Mat activities.
24. Write a note on grades of Mobilisation.
25. Define Closed-chain exercise, its effects with 2 examples.
26. Write a note on Isotonic exercises.
27. What is Anthropometry and its uses?
28. Write about principles and uses of Passive movements.
29. Manual muscle testing for deltoid muscle
30. Tests for sensation
31. Classification of passive movements
32. Write about open chain and closed chain exercise.
33. Technique of suspension therapy for knee flexion and extension
34. Use of Frenkles exercise and its progression
35. Merits and demerits of Hydrotherapy
36. Write about Mat exercises.
37. Indications and contraindications of joint mobilization
38. Principles and technique of Free exercises
39. Evaluation of aerobic capacity
40. Technique of Goniometric measurement for Ankle Joint

41. Write in brief about concentric and eccentric exercise with examples.
42. Write in brief about the angle of pelvic inclination.
43. Explain the limb length measurement in detail
44. Techniques of massage manipulation
45. Write a note on Mulligan technique of joint mobilization
46. What are the principles & techniques of Hydrotherapy
47. Define inco-ordination, what are the non-equilibrium tests of co-ordination
48. Write a note on pulmonary Function tests
49. Explain the technique of strengthening of elbow flexors from grade 1 to grade 3
50. Dynamic power test
51. Write a note on Mitchel's technique of relaxation
52. Principles & benefits of Asanas
53. Functional re-education
54. Explain the principles of goniometry & it's technique of measurement
55. Enumerate the principles of PNF
56. Write the protocol for re-education of a muscle from power 1 to 2
57. Write briefly about the various types of breathing exercise
58. Define hydrotherapy. Enumerate the precautions and contra indications of hydrotherapy
59. What are the normal and abnormal responses to acute aerobic exercise?
60. Write about Frenkels exercises for lower limb
61. Explain the principles, methods and techniques of pranayama
62. Illustrate MMT for knee flexors and extensors
63. Define passive movements. Classify it an write down the principles for giving passive Movements
64. Therapeutic gymnasium
65. Give 5 limitation of goniometry

66. Describe stretching technique for hamstring tightness
67. Describe limb length measurement technique for upperlimb
68. List the type of walking aids with their uses
69. Define passive movements. Explain the type of passive movements
70. Define functional reeducation and mention the stages from lying to sitting
71. Define the muscle contraction with examples
72. Explain the methods of progressive strength training
73. Explain the ATP-PCr system during exercise.
74. Merits and demerits of Hydrotherapy
75. What is progressive resisted exercise? Explain oxford technique.
76. Technique of Goniometric measurement for Ankle Joint
77. Write in brief about the angle of pelvic inclination
78. Describe type of muscle contraction with example
79. Explain the methods of postural evaluation
80. Explain the effect of immobilization on musculoskeletal system
81. Write a note on PNF Stretching
82. Explain the merits and demerits of continuous passive mobilization
83. Explain the role of recreational activities in rehabilitation
84. Explain coordination evaluation in detail
85. Write a note on muscle re education
86. Define stretching. What are the physiological effect of stretching
87. What are frenkels exercise, mention the uses of frenkels exercise
88. Define postural drainage. Mention indications and technique
89. Define endurance. Explain the types of endurance with example
90. Describe muscle work during squatting
91. Write a notes on grades of mobilization

92. Rhythmic stabilization and rhythmic initiation
93. Physiologic changes during aerobic exercise
94. Define limb length discrepancy and type of limb length discrepancies
95. Explain derived positions from kneeling and mention advantages and disadvantages for the same
96. Factors contributing to poor posture
97. Principles of postural re education
98. Techniques of massage manipulation
99. Functional re education of upper limb
100. Explain circuit weight training
101. Evaluation of balance
102. Anthropometric measurement
103. Phases of gait cycle
104. Whirlpool bath
105. Concave – convex rule
106. Mat activities
107. Describe high kneeling
108. Petrissage technique
109. Physical properties of wate
110. History of massage
111. Maitland's Graded Oscillatory Technique
112. free exercise to the shoulder joint
113. Sequence for neck massage
114. Contrast Bath
115. Hanging
116. Percussion manipulation

117. Health and hygiene for the massage therapist
118. Explain the kinetics and kinematic studies in human gait
119. Indications for massage therapy
120. Friction massage types, benefits
121. Nervous control of movement
122. Accessory movements
123. Positions derived from standing
124. Effleurage.
125. 3rd order levers.
126. Line of gravity, base and equilibrium
127. Rhythmic stabilization
128. Types of traction
129. Postural control mechanism.
130. Technique of friction and its effects and uses.
131. Second order lever with example.
132. De'lormes technique.
133. Free exercises for shoulder join
134. Contract relax/Hold relax.
135. Pulleys and its therapeutic uses.
136. Manual muscle testing.
137. Various standing position
138. Free exercises to knee joint
139. Joint mobility
140. Static power test
141. Active stretching.
142. Explain the cardiovascular changes that occur with endurance training

143. What is pursed lip breathing? Write the indications and procedure of pursed lip breathing.
144. Compare Delorme and Oxford regimens of progressive resisted exercises
145. Describe the physiology of balance and the components of balance
146. Explain relaxation and describe about Jacobson's relaxation
147. Define suspension therapy. Explain the principles, uses, types and technique of suspension therapy
148. What is proprioceptive neuromuscular facilitation (PNF). Explain the basic neurophysiologic principles of PNF
149. Techniques of general relaxation
150. Explain the value and disadvantages of groups exercise.
151. Techniques of chest physiotherapy
152. Causes of muscle paralysis.
153. Crutch balance training
154. Pulleys and springs
155. .Intrinsic foot muscles
156. Exercises for scoliosis
157. Various pathological gait
158. List the determinants of an exercise program and describe the physiological responses to aerobic exercises
159. Describe the procedure adapted to measure true limb length.
160. Describe the principles of passive movements
161. What is good posture. Write about corrective methods and patient education to maintain good posture
162. Define concentric and eccentric exercise
163. Explain any two techniques of massage in detail
164. Classify stretching. Explain ballistic stretching in detail

165. Explain any two techniques of pranayama
166. merits and demerits of goniometric measurements
167. .Explain progressive resisted exercise
168. Discuss the equilibrium tests for co -ordination
169. Define resisted exercise. State and explain the techniques of resisted exercise
170. Draw the universal goniometer and label its parts. Mention the types of goniometers. Write about the principles of goniometry
171. What is postural drainage. Write about the indications and contraindications of postural drainage
172. . Define balance. Write about the types of balance retraining
173. Describe medical research council grading system for muscle testing
174. Describe movements at shoulder joint in relation to axis and planes for movement.
175. Describe the physiology of balance
176. Discuss in detail about posture.
177. Define Asanas and Pranayamas. Mention about its principles, types and contraindications
178. Explain the principles of hydrotherapy and its method of application in exercise therapy
179. Discuss the various physiological changes that occur during aerobic exercises
180. Describe the various techniques of stretching. Add a note on the precautions and contraindications of stretching
181. Effect and uses of pranayama
182. Define tonic and phasic muscles, give one example for each type of muscle
183. Frenkel's exercise
184. Neural tension test for ulnar nerve
185. Patterns of properioceptive neuromuscular facilitation for upper limb
186. Principles of giving relaxed passive movements
187. Basics of neurodynamics

188. Anatomy and physiology of cerebellum
189. Explain progressive resisted exercises
190. Postural drainage – principles, indications and contraindications.
191. Organisation of Group Exercises
192. Stretching method and home program for tendo-achilles tightness.
193. Explain the method of measuring true and apparent limb length.
194. Pre – crutch training
195. Axes and planes
196. Plyometrics
197. Mitchell's relaxation technique
198. Describe sway back posture with reference to ideal plumb line alignment
199. Factors influencing equilibrium
200. Describe the types of muscle actions
201. Effleurage and mention its effects and uses

## SHORT NOTES

1. Strain.
2. Name the critical elements of exercises.
3. Two limitations of joint mobilization.
4. Name the test for inco-ordination.
5. Define posture.
6. What is vertical suspension?
7. Two contra indications of inverted asanas.
8. Uses of hip hiking.
9. Two uses of assisted exercises.
10. SAID Principle.

11. Endurance test
12. True limb length and its importance
13. What is Muscle tone and Postural tone?
14. Define Active movement.
15. 2 examples of isometric exercises
16. Define Open chain exercises.
17. 4 uses of Effleurage
18. Define Active and inactive postures.
19. 4 effects of Aerobic exercises
20. 2 types of Hydro Therapy techniques
21. Speed Test
22. Brief Resisted Isometric Exercise
23. Petrissage
24. Gutter Crutch
25. Define equilibrium.
26. Disadvantages of group therapy
27. Apparent Limb length
28. Active and Inactive posture
29. Two tests for inco-ordination.
30. Mention any 2 derived positions from sitting
31. Define 10 RM
32. Define work & endurance
33. Differentiate between spasticity & tightness
34. What is “break test”?
35. Name 2 therapeutic effects of exercise in water
36. Enumerate any two mat activities

37. Define good posture
38. Write any two derived positions
39. List down the components of a gait cycle
40. Define stretching
41. Write any two principles of MMT
42. What is ballistic stretching
43. What are the advantages of mat exercises
44. Give 2 uses of massage
45. Give 2 uses of endurance exercise
46. Give 2 uses of treadmill
47. What is BRIME
48. Define stride length.
49. Isokinetic exercises
50. Vo2 Max
51. Active and inactive posture
52. Type of receptors
53. Define accommodation
54. Mention four type of effleurage
55. What is hold relax technique
56. Mention two uses of static cycle
57. Define tightness and contracture
58. Define pinch grip
59. Three point gait
60. Kneading
61. Self-stretching
62. What is a motor unit

63. Indication of resisted exercise
64. Indication of axillary crutches
65. Oxford method of muscle testing
66. Goals of pnf
67. Define cadence
68. Buoyancy.
69. 3rd order lever
70. Frontal plane.
71. Movable pulley
72. Why is high fever contraindicated for passive movements?
73. Pulleys
74. Line of gravity
75. Joint shapes
76. Ironing
77. Two joint muscle
78. Barrier concept
79. Rhythmic initiation
80. .Physiological relaxation
81. Reach standing
82. Friction
83. Inertia
84. Parallelogram Law of vectors
85. Third Order lever
86. Hooke's law
87. Pelvic tilt
88. Progressive – Resisted Exercise

89. Non- weight bearing exercises
90. Lateral tilting of pelvis
91. Acceleration
92. Ergometer
93. Plyometric training
94. Elasticity.
95. Aims of exercise therapy.
96. Acceleration.
97. Momentum
98. Angle of pull
99. Waddling Gait.
100. General contraindications for active exercise.
101. Kinetic energy.
102. Stride stand
103. Factors causing BAD posture
104. Fast twitch fatigue resisted muscle fibre.
105. Parameters used in traction.
106. Circular kneading.
107. Angle of pull.
108. Muscle tone.
109. Facilitation.
110. Static posture.
111. High standing.
112. Goniometer.
113. Gravity.
114. Limb length assessment.

115. Newton’s law of inertia
116. Translatory motion.
117. Define – Pulley.
118. Multipennate muscle.
119. Stroking manipulation
120. Passive range of motion.
121. Concentric contraction.
122. Rhythmic initiation
123. Motor unit.
124. Synergist.
125. Support.
126. Posture tone
127. D2 Flexion
128. D1 flexion
129. Hubbard tank
130. State the precautions and contraindications of stretching
131. The effects and uses of half lying position.
132. What is delayed onset of muscle soreness
133. What is isokinetic exercise
134. Frenkel’s exercise for the legs in standing
135. The indications and contraindications for Mulligan’s technique.
136. Define percussion manipulation. Write two uses of it
137. Meditation
138. State one example for all orders of lever
139. Four limitations of goniometry
140. Describe the stretching techniques for calf muscle tightness

141. Define functional re -education and mention the stages from lying to sitting
142. Describe the types of resisted exercises with examples.
143. Tests of sensation
144. Define co -ordination and mention the non -equilibrium tests of co -ordination
145. Pulmonary function tests
146. Biaxial joint movement
147. Diaphragmatic breathing exercise
148. Purpose and uses of bridging
149. Define Hooke's law
150. Stride stance
151. Agility exercises
152. Buoyancy and it's clinical significance
153. Stunt and spurt muscles
154. Break test
155. Mention the derived positions attainable from lying position
156. Closed chain exercises
157. Mention the precautions and contraindications for hydrotherapy
158. Mention the causes for impaired balance
159. Mention the causes for incoordination
160. What are the contraindications for mobilization technique
161. Facilitated stretching
162. Degrees of relaxation
163. Mention the principles for isometric exercise prescription
164. Uses of mat exercise
165. SAID principle
166. Limitations of manual muscle testing.

167. Dynamic power tests
168. Macqueen training
169. Name three uses of active exercises
170. What is vertical suspension
171. What is muscle tone and postural tone.
172. Four uses of effleurage
173. Equilibrium
174. Normal end feel
175. Endurance test
176. Two point gait
177. What is rhythmic stabilization. Mention its uses
178. Trigger point release
179. Picking up manipulation
180. Uses of yoga in physiotherapy
181. Measurement of apparent limb length
182. What is centralization in Mc Kenzie method
183. The effects and uses of active assisted exercises
184. What is delayed onset of muscle soreness
185. Mention the components of D1 flexion pattern in upper extremity
186. Classify passive movements delivered to a joint
187. Mention the causes for incoordination
188. Describe the properties of water
189. What is postural drainage. Give two indications
190. Give the importance of warm -up period in aerobic exercise.
191. What are multiple angle isometrics
192. Mention any three derived positions from sitting

193. Four principles of manual muscle testing.
194. Explain the principles of training with walking aids
195. Explain open and closed chain exercise for quadriceps
196. Enumerate the various parameters measured in pulmonary function testing.
197. Define local and general endurance
198. Define centre of gravity (COG) and line of gravity (LOG)
199. Pendular exercises
200. Lateral costal expansion exercise
201. Test for neuromuscular deficiency
202. Indications for trigger point release
203. Principle of meditation
204. Passive insufficiency with an example
205. Factors responsible for good posture.
206. Uses of cool down exercises.
207. Coughing and huffing.
208. Equilibrium board
209. Define diaphragmatic breathing exercise and mention two uses
210. List three exercises to mobilize a stiff shoulde
211. Four point gait pattern
212. Stroking manipulation
213. Benefits of asanas
214. Circuit weight training
215. Indication for muscle energy technique
216. Group action of muscles.
217. Friction
218. Define trick movements and list two examples

219. Define prime movers and synergists

220. Indications of mat exercises

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## EXERCISE THERAPY- ANSWER KEY

## ESSAY- 15 MARK

**1. PNF Techniques of Facilitation for Mobility:**

Proprioceptive Neuromuscular Facilitation (PNF) is an approach to therapeutic exercise that aims to improve flexibility, strength, and coordination. PNF techniques include:

- Hold-Relax: The therapist asks the patient to perform an isometric contraction of the target muscle for a few seconds. After that, the patient relaxes, and the therapist assists in moving the limb into a stretch.
- Contract-Relax: Similar to hold-relax, but after the isometric contraction, the patient actively moves the limb through the new range of motion.
- Agonist-Contract: The patient contracts the opposing muscle while the target muscle is lengthened, promoting reciprocal inhibition and a deeper stretch.
- Rhythmic Stabilization: Isometric contractions are performed against resistance in multiple planes to enhance stability and control.
- Combination of Isotonics: Combining isotonic contractions of agonist and antagonist muscles to promote a greater range of motion.

**2. Mobilizing the Ankle Joint:**

Mobilizing the ankle joint involves performing various movements to improve its range of motion. Techniques include:

- Dorsiflexion and Plantar Flexion: Moving the foot up (dorsiflexion) and down (plantar flexion).
- Inversion and Eversion: Tilting the foot inwards (inversion) and outwards (eversion).

- Circles: Performing circular movements with the foot, combining different ranges of motion.

### 3. Physiological Changes During Aerobic Exercises:

Aerobic exercises lead to several physiological changes, including increased heart rate, respiratory rate, and oxygen consumption. The cardiovascular system adapts by improving the efficiency of oxygen delivery to working muscles, increasing cardiac output, and enhancing capillary density. Muscles utilize more oxygen, leading to increased metabolism and energy production. Regular aerobic exercise can result in improved cardiovascular endurance, increased lung capacity, and enhanced overall fitness.

### 4. Proprioceptive Neuromuscular Facilitation (PNF):

PNF is a therapeutic approach that utilizes the neuromuscular system to improve flexibility, strength, and coordination. Its principles include using the proprioceptive system to enhance sensory input, capitalizing on the stretch reflex, and promoting the coordination of agonist-antagonist muscle groups. PNF techniques involve specific patterns of contraction and relaxation, often with a partner's assistance, to achieve gains in mobility and strength.

### 5. Effects of PNF Techniques:

PNF techniques improve muscle strength, coordination, and flexibility. They promote neuromuscular control and can be especially effective in rehabilitation settings. PNF can also enhance the functional range of motion and is commonly used to improve motor skills in athletes and patients with neurological conditions.

### 6. Stretching:

Stretching is the deliberate lengthening of muscles to increase flexibility and range of motion. Determinants of stretching effectiveness include duration, frequency, intensity, and type of stretch. Techniques include static (holding a stretch), dynamic (moving through a stretch), ballistic (using momentum), and PNF stretches. Contraindications to stretching include recent injuries, joint instability, and certain medical conditions. Effects include improved muscle flexibility, reduced muscle tension, and increased circulation.

## 7. Asanas and Pranayamas:

Asanas are physical postures in yoga, while pranayamas are breathing exercises. Principles of asanas involve balance, alignment, and mindfulness. Types of asanas include standing, sitting, supine, prone, and inverted poses. Contraindications are based on individual limitations and injuries. Pranayamas involve controlled breathing techniques that influence the flow of energy (prana) in the body. These techniques promote relaxation, concentration, and vitality.

## 8. Physiology of Balance:

Balance involves the integration of sensory input from the visual, vestibular, and proprioceptive systems. Components of balance include:

Static Balance: Maintaining equilibrium while stationary.

Dynamic Balance: Maintaining equilibrium during movement.

Anticipatory Postural Control: Preparing the body for expected perturbations.

Reactive Postural Control: Adjusting to unexpected disturbances.

## 9. Relaxation and Jacobson's Relaxation:

Relaxation is a state of reduced physical and mental tension. Jacobson's Progressive Muscle Relaxation is a technique involving the systematic tensing and relaxing of muscle groups to achieve overall relaxation. It helps individuals become more aware of bodily sensations and can reduce stress and anxiety. The technique is based on the principle that relaxation of muscles leads to relaxation of the mind.

## 10. Aerobic Exercises:

Aerobic exercises, also known as cardiovascular exercises, are a form of physical activity that significantly increases the body's demand for oxygen over an extended period. These exercises involve large muscle groups and are performed at a moderate intensity, sustaining an elevated heart rate. Aerobic exercises have numerous health benefits, including improved cardiovascular health, increased lung capacity, weight management, enhanced endurance, and reduced risk of chronic diseases. Examples of aerobic exercises include walking, jogging, cycling, swimming, dancing, and aerobics classes. These exercises stimulate the heart and lungs, leading to adaptations such as increased cardiac output, improved oxygen delivery to

tissues, and enhanced metabolic efficiency. Engaging in regular aerobic exercise contributes to overall fitness and well-being.

**11. Anthropometry:**

Anthropometry is the scientific study of human body measurements and proportions. Its principles involve accurate measurement techniques, standardization, and statistical analysis. Techniques include using calibrated instruments like calipers and tape measures to measure various body dimensions, such as height, weight, body circumference, and skinfold thickness. Anthropometric measurements are used for a wide range of purposes, including assessing growth and development, evaluating nutritional status, designing ergonomic products, and conducting research on body composition. However, anthropometric measurements have limitations, such as not accounting for muscle mass, bone density, and genetic variations. Additionally, cultural differences can influence body proportions and measurements.

**12. Principles and Grades of Mobilization for Shoulder Joint:**

Mobilization refers to the manual manipulation of joints to restore their normal range of motion. The principles of mobilization include controlling pain, restoring joint mobility, and enhancing function. Grades of mobilization are categorized based on the intensity of the movement and resistance applied:

- Grade I: Small-amplitude movements at the beginning of the range, often used for pain relief.
- Grade II: Larger-amplitude movements within the pain-free range.
- Grade III: Large-amplitude movements at or near the end of the pain-free range.
- Grade IV: Small-amplitude movements at the end of the range, often used to increase joint play.
- Grade V: High-velocity, low-amplitude thrusts, commonly associated with joint

**13. Balance:**

Balance refers to the ability to maintain equilibrium and stability while performing various activities. Evaluation of impaired balance involves assessing sensory input from vision, proprioception, and the vestibular system. Balance re-training often includes exercises to improve proprioception, coordination, and muscle strength. Rehabilitation programs may

involve activities like standing on one leg, walking on uneven surfaces, and performing dynamic movements. Balance training helps prevent falls, especially in older adults, and enhances functional independence.

**14. Indications and Principles of Massage:**

Massage is a manual therapy technique involving the manipulation of soft tissues to promote relaxation, relieve tension, and improve circulation. Indications for massage include muscle tension, stress reduction, pain management, and injury rehabilitation. The principles of massage involve using appropriate pressure, direction, and techniques to address specific needs. Manipulations in massage include effleurage (gliding strokes), petrissage (kneading), friction, tapotement (percussion), and vibration. Physiological and therapeutic uses of manipulations in massage include increasing blood flow, reducing muscle tightness, promoting relaxation, and aiding lymphatic drainage.

**15. Limb Length Measurement and Types of Crutches:**

Limb length can be measured using a tape measure, from specific anatomical landmarks to accurately assess asymmetry or monitor growth. Types of crutches include axillary crutches, forearm crutches, and platform crutches. Axillary crutches are placed under the armpits, forearm crutches have cuffs around the forearm, and platform crutches provide support for the forearm and wrists. Crutches are used to assist walking and weight-bearing during injury recovery or rehabilitation.

**16. Starting Positions and Muscle Activity:**

Starting positions in exercise refer to the initial stance or posture before performing a movement. Muscle activity varies depending on the exercise and starting position. For example:

- Squats: Starting with feet shoulder-width apart, muscles involved include quadriceps, hamstrings, glutes, and core muscles.
- Push-Ups: Starting in a plank position, muscles involved include chest muscles, triceps, shoulders, and core muscles.
- Lunges: Starting with one foot forward, muscles involved include quadriceps, hamstrings, glutes, and calf muscles.

- Plank: Starting in a push-up position, muscles involved include core muscles, shoulders, triceps, and hip stabilizers.

**17. Principles of Aerobic Exercise Training and Effects on the Body Systems:**

Aerobic exercise training involves the systematic application of cardiovascular exercises to improve overall fitness and health. The principles of aerobic exercise training guide individuals in achieving optimal results while minimizing the risk of injury. These principles include:

- Frequency: Refers to the number of sessions per week. Regularity is crucial for sustaining cardiovascular adaptations. Typically, 3-5 sessions per week are recommended.
- Intensity: Determines the level of effort during exercise. Aerobic exercises should be performed at a moderate intensity, where the heart rate is elevated to a range that is effective yet sustainable.
- Duration: Represents the length of each exercise session. The duration of aerobic exercises should generally be between 20 to 60 minutes, depending on fitness levels and goals.
- Mode: Refers to the type of aerobic exercise chosen. Activities like walking, jogging, cycling, swimming, and dancing are common choices.
- Progression: Involves gradually increasing the intensity, duration, or frequency of exercises over time. This prevents plateaus and promotes continuous improvement.

Individualization: Tailoring the exercise program to an individual's fitness level, goals, and any pre-existing conditions. It's important to start at an appropriate level and gradually progress.

❖ Effects of Aerobic Exercise Training on Body Systems:

Aerobic exercise training has profound effects on various body systems:

- Cardiovascular System: Increases heart rate, stroke volume, and cardiac output, leading to improved heart efficiency. This results in enhanced oxygen delivery to tissues, reduced resting heart rate, and increased capillary density.

- Respiratory System: Improves lung capacity and oxygen exchange efficiency, enhancing endurance and overall respiratory function.
- Musculoskeletal System: Increases muscle endurance and efficiency, leading to improved performance in daily activities and reduced risk of muscular fatigue.
- Metabolic System: Promotes energy expenditure, contributing to weight management. It also enhances insulin sensitivity, which can aid in diabetes management.
- Endocrine System: Increases the release of endorphins, the body's natural "feel-good" hormones, promoting a sense of well-being and reducing stress.
- Immune System: Regular moderate-intensity aerobic exercise is associated with a strengthened immune system and reduced inflammation.
- Neurological System: Enhances cognitive function, memory, and mood due to improved blood flow and neurotransmitter release.
- Vascular System: Dilates blood vessels, leading to reduced blood pressure and improved vascular health.
- Bone Health: While not a primary focus, weight-bearing aerobic exercises contribute to maintaining bone density and overall bone health.

**18. Definition and Classification of Massage with Indications and Contraindications:**

Massage is a therapeutic technique involving the manipulation of soft tissues to promote relaxation, relieve muscle tension, enhance circulation, and improve overall well-being. It can be performed using various techniques, pressures, and rhythms. Massage is classified into several types based on its intended effects and techniques used:

- Swedish Massage: Involves long gliding strokes, kneading, friction, tapping, and gentle stretching. It promotes relaxation, improved circulation, and relief from muscle tension.
- Deep Tissue Massage: Focuses on deeper layers of muscles and connective tissues to address chronic muscle tension and knots.
- Sports Massage: Tailored to athletes, it combines techniques to prevent or treat injuries, improve flexibility, and enhance performance.

- Trigger Point Massage: Targets specific trigger points in muscles to alleviate pain and tension.
- Prenatal Massage: Designed for pregnant women to reduce discomfort, alleviate muscle tension, and promote relaxation.

❖ Indications: Massage is indicated for:

- Muscle tension and soreness
- Stress reduction
- Pain management
- Improved circulation
- Enhanced relaxation
- Rehabilitation after injury
- Contraindications: Massage may be contraindicated in cases of:
- Open wounds or skin infections
- Fever or acute illness
- Certain skin conditions
- Recent surgery or injury
- Blood clotting disorders

**19. Physiology of Balance and Components:**

Balance is the ability to maintain equilibrium and stability during static and dynamic activities. It relies on sensory input from the visual, vestibular, and proprioceptive systems. The components of balance include:

- Visual Input: Information from the eyes about the body's position in relation to the environment.
- Vestibular Input: Information from the inner ear's vestibular system, which detects changes in head position and movement.
- Proprioceptive Input: Sensations from muscles, joints, and tendons that provide information about body position and movement.

- Muscular Control: Activation of muscles to adjust posture and maintain balance.
- Central Processing: Integration of sensory input and motor responses by the central nervous system to maintain equilibrium.
- Anticipatory Postural Control: Ability to prepare the body for expected disturbances or movements.
- Reactive Postural Control: Ability to adjust to unexpected disturbances.
- Maintaining balance is a complex process involving the coordination of multiple systems to prevent falls and ensure efficient movement.

**20. Technique of Strengthening the Biceps Brachii from Grade 1 to Grade 5:**

Strengthening exercises for the biceps brachii can be progressed from grade 1 to grade 5 to accommodate different levels of strength and rehabilitation needs:

- Grade 1: Isometric Contraction (Static Hold): With the elbow bent at 90 degrees, press the palm against a solid surface (e.g., wall) for 5-10 seconds. This activates the biceps isometrically without joint movement.
- Grade 2: Isotonic Contraction (Active Movement): Perform bicep curls with a light resistance band or weight. Slowly flex and extend the elbow while controlling the movement.
- Grade 3: Isotonic Against Gravity (Active Movement Against Gravity): Perform bicep curls against gravity, using a heavier weight or resistance band.
- Grade 4: Isotonic Against Gravity and Resistance (Active Movement Against Gravity with Resistance): Combine bicep curls with a significant resistance load to further challenge muscle strength.
- Grade 5: Isotonic Against Gravity and Maximal Resistance (Active Movement Against Gravity with Maximal Resistance): Use the heaviest weight or resistance band that can be safely managed to maximize biceps strength.

**21. Classification of Strengthening Exercises and Progressive Resisted Exercise:**

Classification of Strengthening Exercises: Strengthening exercises can be classified into different categories based on their nature and equipment used:

- Isometric Exercises: Muscle contraction without joint movement (e.g., pushing against an immovable object).
- Isotonic Exercises: Muscle contraction with joint movement, divided into concentric (muscle shortening) and eccentric (muscle lengthening) phases.
- Isokinetic Exercises: Muscle contraction at a constant speed against variable resistance, often using specialized equipment.
- Progressive Resisted Exercise:

Progressive resisted exercise is a method of increasing resistance over time to continually challenge and improve muscle strength. This progression can occur through: Increasing the weight or resistance level, Modifying the number of repetitions and sets, Adjusting the speed of movement, Varying the exercise technique.

**22. Principles, Types, and Uses of Goniometry:**

Principles of Goniometry: Goniometry is the measurement of joint angles using a device called a goniometer. The principles of goniometry involve accurate measurement techniques, proper alignment of the goniometer, and consistency in positioning. The goniometer should be placed along the axis of the joint being measured, with its arms aligned along the segments of the body. Goniometric measurements are essential for assessing joint range of motion (ROM) and tracking progress during rehabilitation or therapeutic interventions.

❖ Types of Goniometry:

- Universal Goniometer: Consists of a protractor-like scale with two arms that can be aligned along the segments of the body to measure joint angles.
- Digital Goniometer: Utilizes electronic sensors to measure joint angles and provides digital readouts for accuracy.
- Gravity Inclinometer: Measures angles using gravity as a reference, often used for spine and postural assessments.

❖ Uses of Goniometry:

- Assessment: Goniometry is used to quantify joint ROM and identify limitations or abnormalities in joint movement.

- Diagnosis: It aids in diagnosing musculoskeletal conditions, such as joint stiffness, contractures, or joint instability.
- Rehabilitation: Goniometry is crucial for designing personalized rehabilitation programs and tracking progress in patients recovering from injuries or surgeries.
- Research: Goniometric measurements are used in research studies to investigate joint biomechanics, compare interventions, and analyze functional outcomes.

**23. Definition of Balance, Two Tests, and Treatment for Balance Retraining:**

Balance refers to the ability to maintain equilibrium and stability while performing static or dynamic activities. It relies on sensory input from the visual, vestibular, and proprioceptive systems, along with central processing and muscular control.

❖ Two Tests of Balance:

- Romberg Test: The patient stands with feet together and eyes closed. This test assesses the ability to maintain balance without visual input.
- Berg Balance Scale: A standardized test that evaluates functional balance and mobility by assessing various tasks like sitting, standing, and reaching.

❖ Treatment for Balance Retraining:

Balance retraining for patients with balance dysfunction involves targeted interventions to improve stability and prevent falls. Treatment strategies may include:

- Proprioceptive and Vestibular Exercises: Activities that challenge the proprioceptive and vestibular systems to improve sensory integration and postural control.
- Strength Training: Strengthening the muscles involved in postural control to enhance stability.
- Dynamic Balance Activities: Exercises that replicate real-world situations, such as walking on uneven surfaces or performing movements that challenge balance.
- Gait Training: Focusing on proper walking patterns and transitions to improve overall functional mobility.
- Dual-Task Training: Combining balance exercises with cognitive tasks to enhance multitasking skills.

## 24. Suspension Therapy: Principles, Types, and Uses:

Suspension therapy involves exercises performed while the body is partially suspended or supported by straps, ropes, or slings. It uses body weight and gravity as resistance to engage multiple muscle groups. The principles of suspension therapy include leveraging body position to control intensity, incorporating instability for core activation, and adjusting angles to target different muscle groups.

❖ Types of Suspension Therapy:

- TRX (Total Resistance eXercise): Utilizes a suspension trainer to perform various exercises targeting strength, flexibility, and stability.
- Aerial Yoga: Combines yoga poses with a suspended fabric hammock, promoting flexibility, strength, and decompression of the spine.
- Sling Training: Involves performing exercises using a sling or suspension system, emphasizing functional movements and body control.

❖ Uses of Suspension Therapy:

- Strength Training: Suspension exercises engage multiple muscle groups simultaneously, promoting functional strength.
- Core Activation: Instability requires core muscles to stabilize the body, enhancing core strength and stability.
- Flexibility: Suspension therapy can facilitate passive and active stretching, improving flexibility.
- Balance and Coordination: Exercises challenge proprioception and balance control, enhancing overall stability.
- Rehabilitation: Suspension therapy can be used in rehabilitation settings to gradually build strength and mobility.

## 25. Posture: Types, Kinetics and Kinematics, and Postural Control Mechanism:

❖ Types of Posture:

- Static Posture: The alignment and positioning of the body while at rest.
- Dynamic Posture: The alignment and control of the body during movement or activity.

❖ Kinetics and Kinematics in Posture:

- Kinetics: Focuses on the forces acting on the body during postural changes.
- Kinematics: Examines the joint movements, angles, and range of motion during postural adjustments.

❖ Postural Control Mechanism:

Postural control involves integrating sensory input from the visual, vestibular, and proprioceptive systems to maintain equilibrium. The central nervous system processes this information and activates appropriate muscular responses to adjust posture and prevent falls.

**26. Postural Mechanisms, Principles, and Techniques of Postural Re-Education:**

❖ Postural Mechanisms:

- Anticipatory Postural Control: Preparing the body for expected perturbations or movements based on sensory input.
- Reactive Postural Control: Adjusting the body in response to unexpected disturbances or shifts in equilibrium.

❖ Principles of Postural Re-Education:

- Individualization: Tailoring interventions to the patient's specific postural deficits and needs.
- Progression: Gradually increasing the complexity and challenge of exercises to promote improvement.
- Feedback: Providing real-time feedback to the patient about posture and movement.
- Motor Learning: Incorporating repetition and practice to reinforce new postural habits.

❖ Techniques of Postural Re-Education:

- Mirror Feedback: Using mirrors to help patients visualize their posture and make corrections.
- Proprioceptive Exercises: Engaging exercises that challenge proprioception and enhance postural awareness.

- Core Strengthening: Focusing on strengthening core muscles to provide a stable base for optimal posture.
- Stretching Exercises: Addressing tight muscles that contribute to poor posture.
- Ergonomic Education: Providing guidance on proper posture during daily activities.

**27. Active Movement and Classification:**

Active movement refers to the motion produced by an individual's own muscles, without any external assistance. It signifies the ability to control one's body through voluntary muscle contractions. Active movements are integral for daily activities and functional independence. They can be classified into two main categories:

- Active Assisted Movements: These are movements in which an individual requires some external assistance to complete the motion. The assistance can be in the form of a therapist's guidance, use of devices, or body weight support.
- Active Free Movements: These are voluntary movements performed by an individual without any external assistance. The individual initiates and completes the motion using their own muscle strength.

Active movements play a crucial role in rehabilitation and maintaining joint health. They help prevent muscle atrophy, improve joint mobility, enhance muscle strength, and contribute to overall functional capacity.

**28. Levers, Orders, and Application in Physiotherapy:**

Levers are simple mechanical devices that consist of a rigid bar (bone), a pivot point (joint), and applied force (muscle contraction). They are essential in various movements within the body and find wide applications in physiotherapy. Levers are categorized into three classes based on the relative positions of the pivot point, applied force, and resistance:

- First-Class Levers: The pivot point is situated between the applied force and the resistance. Examples include the neck when lifting the head off a pillow.
- Second-Class Levers: The resistance is located between the pivot point and the applied force. An example is the calf muscles (gastrocnemius) when rising onto the toes.

- Third-Class Levers: The applied force is exerted between the pivot point and the resistance. The biceps brachii when flexing the forearm at the elbow is an example.

### 29. Hydrotherapy: Principles, Indications, Contraindications, Procedure, and Effects:

Hydrotherapy is a therapeutic approach that utilizes water in various forms, temperatures, and pressures to promote healing and improve overall well-being. Its principles are based on the unique properties of water, including buoyancy, hydrostatic pressure, and temperature regulation. Hydrotherapy can be administered through techniques such as immersion, whirlpool baths, contrast baths, and underwater exercises.

Indications for hydrotherapy include musculoskeletal conditions, pain management, wound healing, and relaxation. However, certain contraindications must be considered, including cardiovascular issues, open wounds, and infectious skin conditions.

The procedure involves carefully selecting the appropriate water temperature, duration, and technique based on the individual's needs. Hydrotherapy can lead to physiological effects such as improved blood circulation, muscle relaxation, reduced joint inflammation, and increased metabolism. It also offers therapeutic effects, including pain relief, enhanced mobility, stress reduction, and improved sleep quality.

### 30. Posture, Factors, and Postural Donations:

Posture refers to the alignment and positioning of the body in relation to gravity and external environment. Maintaining good posture is vital for overall health and well-being. Various factors influence posture, including:

- Muscle Strength and Imbalance: Weak or imbalanced muscles can lead to poor posture.
- Habitual Positions: Frequent activities and positions can shape posture over time.
- Ergonomics: Improper workplace setup can contribute to poor posture.
- Structural Factors: Anatomical variations or medical conditions can impact posture.

Postural donations refer to practices that enhance posture and body alignment. These include ergonomic adjustments, regular breaks during prolonged sitting, proper footwear, core-strengthening exercises, and mindfulness of body alignment during daily activities.

Maintaining good posture reduces the risk of musculoskeletal issues and supports optimal physiological function.

### 31. Techniques of General and Local Relaxation:

General relaxation techniques aim to reduce overall muscle tension and induce a state of relaxation throughout the body. Techniques include:

- Progressive Muscle Relaxation: Involves tensing and relaxing muscle groups systematically.
- Deep Breathing: Focuses on slow, deep breaths to promote relaxation.
- Guided Imagery: Using mental imagery to create a calm and peaceful environment.

Local relaxation techniques target specific muscle groups or areas. These include:

- Massage: Manipulating soft tissues to alleviate tension and promote relaxation.
- Stretching: Gentle stretching of muscles to release tightness and improve flexibility.
- Heat Therapy: Applying heat to muscles to relax and increase blood flow.

### 32. Lever in Physiotherapy: Types and Uses:

Lever is a simple mechanical device consisting of a rigid bar, a pivot point (fulcrum), applied force (effort), and a resistance. Levers are crucial in physiotherapy for analyzing movement and optimizing exercises. There are three types of levers:

- First-Class Levers: The fulcrum is positioned between the effort and the resistance. Examples in physiotherapy include neck extension exercises.
- Second-Class Levers: The resistance is between the fulcrum and the effort. An example is the calf muscles during heel raise exercises.
- Third-Class Levers: The effort is applied between the fulcrum and the resistance. The biceps during elbow flexion exercises are a common example.

❖ Uses in Physiotherapy:

Levers help therapists understand biomechanics, design exercises, and apply optimal force for rehabilitation. They are utilized in exercises to maximize muscle engagement, joint stability, and functional movement patterns.

**33. Physiological and Therapeutic Effects of Free Exercises:**

Free exercises are movements performed without external resistance, often using body weight. They have significant physiological and therapeutic effects:

- ❖ Physiological Effects:
  - Muscular Strength and Endurance: Free exercises engage multiple muscle groups, promoting strength and endurance development.
  - Joint Mobility: Dynamic movements enhance joint flexibility and range of motion.
  - Cardiovascular Fitness: Free exercises with moderate intensity contribute to cardiovascular conditioning.
  - Neuromuscular Coordination: Complex movements improve coordination and motor skills.
  - Bone Health: Weight-bearing free exercises support bone density and health.
- ❖ Therapeutic Effects:
  - Rehabilitation: Free exercises are used in various rehabilitation programs to restore function after injuries or surgeries.
  - Functional Training: Mimicking real-life movements enhances the ability to perform daily activities.
  - Injury Prevention: Strengthening and conditioning muscles reduces the risk of injuries.
  - Holistic Well-being: Free exercises release endorphins, promoting mental and emotional well-being.

**34. Posture and Postural Reflex Mechanism:**

Posture is the alignment of the body in relation to gravity and external forces. The postural reflex mechanism involves sensory input, central processing, and motor responses to maintain balance and posture. It includes three primary components:

- Visual Input: Information from the eyes helps in spatial orientation and adjusting posture.
- Vestibular Input: The inner ear detects changes in head position and movement.
- Proprioceptive Input: Sensations from muscles, joints, and tendons provide information about body position.

The central nervous system processes these inputs and generates motor responses to maintain an upright and stable posture. This reflex mechanism is essential for everyday activities and movements.

**35. Group Exercise: Types, Advantages:**

Group exercise refers to fitness or physical activity sessions conducted in a group setting led by an instructor. There are various types of group exercise:

- Aerobics: Choreographed movements to music, promoting cardiovascular fitness.
- Yoga: Combines postures, breathing, and relaxation techniques for holistic well-being.
- Zumba: Dance-inspired workout routines that enhance cardiovascular health.
- Pilates: Focuses on core strength, flexibility, and balance.
- Cycling Classes: Indoor cycling sessions that improve cardiovascular endurance.

❖ Advantages of Group Exercise:

- Motivation: Group dynamics and instructor encouragement boost motivation.
- Social Interaction: Provides a sense of community and social engagement.
- Structured Workouts: Instructors lead organized routines for efficient workouts.
- Variety: Various class types cater to different preferences and fitness levels.
- Accountability: Group members hold each other accountable for attendance and effort.

**36. Proprioceptive Neuromuscular Facilitation (PNF) and Repeated Contractions:**

Proprioceptive Neuromuscular Facilitation (PNF) is an approach that uses patterns of movement and sensory input to improve neuromuscular function. Repeated contractions are a PNF technique involving the rhythmic contraction and relaxation of muscles.

❖ Applications and Effects of Repeated Contractions:

- Muscle Relaxation: Repeated contractions can reduce muscle tension and promote relaxation.
- Pain Management: The technique can alleviate muscle soreness and discomfort.
- Range of Motion: It can enhance joint mobility and flexibility.
- Neuromuscular Re-Education: Repeated contractions improve muscle activation and coordination.
- Muscle Endurance: Regular practice increases muscle endurance.

**37. Hydrotherapy: Indications, Precautions, Effects, and Uses:**

Hydrotherapy involves using water in various forms and temperatures for therapeutic purposes. It includes immersion, hydrostatic pressure, and buoyancy effects. Indications include musculoskeletal pain, post-surgery rehabilitation, and stress relief. Precautions involve monitoring water temperature and individual's medical conditions. Effects include improved circulation, muscle relaxation, pain reduction, and psychological relaxation. Uses range from wound healing to arthritis management and sports rehabilitation.

**38. Principles of Aerobic Exercise Training and Effects on Body Systems:**

The principles of aerobic exercise training include frequency, intensity, duration, mode, progression, and individualization. Effects on the body systems include improved cardiovascular fitness, increased lung capacity, enhanced muscle endurance, metabolic improvements, better weight management, strengthened immune system, and enhanced mood and cognitive function.

**39. Principles and Grades of Mobilization, Mobilization Techniques for Shoulder Joint:**

Principles of mobilization involve applying controlled passive movements to joints to improve mobility. Grades range from I (small amplitude) to IV (large amplitude with joint play). For the shoulder joint, techniques include glenohumeral distraction, joint glides, and scapular mobilizations, aiming to increase range of motion, reduce pain, and improve joint function.

**40. Stretching and Procedure for Hamstring Muscles:**

Stretching is the deliberate lengthening of muscles to increase flexibility and range of motion. For hamstring muscles, the procedure involves:

- Lie on your back, with one leg extended and the other leg bent.
- Slowly raise the extended leg while keeping the knee straight.
- Use a strap or your hands to gently pull the raised leg towards you.
- Hold the stretch for 15-30 seconds.
- Repeat on the other leg.

**41. Preparing a Below Knee Amputee for Crutch Walking:**

To prepare a below knee amputee for crutch walking:

- Ensure residual limb healing is complete.
- Assess overall physical condition and prosthetic readiness.
- Teach proper donning and doffing of the prosthetic limb.
- Train on weight-bearing and balance with the prosthesis.
- Teach proper crutch positioning and gait pattern.
- Practice crutch walking with gradual progression to build confidence and strength.

**42. Principles of Joint Goniometry, Types of Goniometers, Normal Hip Joint Range of Motion:**

Principles of joint goniometry involve accurate placement, alignment, and axis alignment of the goniometer to measure joint angles. Types include universal, digital, and gravity inclinometer goniometers. Normal range of motion at the hip joint:

- Flexion: 0-120 degrees
- Extension: 0-30 degrees
- Abduction: 0-45 degrees
- Adduction: 0-30 degrees

- Internal Rotation: 0-45 degrees
- External Rotation: 0-45 degrees

**43. Basic Neurophysiologic Principles of PNF, Rhythmic Initiation Technique:**

Proprioceptive Neuromuscular Facilitation (PNF) principles involve the stimulation of proprioceptors, reciprocal inhibition, and irradiation. Rhythmic initiation technique involves initiating passive movement, progressing to active-assisted, and then active movements. It enhances neuromuscular coordination, proprioception, and movement control.

**44. Principles, Grades, Indications, Contraindications, Effects, and Uses of Mobilization:**

Mobilization principles involve controlled joint movement to improve mobility and reduce pain. Grades range from I (small amplitude) to IV (large amplitude with joint play). Indications include joint stiffness and pain. Contraindications involve acute inflammation or joint instability. Effects include pain reduction, increased range of motion, and improved joint function. Uses include physical therapy and rehabilitation.

**45. Jacobson's Relaxation, Conditions for General Relaxation, Support Providing Relaxation:**

Jacobson's Relaxation is a technique involving progressive muscle relaxation to achieve a state of deep relaxation. Conditions for general relaxation include a quiet environment, comfortable clothing, and mental focus. Support for relaxation involves pillows, bolsters, and blankets. Diagrams can illustrate proper positioning for relaxation in supine, prone, and side-lying positions.

**46. Basic Functional Activities Trained on the Mat, Rolling Procedure, Purposes, and Uses:**

Basic functional activities on the mat include rolling, sitting, crawling, and transitioning. Rolling procedure:

- Lie supine, arms extended.
- Flex hips and knees, rotate head towards one side.
- Push off with feet and hands, rolling onto side.

- Continue rolling to prone or opposite side.

Purposes of rolling include improving coordination, mobility, and vestibular stimulation. It's used in neurological and developmental therapies. Diagrams can depict the rolling sequence.

**47. Causes of Decreased Muscle Performance, Principles of Training for Muscle Improvement:**

Causes of decreased muscle performance include disuse, aging, injury, and neurological conditions. Principles for training to improve muscle performance include specificity, overload, progression, individualization, and reversibility. Targeted exercises, progressive resistance, and proper rest are essential.

**48. Posture, Common Deviations, Corrective Measures for Kyphotic Posture:**

Posture is the alignment of the body in relation to gravity. Common deviations include kyphotic posture with rounded upper back. Corrective measures involve:

- Strengthening back extensors.
- Stretching chest muscles.
- Practicing shoulder retraction exercises.
- Ergonomic adjustments.
- Conscious postural awareness.

**49. Principles of Suspension Therapy, Technique for Shoulder Internal and External Rotation:**

Principles of suspension therapy involve using body weight and gravity.

❖ For shoulder internal rotation:

- Attach the suspension trainer at waist height.
- Stand facing the anchor point, holding the straps.
- Move the shoulder joint inwards against the resistance.

❖ For shoulder external rotation:

- Face away from the anchor point.
- Hold straps with arms bent at 90 degrees.

- Rotate arms outwards against resistance.

**50. Techniques Used in Massage, Therapeutic Effects for Each:**

Massage techniques include effleurage, petrissage, tapotement, friction, and kneading. Effleurage promotes relaxation and blood flow. Petrissage improves tissue mobility and reduces muscle tension. Tapotement stimulates nerves and muscles. Friction breaks down scar tissue. Kneading reduces muscle knots and improves circulation.

**51. Principles and Types of Walking Aids:**

Walking aids assist individuals with mobility challenges. Principles involve stability, safety, and proper fit. Types include:

- Crutches: Underarm or forearm, used for temporary support.
- Canes: Single-point or quad-based, for balance assistance.
- Walkers: Standard, two-wheeled, or rollator, providing more stability.
- Wheelchairs: Manual or powered, for those with significant mobility limitations.

**52. Massage Definition, Techniques, and Therapeutic Effects:**

Massage is a manual therapy involving the manipulation of soft tissues for relaxation, pain relief, and improved circulation. Techniques include:

- Effleurage: Promotes relaxation and circulation.
- Petrissage: Increases tissue mobility and reduces tension.
- Tapotement: Stimulates nerves and muscles.
- Friction: Breaks down scar tissue and adhesions.
- Kneading: Reduces muscle knots and enhances blood flow.

**53. Group Exercises: Merits, Demerits, and Organization:**

Group exercises are fitness sessions conducted in a group setting. Merits include motivation, social interaction, and structured workouts. Demerits can include limited individualization and risk of injury. Organization involves scheduling, choosing appropriate exercises, and catering to diverse fitness levels.

### 54. Factors Predisposing to Poor Posture, Postural Re-Education, and Patient Education:

Factors include muscle weakness, habit, ergonomic factors, and spinal conditions. Postural re-education involves exercises, awareness, and ergonomic adjustments. Patient education emphasizes proper alignment during daily activities and reinforces good posture habits.

### 55. Principles, Indications, and Limitations of Manual Muscle Testing:

Manual muscle testing evaluates muscle strength and function. Principles involve proper positioning and resistance application. Indications include assessing strength deficits. Limitations can include subjective evaluator bias and inability to isolate specific muscles.

### 56. Causes of Immobility, Effects, and Uses of Passive Movements:

Causes include injury, illness, and bed rest. Effects of immobility include muscle atrophy, joint stiffness, and reduced circulation. Passive movements are used to maintain joint mobility, prevent contractures, and improve circulation in immobilized patients.

### 57. Passive Movements Definition, Uses, Principles, and Limitations:

Passive movements involve moving a joint without active muscle contraction. Uses include preventing stiffness, improving circulation, and maintaining joint range of motion. Principles involve proper technique and avoiding pain. Limitations can include discomfort and the need for caution in certain conditions.

## SHORT ESSAY

### 1. Measuring Supination and Pronation with a Goniometer:

To measure supination and pronation:

Place the goniometer's center axis over the longitudinal axis of the forearm.

Align the stationary arm with the ulnar styloid and the movable arm with the head of the ulna.

Ask the person to move their forearm from palm down (pronation) to palm up (supination).

Read the goniometer to determine the range of motion.

**2. Ranges of Muscle Work with Examples:**

Muscle work ranges:

- Isometric: No change in muscle length (e.g., planking).
- Concentric: Muscle shortens (e.g., bicep curl lifting a weight).
- Eccentric: Muscle lengthens (e.g., lowering a weight during bicep curl).

**3. Technique of Petrissage:**

Petrissage is a massage technique involving kneading, lifting, and squeezing of soft tissues. Therapists use their hands and fingers to rhythmically lift and compress muscles and skin.

**4. Derived Positions in Kneeling:**

- Kneeling-lying: Kneel and lean back to sit on heels.
- Kneeling-sitting: Sit on heels with trunk upright.
- Kneeling half-kneel: One knee on the ground, the other foot flat on the floor.

**5. Methods for Improving Standing Balance:**

- Static Balance: Standing still.
- Dynamic Balance: Shifting weight, reaching, and turning.
- Balance Training: Standing on one leg, using balance discs, or unstable surfaces.

**6. Examples of Free Exercises for Spinal Extensors with Diagrams:**

- Superman Pose: Lie prone, lift arms and legs off the ground.
- Cobra Pose: Lie prone, lift chest off the ground while keeping hips down.

**7. Yoga and Basic Principles:**

Yoga is a mind-body practice involving physical postures, breath control, and meditation. Basic principles include proper breathing, mindfulness, flexibility, strength, and balance.

**8. Close Kinetic Chain Exercises for Shoulder:**

- Push-Ups: Hands on the ground, push body up.
- Dips: Hands on parallel bars, lift body up and down.

- Wall Push-Ups: Hands on a wall, push body towards the wall.

**9. Hydrotherapy and Its Principle:**

Hydrotherapy uses water for therapeutic purposes. Principle: Water's properties (buoyancy, hydrostatic pressure, temperature) influence circulation, relaxation, and pain relief.

**10. Factors Predisposing to Poor Postures:**

Factors include muscle weakness, poor ergonomics, prolonged sitting, incorrect lifting techniques, and spinal conditions.

**11. Indications and Principles for Resisted Exercises:**

Indications: Strengthening specific muscle groups. Principles: Progressive resistance, proper form, targeting specific muscles.

**12. Physiological Uses of Massage:**

- Increases blood circulation.
- Enhances lymphatic drainage.
- Reduces muscle tension and soreness.
- Promotes relaxation and stress relief.

**13. Muscle Testing Techniques for Shoulder Extensors:**

Patient resists while the examiner applies force.

Gravity eliminated: Prone, arm off the table, elbow bent at 90 degrees.

Resistance applied in the direction of shoulder extension.

**14. Circuit Training:**

Circuit training involves a series of exercises performed in sequence with minimal rest between them. It combines cardiovascular and strength training.

**15. Starting Positions and Their Uses:**

Starting positions are fundamental poses for exercises. They establish body alignment and provide a base for movement. Examples include supine, prone, sitting, and standing positions.

**16. Static and Dynamic Power Tests:**

- Static Power Tests: Measure maximal force against an immovable object (e.g., isometric handgrip test).
- Dynamic Power Tests: Measure power during dynamic movements (e.g., vertical jump test).

**17. Coordination Tests:**

Coordination tests assess an individual's ability to perform precise movements with proper timing and sequencing. Examples include finger-to-nose test, heel-to-shin test.

**18. Pulmonary Function Test (PFT) and Its Importance:**

PFT measures lung capacity and function. It helps diagnose lung conditions, assess lung disease severity, and monitor treatment effectiveness.

**19. Jacobson's Relaxation Technique:**

Jacobson's technique involves progressive muscle relaxation to achieve deep physical and mental relaxation.

**20. Uses and Limitations of Goniometry:**

- Uses: Measures joint range of motion, evaluates progress in rehabilitation.
- Limitations: Depends on patient effort, limited to joint motion in a specific plane.

**21. Free Exercises: Types and Uses:**

Free exercises are movements performed without external resistance. They promote overall fitness, flexibility, and functional capacity. Types of free exercises include

Bodyweight Exercises: Push-ups, squats, lunges.

Yoga and Pilates: Enhance flexibility and core strength.

Calisthenics: Dynamic movements like jumping jacks and burpees.

Free exercises are versatile and can be adapted for various fitness levels and goals, making them suitable for general fitness, rehabilitation, and sports training.

**22. Resisted Exercises: Principles and Uses:**

Resisted exercises involve adding external resistance to movements. Principles include progressive overload and targeting specific muscle groups. They are used for:

Strength Training: Building muscle mass and strength.

Rehabilitation: Restoring muscle function after injury.

Sports Performance: Enhancing power and muscular endurance.

Resisted exercises can be done using weights, resistance bands, or body weight.

**23. Functional Re-Education and Mat Activities:**

Functional re-education aims to restore functional movement patterns. Mat activities involve exercises performed on the floor, such as rolling, crawling, and transitioning between positions. These activities simulate real-life movements, improve coordination, and promote muscle activation.

**24. Grades of Mobilization:**

Grades of mobilization range from I (small amplitude) to IV (large amplitude with joint play). They guide joint manipulation techniques used by physical therapists to improve joint mobility, reduce pain, and restore proper function.

**25. Closed-Chain Exercise: Effects and Examples:**

Closed-chain exercises involve the distal segment being fixed, and movement occurs at the proximal joint. Effects include joint stability, muscle activation, and functional improvement. Examples are squats and push-ups.

**26. Isotonic Exercises:**

Isotonic exercises involve muscle contraction with constant tension. They are categorized into concentric (shortening) and eccentric (lengthening) contractions. Isotonic exercises improve muscle strength, endurance, and coordination.

**27. Anthropometry and Its Uses:**

Anthropometry measures human body dimensions. It is used in various fields such as health assessment, ergonomic design, clothing industry, and sports performance analysis.

### 28. Principles and Uses of Passive Movements:

Passive movements are externally applied movements to a joint. Principles include proper technique and avoiding pain. Uses include maintaining joint range of motion, preventing contractures, and improving circulation.

### 29. Manual Muscle Testing for Deltoid Muscle:

Manual muscle testing for the deltoid muscle involves assessing its strength by applying resistance during abduction of the arm. It helps evaluate muscle function and detect weaknesses.

### 30. Tests for Sensation:

Sensation tests assess the nervous system's ability to detect stimuli. Examples include light touch, temperature, and vibration tests. These tests aid in diagnosing neurological conditions and monitoring nerve function.

### 31. Classification of Passive Movements:

Passive movements are categorized into two types based on the level of control and involvement of the patient:

- Assisted Passive Movements: The patient is involved to some extent in the movement with external assistance.
- True Passive Movements: The patient remains completely relaxed while an external force moves the joint.

### 32. Open Chain and Closed Chain Exercises:

Open chain exercises involve movement where the distal segment is free (e.g., leg extension using a machine). Closed chain exercises involve movement where the distal segment is fixed (e.g., squat). Closed chain exercises offer better joint stability and functional application.

### 33. Suspension Therapy Technique for Knee Flexion and Extension:

❖ For knee flexion:

- Attach suspension straps to a stable anchor point
- Place foot in the straps.

- Flex knee by pulling foot towards hips.

❖ For knee extension:

- Extend the leg by pushing foot away from hips.

**34. Use and Progression of Frenkel's Exercises:**

Frenkel's exercises are used for neurological rehabilitation. They involve repetitive, precise, and controlled movements. Progression includes increasing speed, complexity, and resistance to improve neuromuscular coordination and function.

**35. Merits and Demerits of Hydrotherapy:**

❖ Merits:

- Reduces joint stress
- Enhances circulation.
- Supports relaxation and pain relief.
- Facilitates exercises with reduced weight-bearing.

❖ Demerits:

- Requires access to appropriate facilities.
- Limited therapeutic effects for some conditions.
- Safety concerns for certain populations.

**36. Mat Exercises:**

Mat exercises are performed on the floor and are beneficial for core strength, flexibility, and functional movements. Examples include crunches, bridges, planks, and leg raises.

**37. Indications and Contraindications of Joint Mobilization:**

Indications: Joint stiffness, reduced range of motion, pain, joint hypomobility. Contraindications: Acute inflammation, joint instability, fractures, certain medical conditions.

**38. Principles and Technique of Free Exercises:**

Principles: Specificity, overload, progression, individualization. Technique: Perform movements using body weight or minimal equipment, focusing on proper form and full range of motion.

### 39. Evaluation of Aerobic Capacity:

Aerobic capacity can be evaluated through tests like the VO2 max test where an individual's maximal oxygen consumption is measured during intense exercise. Other methods include the Cooper 12-minute run or the submaximal exercise tests.

### 40. Goniometric Measurement for Ankle Joint:

For ankle joint measurement:

- Place the goniometer axis over the lateral malleolus.
- Align the stationary arm with the fibula and the movable arm with the fifth metatarsal.
- Measure dorsiflexion and plantarflexion ranges of motion.

### 41. Concentric and Eccentric Exercise with Examples:

Concentric exercise involves muscle contraction while it shortens (e.g., lifting a weight during bicep curl). Eccentric exercise involves contraction while the muscle lengthens (e.g., lowering the weight during bicep curl). Both types are important for muscle strength, control, and injury prevention.

### 42. Angle of Pelvic Inclination:

The angle of pelvic inclination is the angle between the pelvic plane and the horizontal plane. It reflects the tilting of the pelvis. Anterior pelvic tilt involves the pelvis tilting forward, while posterior tilt involves tilting backward. The angle affects spinal curvature and posture.

### 43. Limb Length Measurement:

Limb length measurement involves measuring the distance between bony landmarks. For upper limbs, measure from the acromion to the tip of the middle finger. For lower limbs, measure from the anterior superior iliac spine to the medial malleolus.

### 44. Techniques of Massage Manipulation:

Massage manipulation techniques include:

Effleurage: Long strokes for relaxation and circulation.

Petrissage: Kneading for tissue mobility and tension reduction.

Tapotement: Rhythmic tapping for stimulation.

Friction: Circular pressure to break scar tissue.

Vibration: Oscillating movement for relaxation.

**45. Mulligan Technique of Joint Mobilization:**

Mulligan technique combines manual therapy with active movement. It involves using accessory glides to improve joint mechanics and reduce pain. Patients perform pain-free movements while the therapist provides joint mobilization.

**46. Principles and Techniques of Hydrotherapy:**

Principles: Water temperature, buoyancy, and hydrostatic pressure influence therapeutic effects. Techniques: Immersion, whirlpools, contrast baths, steam baths, and aquatic exercises. Hydrotherapy is used for pain relief, relaxation, and rehabilitation.

**47. Incoordination and Non-Equilibrium Tests of Coordination:**

Incoordination refers to the inability to perform smooth and accurate movements due to impaired neuromuscular control. Non-equilibrium tests of coordination assess coordination during dynamic movements. Examples include finger-to-nose test and alternate finger tapping.

**48. Pulmonary Function Tests:**

Pulmonary Function Tests (PFTs) assess lung function and capacity. They include spirometry, which measures lung volumes and airflow rates. PFTs help diagnose respiratory conditions, monitor disease progression, and assess treatment effectiveness.

**49. Technique of Strengthening Elbow Flexors (Grade 1 to 3):**

Grade 1: Isometric contraction without movement.

Grade 2: Active-assisted movement with minimal resistance.

Grade 3: Active movement against gravity with moderate resistance.

**50. Dynamic Power Test:**

Dynamic power test assesses muscle power during dynamic movements. An example is the vertical jump test, where an individual jumps as high as possible, measuring explosive lower limb power.

## 51. Mitchel's Technique of Relaxation:

Mitchel's technique of relaxation is a therapeutic approach designed to release muscular tension and induce a state of deep relaxation. It involves a systematic process of tensing and then relaxing specific muscle groups. This technique aims to increase awareness of bodily sensations, reduce stress, and promote relaxation.

## 52. Principles & Benefits of Asanas:

Asanas are yoga postures designed to promote physical, mental, and spiritual well-being. The principles of asanas involve proper alignment, balance, breathing, and mindfulness. Benefits include increased flexibility, improved strength, enhanced circulation, stress reduction, and better mental focus.

## 53. Functional Re-Education:

Functional re-education is a rehabilitation approach focused on restoring normal movement patterns and functional activities after injury or illness. It involves exercises and activities that mimic real-life tasks, promoting the integration of motor skills and enhancing overall functional capacity.

## 54. Principles of Goniometry & Technique of Measurement:

Goniometry is the measurement of joint angles. The principles involve proper patient positioning, alignment of goniometer with anatomical landmarks, and ensuring that measurements are taken in the correct planes. The technique involves using a goniometer, a specialized instrument, to measure the angles created by joint movement.

## 55. Principles of PNF (Proprioceptive Neuromuscular Facilitation):

PNF is a rehabilitation technique that involves patterns of movement and muscle contractions to improve flexibility, strength, and coordination. Its principles include the use of diagonal patterns, alternating contractions and relaxations, and combining active and resisted movements to enhance neuromuscular function.

## 56. Protocol for Re-Education of Muscle from Power 1 to 2:

The protocol involves progressive exercises to transition a muscle from a weak state (Power 1) to a slightly stronger state (Power 2). This could include exercises that start with low resistance and gradually increase over time, focusing on controlled movements, appropriate repetitions, and gradual intensity progression.

**57. Types of Breathing Exercises:**

Various types of breathing exercises include diaphragmatic breathing, pursed-lip breathing, deep belly breathing, and alternate nostril breathing. These exercises aim to improve lung capacity, reduce stress, enhance oxygen exchange, and promote relaxation.

**58. Hydrotherapy - Precautions and Contraindications:**

Hydrotherapy is a therapeutic approach using water for various treatments. Precautions involve ensuring proper water temperature, monitoring patients closely, and preventing slips. Contraindications include open wounds, skin infections, heart conditions, and some respiratory issues.

**59. Normal and Abnormal Responses to Acute Aerobic Exercise:**

Normal responses to acute aerobic exercise include increased heart rate, breathing rate, and blood flow to muscles. Abnormal responses might include excessive fatigue, dizziness, chest pain, or abnormal heart rhythms.

**60. Frenkel's Exercises for Lower Limb:**

Frenkel's exercises are a series of therapeutic exercises aimed at improving coordination and proprioception. For the lower limb, these exercises involve activities like tracing patterns on the floor, tapping toes in sequence, and various forms of controlled leg movements to enhance neuromuscular control.

**61. Principles, Methods, and Techniques of Pranayama:**

Pranayama is a crucial aspect of yoga involving breath control to enhance physical, mental, and spiritual well-being. Its principles include proper posture, awareness of breath, and gradual progression. Methods involve inhaling (puraka), exhaling (rechaka), and holding the breath (kumbhaka). Techniques like Anulom Vilom, Bhastrika, and Ujjayi focus on regulating breath patterns, increasing lung capacity, and calming the mind.

**62. Manual Muscle Testing (MMT) for Knee Flexors and Extensors:**

Manual Muscle Testing (MMT) assesses muscle strength. For knee flexors, the patient lies prone with the knee bent, and the examiner resists knee flexion. For knee extensors, the patient is supine with the leg extended, and the examiner resists knee extension. The examiner grades the strength based on the patient's ability to overcome resistance.

### 63. Passive Movements - Definition and Principles:

Passive movements are therapeutic techniques in which an external force moves a patient's joint through its range of motion without active muscle contraction. Passive movements help maintain joint mobility, prevent contractures, and improve circulation. Principles involve gentle and controlled motion, avoiding pain, and ensuring patient relaxation.

### 64. Therapeutic Gymnasium:

A therapeutic gymnasium is a controlled environment where rehabilitation professionals conduct exercises and activities tailored to individual patient needs. It includes equipment and exercises aimed at improving strength, flexibility, balance, coordination, and overall functional capacity.

### 65. Limitations of Goniometry:

Limitations of goniometry include:

- Subjectivity: Measurements can vary based on the examiner's technique.
- Muscle Tension: Muscles may restrict joint movement, leading to inaccurate measurements.
- Anatomical Variation: Differences in joint shape and size can affect measurements.
- Patient Cooperation: Patient discomfort or lack of cooperation can affect measurements.
- Joint Pathology: Conditions like swelling or pain can limit joint movement during measurement.

### 66. Stretching Technique for Hamstring Tightness:

To stretch tight hamstrings, a common technique involves the patient lying supine with one leg extended and the other raised, supported by a strap or the hands. The leg is raised until a gentle stretch is felt in the hamstrings. The stretch is held for about 20-30 seconds, repeated 3-4 times on each side.

### 67. Limb Length Measurement Technique for Upper Limb:

Limb length can be measured using a measuring tape or caliper. For the upper limb, measurements are taken from specific points like the acromion process to the tip of the middle finger. The arm is positioned alongside the body while the measurement is taken.

### 68. Types of Walking Aids and Their Uses:

Walking aids include canes, crutches, and walkers. Canes provide stability and support for mild balance issues. Crutches aid in weight-bearing for one or both legs. Walkers offer more extensive support for those with limited mobility or balance.

### 69. Passive Movements - Definition and Types:

Passive movements are techniques where an external force moves a joint without active muscle involvement. Types include:

- Pendulum Movements: Gentle swinging motions to increase joint mobility.
- Continuous Passive Motion (CPM): Machines that move a joint through a controlled range of motion.
- Sustained Stretch: Applying a steady force to maintain joint range.
- Joint Mobilizations: Skilled manual techniques by therapists to improve joint mobility.

### 70. Functional Reeducation and Stages from Lying to Sitting:

Functional reeducation is a rehabilitation process aimed at restoring and improving functional abilities after injury or illness. The stages from lying to sitting involve:

- Supine to Side-Lying: From lying on the back, the patient turns onto their side.
- Side-Lying to Sitting on Edge of Bed: Transition from side-lying to sitting at the edge of the bed.
- Sitting Up: Moving from the bed to a fully seated position.

These stages focus on improving core stability, coordination, and gradual weight-bearing, enabling patients to perform daily activities more independently.

### 71. Muscle Contraction Definition and Examples:

Muscle contraction is the process of generating force within muscle fibers. Examples include:

- Isometric Contraction: Muscle length remains unchanged, e.g., holding a static plank.

- Isotonic Contraction: Muscle length changes with constant tension, e.g., lifting weights.
- Eccentric Contraction: Muscle lengthens under tension, e.g., lowering a weight.
- Concentric Contraction: Muscle shortens while generating force, e.g., lifting a weight.

**72. Methods of Progressive Strength Training:**

Progressive strength training involves gradually increasing resistance to build muscle strength. Methods include:

- Linear Periodization: Gradually increasing weight and decreasing reps over time.
- Undulating Periodization: Varying intensity and volume within a training cycle.
- Pyramid Training: Gradually increasing and then decreasing weight within a set.
- Progressive Overload: Continuously increasing resistance to challenge muscles.

**73. ATP-PCr System during Exercise:**

The ATP-PCr (adenosine triphosphate-phosphocreatine) system is an immediate energy source during short bursts of high-intensity exercise. Creatine kinase facilitates the transfer of phosphate from PCr to ADP, regenerating ATP for rapid energy production. This system is efficient but limited to short-duration activities.

**74. Merits and Demerits of Hydrotherapy:**

Merits of hydrotherapy include pain relief, improved circulation, reduced muscle tension, and low-impact exercise. Demerits include infection risk, waterborne allergies, contraindications for certain conditions, and the need for specialized facilities.

**75. Progressive Resisted Exercise and Oxford Technique:**

Progressive resisted exercise involves gradually increasing resistance for muscle strengthening. The Oxford Technique uses a manual or mechanical device to provide resistance as the patient performs isotonic muscle contractions against it. It allows controlled and targeted resistance adjustments.

### 76. Goniometric Measurement for Ankle Joint:

To measure ankle joint range of motion using a goniometer, the axis is aligned with the lateral malleolus, the stationary arm with the fibula, and the moving arm with the fifth metatarsal. Dorsiflexion and plantarflexion angles are recorded.

### 77. Angle of Pelvic Inclination:

The angle of pelvic inclination is the angle between the line connecting the anterior superior iliac spines and a horizontal reference line. It reflects the tilt of the pelvis and can influence lumbar curvature and posture.

### 78. Types of Muscle Contraction with Examples:

- Isometric: Holding a yoga pose without movement.
- Isotonic Concentric: Lifting a dumbbell during a bicep curl.
- Isotonic Eccentric: Lowering the dumbbell during a bicep curl.
- Isokinetic: Using specialized equipment that maintains constant speed during contraction.

### 79. Methods of Postural Evaluation:

Methods include visual observation, plumb line assessment, digital analysis, and specialized tools like posture grids. These help identify postural imbalances, alignment issues, and areas of concern.

### 80. Effect of Immobilization on Musculoskeletal System:

Immobilization due to injury or medical conditions can lead to muscle atrophy, decreased bone density, joint stiffness, and loss of functional capacity. Rehabilitation and exercise are essential to counter these effects and promote recovery.

### 81. PNF Stretching:

PNF (Proprioceptive Neuromuscular Facilitation) stretching is a dynamic stretching technique used to increase flexibility and range of motion. It involves alternating contractions and relaxations of muscles. The two main methods are the Hold-Relax and Contract-Relax techniques. These involve a partner or resistance to enhance the stretch. PNF stretching

improves neuromuscular coordination, enhances muscle flexibility, and is commonly used in rehabilitation and sports training.

**82. Merits and Demerits of Continuous Passive Mobilization:**

Merits of continuous passive mobilization include improved joint nutrition, prevention of joint stiffness, and controlled range of motion. Demerits can include discomfort, joint overstretching, potential for joint injury, and limitations in addressing muscle strengthening.

**83. Role of Recreational Activities in Rehabilitation:**

Recreational activities offer psychological, social, and physical benefits during rehabilitation. They enhance motivation, boost self-esteem, provide a sense of achievement, and promote engagement with others. Activities like swimming, hiking, and group sports encourage movement and improve overall well-being.

**84. Coordination Evaluation:**

Coordination evaluation assesses a person's ability to perform controlled and purposeful movements. It involves testing balance, fine and gross motor skills, reaction time, and spatial awareness. Tests like the finger-to-nose test, tandem gait, and tapping exercises help identify coordination deficits.

**85. Muscle Re-education:**

Muscle re-education is a process of restoring normal muscle function and control after injury or surgery. It involves exercises that focus on improving muscle strength, coordination, and neuromuscular control. This helps patients regain proper movement patterns and function.

**86. Definition of Stretching and Physiological Effects:**

Stretching is the deliberate lengthening of muscles to improve flexibility and range of motion. Physiological effects of stretching include increased blood flow, improved muscle elasticity, reduced muscle tension, enhanced joint lubrication, and improved muscle coordination.

**87. Frenkel's Exercises and Their Uses:**

Frenkel's exercises are a series of exercises designed to improve coordination and proprioception. They involve performing specific movements with increasing complexity and

precision. These exercises are useful in neurological rehabilitation to address conditions like ataxia and loss of motor control.

**88. Postural Drainage:**

Postural drainage is a respiratory therapy technique used to help clear mucus from the lungs. It involves positioning the patient in specific postures to encourage mucus to move from smaller to larger airways, facilitating its removal. Indications include conditions like cystic fibrosis, bronchiectasis, and chronic obstructive pulmonary disease (COPD).

**89. Definition of Endurance and Types with Examples:**

Endurance is the ability of muscles to sustain activity over time. Types include:

Cardiovascular Endurance: The ability of the heart and lungs to supply oxygen during sustained aerobic activities, e.g., jogging.

Muscular Endurance: The ability of muscles to perform repetitive contractions without fatigue, e.g., push-ups.

**90. Muscle Work During Squatting:**

During squatting, multiple muscles are engaged:

Quadriceps: Extend the knee.

Hamstrings: Control knee flexion and hip extension.

Glutes: Assist in hip extension.

Erector Spinae: Stabilize the spine.

Core Muscles: Maintain trunk stability.

Calves: Assist in ankle plantarflexion.

Squatting engages these muscles synergistically to perform a coordinated movement.

**91. Grades of Mobilization:**

Mobilization is a therapeutic technique used in physical therapy to improve joint movement and alleviate pain. It involves skilled passive movements applied to joints and soft tissues by a therapist. The grades of mobilization categorize the intensity and amplitude of these movements. There are five commonly used grades:

- Grade I: This involves small-amplitude, oscillatory movements performed at the beginning of treatment. It aims to reduce pain, decrease muscle guarding, and initiate motion in a restricted joint. Grade I mobilizations are gentle and are typically performed within the patient's pain-free range of motion.
- Grade II: These mobilizations are also oscillatory but involve slightly larger amplitudes than Grade I. Grade II movements are used to improve joint play, increase joint lubrication, and target synovial fluid movement within the joint capsule. They are generally performed within the patient's available range of motion and can provide pain relief.
- Grade III: These mobilizations involve larger-amplitude, sustained movements that take the joint to its mid-range. Grade III movements target stretching the joint capsule, ligaments, and surrounding tissues. They can help improve joint play, increase range of motion, and address restrictions that may have developed in the joint.
- Grade IV: These mobilizations are high-velocity, low-amplitude thrusts aimed at improving joint play and restoring normal joint mechanics. Grade IV mobilizations are often used by manual therapists to address joint restrictions and restore normal function. They require careful assessment and precise execution by the therapist.
- Grade V: This grade involves manipulation, which is a high-velocity, low-amplitude thrust with the goal of achieving joint cavitation (the release of gas bubbles from the synovial fluid). Manipulation is usually reserved for joints that are severely restricted and unresponsive to other grades of mobilization. It requires advanced training and caution due to the potential risks involved.

**92. Rhythmic Stabilization and Rhythmic Initiation:**

Rhythmic stabilization and rhythmic initiation are techniques used in physical therapy to improve neuromuscular control, coordination, and range of motion.

Rhythmic Stabilization: This technique involves alternating isometric contractions of antagonist muscles around a joint. It's used to improve stability by promoting co-contraction and neuromuscular control. Rhythmic stabilization is particularly beneficial for patients with muscle imbalances, joint instability, or motor control issues.

Rhythmic Initiation: This technique involves progressing from passive to active movement in a systematic manner. The therapist initiates movement and guides the patient through the range of motion. This technique helps patients overcome movement hesitancy, improve coordination, and gain a sense of control over their movements.

### 93. Physiologic Changes During Aerobic Exercise:

Aerobic exercise, also known as cardiovascular or endurance exercise, involves activities that increase the heart rate and breathing rate over an extended period. This type of exercise induces several physiologic changes in the body:

Increased Heart Rate: Aerobic exercise raises the heart rate, leading to improved cardiac output, which means more oxygen-rich blood is pumped to the muscles and other organs.

Dilation of Blood Vessels: Blood vessels dilate to accommodate the increased blood flow required by the working muscles. This improves blood circulation and oxygen delivery.

Increased Respiratory Rate: Breathing rate increases to provide more oxygen to the bloodstream and expel excess carbon dioxide.

Enhanced Oxygen Utilization: Aerobic exercise improves the body's ability to use oxygen for energy production in muscles, leading to increased endurance.

Calorie Expenditure: Aerobic exercise burns calories, aiding in weight management and promoting fat loss.

Improved Lung Function: Regular aerobic exercise can enhance lung capacity and efficiency, leading to better oxygen exchange.

Endorphin Release: Aerobic exercise stimulates the release of endorphins, which are natural mood enhancers, promoting a sense of well-being and reducing stress.

Lowered Blood Pressure: Over time, aerobic exercise can lead to reduced resting blood pressure, contributing to cardiovascular health.

### 94. Limb Length Discrepancy and Types:

Limb length discrepancy (LLD) refers to a difference in length between the arms or legs. It can be caused by various factors, including developmental, traumatic, or pathological. There are two main types of LLD:

Structural LLD: This type of discrepancy arises from a physical difference in bone length. It can result from growth plate injuries, bone deformities, or congenital conditions like congenital limb deficiencies. Structural LLDs are generally more challenging to manage and may require surgical intervention in severe cases.

Functional LLD: Functional LLD is not due to an actual difference in bone length but rather to factors that affect apparent limb length. These factors can include muscle imbalances, joint restrictions, and poor posture. Functional LLDs can often be managed with physical therapy and corrective exercises aimed at addressing underlying issues.

**95. Derived Positions from Kneeling:**

Derived positions are various body positions that are assumed from a specific starting position, in this case, kneeling. Here are a few examples along with their advantages and disadvantages:

Half-Kneeling: In this position, one knee is on the ground while the other leg is bent at a 90-degree angle in front. This position enhances stability while allowing movement in the hip and lower back. It's commonly used for exercises that target single-leg stability and hip mobility.

Advantages: Improved balance and stability training, isolation of unilateral movements, reduced pressure on the lower back.

Disadvantages: Limited weight-bearing capacity, not suitable for all individuals, potential for strain on the front knee.

Tall-Kneeling: Both knees are on the ground in this position, with the torso upright. This position is useful for improving core stability, hip mobility, and upper body movements.

Advantages: Enhanced core engagement, improved hip flexibility, neutral spine alignment.

Disadvantages: Potential discomfort on the knees, limited weight-bearing capability, less dynamic than other positions.

**96. Factors Contributing to Poor Posture:**

Poor posture can result from a combination of various factors, including:

Sedentary Lifestyle: Prolonged sitting and lack of movement can lead to muscle imbalances and weakened postural muscles.

Muscle Weakness and Imbalances: Weak core muscles, tight chest muscles, and weak upper back muscles can contribute to poor posture.

Incorrect Ergonomics: Improper workstation setup, such as incorrect chair height or computer screen positioning, can lead to slouching.

Lack of Awareness: Many people are unaware of their posture and fail to make conscious adjustments.

Structural Factors: Some individuals may have structural issues like scoliosis or leg length discrepancies that affect their posture.

Footwear: Wearing shoes with inadequate arch support or high heels can alter spinal alignment.

Carrying Heavy Bags: Carrying heavy bags on one shoulder can lead to asymmetrical posture and muscle strain.

**97. Principles of Postural Reeducation:**

Postural reeducation aims to correct poor posture by addressing underlying muscle imbalances and promoting optimal alignment. Some key principles include:

Awareness: Teaching individuals to become aware of their posture and make conscious adjustments.

Muscle Strengthening: Targeting weak muscles and imbalances through targeted exercises.

Flexibility: Incorporating stretching to alleviate tight muscles that contribute to poor posture.

Ergonomics: Educating individuals about proper workstation setup and ergonomics.

Progressive Approach: Gradually introducing changes to prevent overwhelming the body with new habits.

Functional Integration: Focusing on postural corrections during functional movements and activities.

**98. Techniques of Massage Manipulation:**

Massage manipulation involves various techniques to manipulate soft tissues for therapeutic purposes. Some common techniques include:

Effleurage: Long, gliding strokes used for warm-up and relaxation.

Petrissage: Kneading and squeezing movements that target deeper layers of tissue.

Friction: Circular or linear movements that generate heat and break down adhesions.

Tapotement: Rhythmic tapping or pounding for stimulating blood circulation.

Vibration: Rapid shaking or trembling movements to relax muscles and stimulate nerves.

Myofascial Release: Slow, sustained pressure to release tension in the fascia (connective tissue).

**99. Functional Reeducation of the Upper Limb:**

Functional reeducation of the upper limb involves rehabilitating the arm and hand to regain functional activities. This is commonly used after injuries or surgeries. Techniques include:

Range of Motion Exercises: Gradual movements to restore joint mobility.

Strengthening Exercises: Targeting specific muscles to regain strength for functional tasks.

Coordination Training: Activities that improve hand-eye coordination and fine motor skills.

Task-Specific Training: Practicing functional tasks, such as dressing or eating, to regain independence.

Proprioceptive Training: Enhancing awareness of limb position for accurate movement.

Adaptive Strategies: Teaching alternative techniques to accomplish tasks while adapting to limitations.

**100. Circuit Weight Training:**

Circuit weight training involves performing a series of exercises in a sequence, often targeting different muscle groups. It combines cardiovascular benefits with strength training by transitioning between exercises with minimal rest. This method enhances muscle endurance, burns calories, and improves overall fitness

**101. Evaluation of Balance:**

Balance evaluation assesses a person's ability to maintain equilibrium. It involves various tests and measures, including the Romberg test, Berg Balance Scale, and Timed Up and Go Test. Evaluating balance helps identify deficits and guides rehabilitation strategies

**102. Anthropometric Measurement:**

Anthropometric measurements involve assessing an individual's body dimensions, such as height, weight, limb length, and body composition. These measurements provide valuable information for health assessment, growth monitoring, and designing tailored interventions.

**103. Phases of Gait Cycle:**

The gait cycle consists of two main phases: stance phase (when the foot is in contact with the ground) and swing phase (when the foot is off the ground). Each phase is further divided into subphases: stance includes heel strike, midstance, and toe-off, while swing includes acceleration, midswing, and deceleration.

**104. Whirlpool Bath:**

A whirlpool bath is a hydrotherapy technique that involves immersing the body in a warm water bath equipped with water jets. It provides therapeutic benefits such as relaxation, pain relief, and improved circulation. Different water temperatures and jet pressures can be used based on the therapeutic goal.

**105. Concave – Convex Rule:**

The concave-convex rule is a principle used in joint mobilization. When a concave joint surface moves on a fixed convex surface, the gliding occurs in the same direction as joint movement. When a convex joint surface moves on a fixed concave surface, the gliding occurs in the opposite direction of joint movement.

**106. Mat Activities:**

Mat activities refer to exercises and movements performed on a padded surface, typically on the floor. These activities are common in physical therapy and fitness routines. Mat activities enhance core strength, flexibility, and body awareness.

**107. High Kneeling:**

High kneeling is a position where an individual kneels upright with the hips and knees flexed to 90 degrees. This position is used for various exercises and stretches that target core stability, balance, and hip mobility.

**108. Petrissage Technique:**

Petrissage is a massage technique involving kneading, rolling, and squeezing movements performed on the soft tissues. It aims to improve circulation, relax muscles, and reduce tension. Petrissage helps break down adhesions and promote tissue health.

**109. Physical Properties of Water:**

Water has unique physical properties, including buoyancy (buoyant force counteracts gravity), hydrostatic pressure (pressure exerted by water at different depths), and resistance (water provides resistance to movement). These properties make water a valuable medium for aquatic therapy and exercise.

**110. History of Massage:**

Massage has an ancient history, with evidence of its practice in various cultures like Egyptian, Chinese, and Greek civilizations. It has evolved from a ritualistic and relaxation practice to a therapeutic technique used in medical and rehabilitative settings.

**111. Maitland's Graded Oscillatory Technique:**

Maitland's Graded Oscillatory Technique is a manual therapy approach involving rhythmic oscillations performed at different amplitudes and speeds. It's used to assess joint mobility and treat joint dysfunctions. The technique is named after its developer, Geoffrey Maitland.

**112. Free Exercise to the Shoulder Joint:**

Free exercises for the shoulder joint involve movements in multiple directions to improve flexibility, strength, and stability. These exercises can include shoulder circles, pendulum swings, and diagonal reaches.

**113. Sequence for Neck Massage:**

A typical sequence for neck massage involves gentle effleurage to warm up, followed by kneading, friction, and petrissage techniques. Focus on the trapezius, scalenes, and other neck muscles. Finish with gentle effleurage to promote relaxation.

**114. Contrast Bath:**

Contrast baths alternate between hot and coldwater immersion. This technique enhances blood circulation, reduces inflammation, and promotes tissue healing. It's often used for joint and muscle injuries.

**115. Hanging:**

Hanging refers to suspending the body from a bar using the hands or a device. It can be used for decompression of the spine, shoulder mobility, and grip strength development. Proper form and progression are essential to prevent injury.

**116. Percussion Manipulation:**

Percussion manipulation is a massage technique that involves rhythmic tapping, pounding, or striking movements using the fingertips, fists, or specialized tools. It's used to stimulate circulation, release muscle tension, and invigorate the tissues. Depending on the intensity and speed of the percussion, it can have both relaxing and stimulating effects on the body.

**117. Health and Hygiene for the Massage Therapist:**

Health and hygiene are crucial for massage therapists to ensure a safe and professional environment. They should maintain cleanliness, practice hand hygiene, wear appropriate attire, and ensure a sanitized workspace. Regular exercise, proper nutrition, and self-care are essential to maintain physical and mental well-being.

**118. Kinetics and Kinematic Studies in Human Gait:**

Kinetics studies the forces that cause motion, while kinematics focuses on the motion itself. In human gait analysis, kinetics examines the forces and moments acting on joints, while kinematics studies joint angles, velocities, and displacements. These studies help understand gait abnormalities, diagnose disorders, and design rehabilitation strategies.

**119. Indications for Massage Therapy:**

Massage therapy is indicated for various conditions, including muscle tension, pain, stress, anxiety, circulatory issues, and postural problems. It's also used to support rehabilitation after injuries, enhance sports performance, improve flexibility, and promote relaxation.

**120. Friction Massage: Types, Benefits:**

Friction massage involves applying pressure and friction to soft tissues. Types include transverse friction (cross-fiber), circular friction, and deep friction. It can break down scar tissue, reduce adhesions, improve circulation, and relieve pain. Friction massage is particularly effective for chronic injuries and certain musculoskeletal conditions.

**121. Nervous Control of Movement:**

The nervous system controls movement through a complex interplay between the central nervous system (brain and spinal cord) and peripheral nervous system (nerves connecting to muscles). Sensory feedback, motor commands, and reflexes coordinate to produce smooth and purposeful movements

**122. Accessory Movements:**

Accessory movements are small involuntary joint movements that accompany active movements. They include rolling, sliding, and spinning. Accessory movements are crucial for joint health, as they maintain joint congruence and distribute synovial fluid for lubrication.

**123. Positions Derived from Standing:**

Positions derived from standing include half-kneeling, high kneeling, lunge, and squatting positions. These positions offer stability challenges, improve core strength, and enhance functional movement patterns.

**124. Effleurage:**

Effleurage is a massage technique involving long, gliding strokes performed with gentle pressure using the palms or fingertips. It's commonly used as a warming-up technique and for spreading oil or lotion over the body. Effleurage promotes relaxation, enhances circulation, and prepares the tissues for deeper techniques.

**125. 3rd Order Levers:**

A third-order lever is a mechanical system where the effort (force applied) is between the fulcrum (pivot point) and the resistance (load being moved). Examples include using a pair of tongs to pick up an object. Third-order levers increase the force needed to move the load but allow greater range of motion.

**126. Line of Gravity, Base, and Equilibrium:**

The line of gravity is the vertical line passing through the body's center of mass. The base is the area of support that prevents the body from falling. Equilibrium is achieved when the line of gravity passes through the base, ensuring stability.

**127. Rhythmic Stabilization:**

Rhythmic stabilization is a therapeutic technique involving isometric contractions of antagonist muscles around a joint while a therapist applies resistance. This technique enhances joint stability, neuromuscular control, and proprioception.

**128. Types of Traction:**

Traction involves applying a pulling force to body structures. Types include manual traction (applied by a therapist), mechanical traction (using machines), and positional traction (altering body positions). Traction can alleviate pain, decompress spinal structures, and improve joint mobility.

**129. Postural Control Mechanism:**

The postural control mechanism involves sensory input from visual, vestibular, and proprioceptive systems. The brain processes this information to regulate muscle activation, enabling the body to maintain balance and posture in various situations.

**130. Technique of Friction and Its Effects and Uses:**

Friction massage involves applying pressure perpendicular to the skin's surface, using small, circular motions. It creates heat, increases circulation, and breaks down adhesions. Friction is used to treat scar tissue, chronic pain, and musculoskeletal restrictions, improving tissue health and promoting healing.

**131. Second Order Lever with Example:**

A second-order lever is a mechanical system where the resistance (load being moved) is between the fulcrum (pivot point) and the effort (force applied). An example of a second-order lever is a wheelbarrow. In this case, the wheel (fulcrum) supports the load (resistance), and the person lifting the handles provides the effort to move the load

**132. De’Lorme's Technique:**

De'Lorme's technique is a method used in progressive resistance exercises. It involves performing multiple sets of an exercise with gradually increasing resistance. The first set is usually at 50% of the estimated maximum, the second set at 75%, and the third set at 100%. This technique aims to progressively challenge the muscles and improve strength.

**133. Free Exercises for Shoulder Joint:**

Free exercises for the shoulder joint include shoulder circles, pendulum swings, diagonal reaches, and arm raises. These exercises enhance range of motion, improve flexibility, and strengthen the muscles surrounding the shoulder.

**134. Contract Relax/Hold Relax:**

Contract relax (CR) or hold relax (HR) is a proprioceptive neuromuscular facilitation (PNF) technique used for stretching. The process involves a passive pre-stretch, followed by an isometric contraction of the stretched muscle, and then relaxation to allow for a greater stretch. It enhances flexibility and helps overcome muscle tightness.

**135. Pulleys and Their Therapeutic Uses:**

Pulleys are mechanical devices with a wheel and a rope or chain used to transmit force. In rehabilitation, pulleys are used to assist or resist movement. They're beneficial for improving range of motion, increasing joint mobility, and providing controlled resistance for strength training.

**136. Manual Muscle Testing:**

Manual muscle testing assesses muscle strength by having a patient resist against a therapist's force. It helps identify muscle imbalances, weaknesses, and functional limitations. Grades are assigned based on the patient's ability to resist the applied force.

**137. Various Standing Positions:**

Various standing positions include:

Erect standing: Upright posture with feet parallel.

Tandem stance: Standing with one foot in front of the other.

Semi-tandem stance: Feet slightly apart, one foot forward.

Modified plantigrade stance: Heels raised, weight on toes.

Lunge stance: One foot forward in a partial lunge position.

Step stance: Standing with one foot on a step or platform.

Single-leg stance: Balancing on one leg.

These positions challenge balance and stability and are used in rehabilitation and functional training.

**138. Free Exercises for Knee Joint:**

Free exercises for the knee joint include leg raises, squats, lunges, and step-ups. These exercises enhance quadriceps and hamstring strength, improve joint stability, and maintain knee mobility.

**139. Joint Mobility:**

Joint mobility refers to the range of motion a joint can achieve actively or passively. It involves both physiological motion (normal movement within anatomical limits) and accessory motion (movement required for joint health). Joint mobility is vital for functional activities and preventing stiffness.

**140. Static Power Test:**

The static power test assesses isometric strength by measuring the maximum force a muscle or muscle group can generate against an immovable object or resistance. It's used in physical therapy and fitness testing to gauge muscle strength

**141. Active Stretching:**

Active stretching involves using one's own muscle force to move a joint through its range of motion. Examples include leg swings and arm circles. Active stretching improves flexibility, muscular control, and neuromuscular coordination.

**142. Cardiovascular Changes with Endurance Training:**

Endurance training induces various cardiovascular adaptations, including increased stroke volume, cardiac output, and capillary density. These changes enhance oxygen delivery to muscles, improve efficiency, lower resting heart rate, and increase overall cardiovascular fitness.

**143. Pursed Lip Breathing:**

Pursed lip breathing is a breathing technique used to improve airflow and oxygen exchange, especially in individuals with chronic obstructive pulmonary disease (COPD) or

breathlessness. The person inhales through the nose and exhales slowly through pursed lips, which creates back pressure and prevents early airway collapse.

**144. Comparison of De'Lorme and Oxford Regimens:**

Both De'Lorme and Oxford regimens are progressive resistance exercise methods. De'Lorme involves increasing resistance through successive sets, while Oxford involves decreasing resistance in subsequent sets. De'Lorme aims to improve muscle strength, while Oxford focuses on increasing endurance. The choice depends on the desired training outcome and individual needs.

**145. Physiology of Balance and Components:**

Balance involves the integration of sensory input from vision, vestibular system, and proprioception. It also relies on motor control to maintain stability. The components of balance include the sensory system (receiving feedback), the central nervous system (processing information), and the musculoskeletal system (executing motor responses). These components work together to maintain equilibrium and prevent falls.

**146. Relaxation and Jacobson's Relaxation:**

Relaxation refers to a state of reduced physical and mental tension, promoting a sense of calmness and well-being. Jacobson's relaxation technique is a systematic method developed by Edmund Jacobson. It involves progressively tensing and then releasing different muscle groups while focusing on the sensation of relaxation. This technique helps individuals become more aware of bodily sensations and learn to release muscular tension, leading to overall relaxation.

**147. Suspension Therapy: Principles, Uses, Types, and Technique:**

Suspension therapy involves the use of a suspended system, like a harness or ropes, to partially support a person's body weight during exercises. The principles include creating a controlled environment, reducing weight-bearing, and facilitating movement. It's used for rehabilitation, balance training, and functional exercises. Types include body-weight support systems and aquatic therapy. The technique involves gradual progression and safety measures to challenge the body's stability and function.

**148. Proprioceptive Neuromuscular Facilitation (PNF): Basic Neurophysiologic Principles:**

PNF is a therapeutic approach that combines muscle stretching with alternating contraction and relaxation. Basic neurophysiologic principles involve stimulating proprioceptors (sensory receptors) to enhance neuromuscular communication. PNF uses techniques like contract relax and hold relax to exploit the neuromuscular mechanisms of reciprocal inhibition and autogenic inhibition, promoting improved flexibility and range of motion.

**149. Techniques of General Relaxation:**

General relaxation techniques include deep breathing, progressive muscle relaxation, visualization, and meditation. Deep breathing calms the mind and reduces stress. Progressive muscle relaxation involves tensing and relaxing muscle groups. Visualization guides the mind to a peaceful place. Meditation promotes mental clarity and relaxation.

**150. Value and Disadvantages of Group Exercise:**

Value: Group exercises offer social interaction, motivation, and a structured environment. Participants can learn from each other, share experiences, and receive immediate feedback from an instructor. Group dynamics can enhance enjoyment and adherence to exercise programs.

Disadvantages: Group exercises may not cater to individual needs or fitness levels. Some individuals might feel uncomfortable in a group setting or struggle with coordination. The intensity might not match individual goals, and exercises may not be modified for injuries or limitations.

**151. Techniques of Chest Physiotherapy:**

Chest physiotherapy techniques aim to clear mucus from the respiratory system. They include postural drainage (using gravity to move mucus to larger airways), percussion (gentle tapping on the chest), vibration (manual oscillations to loosen mucus), and breathing exercises. These techniques benefit individuals with respiratory conditions like cystic fibrosis or pneumonia.

**152. Causes of Muscle Paralysis:**

Muscle paralysis can result from various factors, including neurological conditions like stroke, spinal cord injury, or nerve damage. It can also occur due to muscular disorders like

myasthenia gravis or muscular dystrophy. Trauma, infections, toxins, and autoimmune diseases can contribute to muscle paralysis.

**153. Crutch Balance Training:**

Crutch balance training involves teaching individuals how to use crutches effectively and safely. It focuses on weight distribution, proper posture, gait patterns, and balance. Training includes transferring weight from the affected limb to the crutches and coordinating movements to ensure stability.

**154. Pulleys and Springs:**

Pulleys and springs are used in rehabilitation to provide resistance or assistance in movements. Pulleys assist in controlled stretching and strengthening exercises. Springs offer variable resistance to challenge muscles at different points in the range of motion. These devices enhance flexibility, strength, and coordination.

**155. Intrinsic Foot Muscles:**

Intrinsic foot muscles are small muscles located within the foot. They control fine movements, arch support, and toe alignment. Strengthening intrinsic foot muscles improves foot function, stability, and helps prevent foot conditions like plantar fasciitis.

**156. Exercises for Scoliosis:**

Exercises for scoliosis aim to strengthen weak muscles and stretch tight ones. They include core stabilization exercises, side planks, leg raises, and spinal stretches. These exercises may help improve posture and reduce discomfort in individuals with scoliosis.

**157. Various Pathological Gait:**

Pathological gait refers to abnormal walking patterns caused by neurological or musculoskeletal conditions. Examples include hemiplegic gait (due to stroke), spastic gait (due to cerebral palsy), and antalgic gait (due to pain).

**158. Determinants of an Exercise Program and Physiological Responses to Aerobic Exercises:**

Determinants include frequency, intensity, time, type (FITT), and progression. Physiological responses to aerobic exercises include increased heart rate, improved oxygen delivery,

enhanced cardiac output, and utilization of stored energy sources. Aerobic exercises promote cardiovascular health, endurance, and calorie expenditure.

**159. Procedure to Measure True Limb Length:**

Measuring true limb length involves placing the patient supine with equal hip rotation and measuring from the anterior superior iliac spine to the medial malleolus on both sides. This accounts for discrepancies caused by pelvic tilt.

**160. Principles of Passive Movements:**

Passive movements involve a therapist moving a patient's body part through its range of motion without patient effort. Principles include performing movements gently, within the pain-free range, respecting joint integrity, and ensuring relaxation during the process. Passive movements maintain joint mobility, prevent contractures, and promote circulation.

**161. Good Posture, Corrective Methods, and Patient Education:**

Good posture refers to the alignment of body segments that maintains minimal stress on muscles and joints. Corrective methods involve exercises and strategies to improve posture. Patient education is crucial to maintaining good posture. Tips include:

Awareness: Educate patients about correct posture and its benefits.

Ergonomics: Teach proper workstation setup and lifting techniques.

Strengthening: Prescribe exercises to strengthen postural muscles.

Stretching: Recommend stretches to alleviate muscle imbalances.

Mindfulness: Encourage being mindful of posture during activities.

Frequent Breaks: Advise taking breaks from prolonged sitting or standing.

**162. Concentric and Eccentric Exercise:**

Concentric exercise involves muscle contraction as it shortens, generating force to overcome resistance. For instance, lifting a weight during a bicep curl is a concentric contraction. Eccentric exercise involves controlled lengthening of a muscle under resistance. Lowering a weight during a bicep curl is an eccentric contraction. Both types contribute to muscle strength and control.

**163. Techniques of Massage in Detail:**

a. Effleurage: Long gliding strokes for relaxation and improving circulation. It prepares the body for deeper techniques.

b. Friction: Circular or linear movements to break down adhesions, enhance blood flow, and target specific areas of tension.

**164. Ballistic Stretching:**

Ballistic stretching involves rapid, bouncing movements to stretch muscles. It uses momentum to push joints beyond their normal range. However, it carries a risk of injury due to uncontrolled force and can trigger the stretch reflex. It's generally not recommended in favor of safer stretching techniques.

**165. Techniques of Pranayama:**

a. Ujjayi Pranayama: Involves deep, controlled breaths with a slight constriction at the back of the throat. It promotes relaxation, concentration, and mind-body connection.

b. Kapalbhati Pranayama: Involves forceful exhalations and passive inhalations. It stimulates abdominal muscles and improves lung capacity.

**166. Merits and Demerits of Goniometric Measurements:**

Merits: Objective measurement of joint range of motion, aids in diagnosis, treatment planning, and tracking progress.

Demerits: Limited by factors like pain, patient cooperation, and examiner variability. It might not reflect functional movement accurately.

**167. Progressive Resisted Exercise:**

Progressive resisted exercise involves gradually increasing resistance to improve muscle strength. It's based on the principle of overload. Exercises progress from low resistance to higher resistance as muscles adapt and become stronger

**168. Equilibrium Tests for Coordination:**

Equilibrium tests assess balance and coordination. Examples include the Romberg test (maintaining balance with eyes closed) and the Berg Balance Scale (evaluating balance during various tasks).

**169. Resisted Exercise Techniques:**

Resisted exercise involves applying external resistance to muscle contractions. Techniques include:

a. Isometric: Muscle contraction without joint movement.

b. Isotonic: Muscle contraction with joint movement against constant resistance.

c. Isokinetic: Muscle contraction with variable resistance through the range of motion.

**170. Universal Goniometer and Principles of Goniometry:**

The universal goniometer measures joint angles. Its parts include the stationary arm, moving arm, fulcrum, and axis. Types of goniometers include gravity-dependent and gravity-independent. Principles involve aligning the fulcrum with the joint axis, ensuring accurate placement and measuring within the anatomic range.

**171. Postural Drainage: Indications and Contraindications:**

Postural drainage is a technique to clear respiratory secretions. Indications include cystic fibrosis, chronic bronchitis, and pneumonia. Contraindications involve active bleeding, unstable fractures, increased intracranial pressure, or recent surgery.

**172. Balance: Types of Balance Retraining:**

Balance is the ability to maintain equilibrium. Types of balance retraining include static balance (maintaining stability while stationary), dynamic balance (maintaining stability during movement), and anticipatory balance (adjusting before anticipated movement).

**173. Medical Research Council Grading System:**

This system grades muscle strength from 0 to 5: 0 (no contraction), 1 (trace contraction), 2 (active movement with gravity eliminated), 3 (active movement against gravity), 4 (active movement against some resistance), and 5 (normal strength).

**174. Movements at Shoulder Joint in Relation to Axis and Planes:**

Shoulder joint movements occur in three planes:

Flexion and extension (sagittal plane, frontal axis)

Abduction and adduction (frontal plane, sagittal axis)

Internal and external rotation (transverse plane, vertical axis)

**175. Physiology of Balance:**

Balance involves sensory input (vestibular, visual, proprioceptive), integration in the brain, and motor output (muscle activation). It maintains the body's center of mass within the base of support, preventing falls.

**176. Posture:**

Posture refers to the alignment and positioning of the body's various parts in relation to each other and to the external environment. Good posture involves maintaining a balanced and aligned body position that minimizes strain on muscles and joints. Proper posture contributes to overall well-being and prevents musculoskeletal problems. It includes the alignment of the spine, shoulders, hips, and other body parts. Poor posture can lead to various health issues, such as back pain, muscle imbalances, and even affect organ function.

**177. Asanas and Pranayamas:**

Asanas are yoga poses or postures designed to promote physical and mental well-being. Pranayamas are breathing exercises that focus on controlling and regulating the breath. Asanas involve specific body movements and positions that enhance flexibility, strength, and balance. Pranayamas involve different techniques of controlled breathing to enhance lung capacity and relaxation.

**178. Hydrotherapy Principles and Application:**

Hydrotherapy is a therapeutic approach that uses water for various health benefits. Its principles involve using water temperature, pressure, and movement to stimulate circulation, relieve pain, and promote healing. In exercise therapy, hydrotherapy can be applied through techniques like hot and cold baths, whirlpools, and contrast baths to manage pain and enhance recovery.

**179. Physiological Changes during Aerobic Exercises:**

Aerobic exercises, also known as cardiovascular exercises, improve the body's cardiovascular and respiratory systems. During aerobic activities like running, cycling, or swimming, the heart rate and breathing rate increase to supply more oxygen to muscles. This improves lung capacity, enhances oxygen utilization, and strengthens the heart muscle.

**180. Stretching Techniques, Precautions, and Contraindications:**

Stretching techniques involve elongating muscles to improve flexibility and range of motion. Some common techniques include static stretching, dynamic stretching, and proprioceptive neuromuscular facilitation (PNF) stretching. Precautions involve avoiding aggressive or bouncing movements and listening to the body's signals. Contraindications include stretching injured muscles, joints, or areas with inflammation.

**181. Effect and Uses of Pranayama:**

Pranayama techniques focus on breath control and have a profound impact on the body and mind. They can reduce stress, improve lung function, enhance concentration, and promote relaxation. Pranayama is an integral part of yoga and mindfulness practices.

**182. Tonic and Phasic Muscles:**

Tonic muscles are responsible for maintaining posture and stability, such as the muscles of the back. Phasic muscles are involved in dynamic movements, like the biceps during lifting. An example of a tonic muscle is the erector spinae, and an example of a phasic muscle is the deltoid.

**183. Frenkel’s Exercise:**

Frenkel’s exercises are used in neurorehabilitation to improve coordination and proprioception. They involve performing simple repetitive movements in various positions and at different speeds to enhance motor skills and spatial awareness.

**184. Neural Tension Test for Ulnar Nerve:**

This test assesses the tension and mobility of the ulnar nerve. It involves specific movements of the upper limb while monitoring for symptoms like tingling or pain, which could indicate nerve compression or irritation.

**185. PNF Patterns for Upper Limb:**

Proprioceptive neuromuscular facilitation (PNF) patterns are movement techniques used to improve flexibility and strength. They involve a combination of contraction and relaxation of muscles to increase range of motion. Upper limb PNF patterns are designed to enhance functional movements of the arms and shoulders.

**186. Principles of Relaxed Passive Movements:**

Relaxed passive movements involve gently moving a joint within its available range of motion without activating the muscles. The principles include ensuring patient comfort, avoiding pain, and maintaining a slow and controlled movement.

**187. Basics of Neurodynamics:**

Neurodynamics focuses on the movement and function of the nervous system's structures, such as nerves and neural tissues. It involves techniques to assess and improve nerve mobility and function.

**188. Anatomy and Physiology of Cerebellum:**

The cerebellum is a brain structure responsible for coordinating movement, balance, and posture. It receives sensory input and helps fine-tune motor control, ensuring smooth and coordinated movements.

**189. Progressive Resisted Exercises:**

Progressive resisted exercises involve gradually increasing resistance or load to build muscle strength and endurance. This can be achieved through techniques like weight lifting, resistance bands, or bodyweight exercises.

**190. Postural Drainage Principles, Indications, and Contraindications:**

Postural drainage is a chest physiotherapy technique used to improve lung function by promoting the clearance of mucus from the airways. It involves positioning the body to allow gravity to assist in moving mucus toward the larger airways for easier removal. Indications include conditions like cystic fibrosis, while contraindications include cases of recent surgery or certain heart conditions.

**191. Organisation of Group Exercises:**

Organizing group exercises involves planning and conducting fitness or therapeutic sessions for multiple participants. It includes structuring the session, choosing appropriate exercises, managing the group's dynamics, and ensuring safety and effective instruction.

**192. Stretching Method and Home Program for Tendo-Achilles Tightness:**

For tendo-Achilles (Achilles tendon) tightness, stretching can be done using calf stretches, such as wall or step stretches. A home program might involve performing these stretches

regularly, holding them for a specific duration, and gradually increasing the intensity and duration over time.

**193. Measuring True and Apparent Limb Length:**

True limb length is measured from anatomical landmarks like the hip joint to the ankle joint. Apparent limb length is measured from the anterior superior iliac spine (ASIS) to the medial malleolus. True length accounts for joint and bone differences, while apparent length might include muscle and soft tissue variations.

**194. Pre-Crutch Training:**

Pre-crutch training prepares individuals to use crutches safely and effectively. It includes teaching proper techniques for standing up, walking, sitting, and maneuvering with crutches. This training helps prevent strain or accidents when using crutches.

**195. Axes and Planes:**

Axes are imaginary lines around which body movements occur. Planes are imaginary flat surfaces that divide the body into sections. The sagittal plane divides the body into left and right halves, the frontal (coronal) plane divides it into front and back, and the transverse plane divides it into upper and lower sections.

**196. Plyometrics:**

Plyometrics involve rapid, explosive movements to develop power and strength. It utilizes a stretch-shortening cycle, where muscles are rapidly stretched and then rapidly contracted. Examples include box jumps and depth jumps.

**197. Mitchell's Relaxation Technique:**

Mitchell's relaxation technique is a stress-reduction method that involves systematic tensing and relaxing of muscle groups. It aims to create awareness of muscle tension and promote relaxation by consciously releasing tension in each muscle group.

**198. Sway Back Posture with Reference to Ideal Plumb Line Alignment:**

In sway back posture, there's excessive backward curvature of the lower spine (lumbar) and forward head posture. The pelvis tilts backward, exaggerating the lumbar curve. This posture disrupts the ideal plumb line alignment, leading to imbalances and potential discomfort.

**199. Factors Influencing Equilibrium:**

Equilibrium is influenced by factors like the body's center of gravity, base of support, alignment, and external forces. These factors interact to maintain stability during static and dynamic activities.

**200. Types of Muscle Actions:**

Muscle actions include concentric (muscle shortening), eccentric (muscle lengthening), and isometric (muscle stays the same length) contractions. Concentric actions generate movement, eccentric actions control movement, and isometric actions stabilize joints.

**201. Effleurage and its Effects and Uses:**

Effleurage is a massage technique involving long, gliding strokes using light to moderate pressure. It helps relax muscles, improve circulation, and reduce stress. It's often used at the beginning and end of a massage session to prepare the body and promote relaxation.

## SHORT NOTES

**1. Strain:**

Strain refers to the overstretching or tearing of muscles or tendons due to excessive force or improper use. It can result from sudden movements, overexertion, or inadequate warm-up.

**2. Critical Elements of Exercises:**

Critical elements of exercises include proper form, appropriate intensity, correct duration, suitable frequency, and progressive overload. These elements ensure safe and effective training outcomes.

**3. Limitations of Joint Mobilization:**

a. Inappropriate for acute inflammatory conditions.

b. Requires skilled manual therapy, which might not be widely available.

**4. Test for Inco-ordination:**

The Finger-to-Nose Test is commonly used to assess incoordination. The individual is asked to touch their nose with their index finger while extending their arm, testing the coordination of movement.

**5. Posture:**

Posture refers to the alignment and positioning of the body parts in relation to each other and the environment. It affects musculoskeletal health, organ function, and overall well-being.

**6. Vertical Suspension:**

Vertical suspension is a technique used in aquatic therapy where a person is suspended in water vertically. It reduces the impact on joints and allows for low-impact movement.

**7. Contraindications of Inverted Asanas:**

a. Hypertension: Inverted poses can increase blood pressure.

b. Glaucoma: These poses can elevate intraocular pressure, potentially harmful for individuals with glaucoma.

**8. Uses of Hip Hiking:**

a. Used in rehabilitation to improve hip stability and strength.

b. Can aid in correcting muscle imbalances around the hip joint.

**9. Uses of Assisted Exercises:**

a. Assist in rehabilitation after injury or surgery.

b. Enhance range of motion by providing external support during movements.

**10. SAID Principle:**

The SAID (Specific Adaptations to Imposed Demands) Principle states that the body adapts specifically to the type of demand placed on it. This principle is fundamental in exercise programming, as training should match the intended goals and outcomes.

**11. Endurance Test:**

An endurance test measures the ability of muscles to sustain a task over a certain period. Common examples include the Cooper 12-Minute Run for cardiovascular endurance and the Plank Test for core endurance.

**12. True Limb Length and its Importance:**

True limb length is the distance between specific anatomical points on a limb. It's important for assessing structural discrepancies, fitting prosthetics, and ensuring proper movement and alignment.

**13. Muscle Tone and Postural Tone:**

Muscle tone refers to the inherent tension present in a muscle at rest. Postural tone refers to the muscle tension necessary to maintain an upright posture. Both contribute to stability and movement control.

**14. Active Movement:**

Active movement refers to a movement produced by the contraction of an individual's muscles without external assistance. It demonstrates the individual's voluntary control over the movement.

**15. Examples of Isometric Exercises:**

a. Plank: Holding a push-up position without movement.

b. Wall Sit: Holding a seated position against a wall without movement.

**16. Open Chain Exercises:**

Open chain exercises involve moving a limb in space without a fixed point. For example, leg extension machines involve moving the lower leg while the upper leg is stationary.

**17. Uses of Effleurage:**

a. Promotes relaxation and stress reduction.

b. Enhances blood and lymphatic circulation.

c. Prepares muscles for deeper massage techniques.

d. Helps distribute massage oil evenly.

**18. Active and Inactive Postures:**

Active posture involves holding oneself upright through muscle engagement. Inactive posture relies on external support, like leaning against a wall. Active postures are generally better for musculoskeletal health.

**19. Effects of Aerobic Exercises:**

a. Improved cardiovascular fitness.

b. Enhanced lung capacity and oxygen transport.

c. Weight management and calorie expenditure.

d. Increased release of endorphins, promoting mood.

**20. Types of Hydrotherapy Techniques:**

a. Contrast Baths: Alternating between hot and cold water immersion to improve circulation and reduce inflammation.

b. Whirlpool Therapy: Using water jets for massage and relaxation.

**21. Speed Test:**

A speed test measures how quickly an individual can perform a specific movement, such as a sprint or a reaction time test.

**22. Brief Resisted Isometric Exercise:**

A brief resisted isometric exercise involves a short-duration muscle contraction against resistance without joint movement. For example, a brief hold against a stable object.

**23. Petrissage:**

Petrissage is a massage technique involving kneading, lifting, and squeezing of soft tissues. It improves circulation, helps release tension, and promotes relaxation.

**24. Gutter Crutch:**

A gutter crutch is a type of mobility aid, often used for partial weight-bearing while walking. It has forearm supports that distribute weight to the forearms and hands.

**25. Equilibrium:**

Equilibrium refers to a state of balance or stability within the body, achieved through coordinated muscle actions and control. It's vital for maintaining posture and performing movements effectively.

**26. Disadvantages of Group Therapy:**

a. Lack of Individual Attention: Group sessions may not address specific individual needs adequately.

b. Unequal Participation: Some members might dominate discussions, while others remain passive.

c. Lack of Privacy: Sensitive topics might not be discussed openly due to the presence of others.

d. Group Dynamics: Conflicts or disagreements among group members can affect the therapy process.

**27. Apparent Limb Length:**

Apparent limb length is measured from the anterior superior iliac spine (ASIS) to the medial malleolus. It's influenced by factors like muscle tone, posture, and pelvic tilt. Apparent length doesn't account for joint and bone differences like true limb length does.

**28. Active and Inactive Posture:**

Active posture involves using muscle engagement to maintain an upright position. Inactive posture relies on external support, such as leaning on a wall or sitting in a chair with backrest.

**29. Tests for Incoordination:**

a. Finger-to-Nose Test: Assessing the coordination of movement by touching the nose with an extended arm.

b. Rapid Alternating Movement Test: Testing the ability to quickly alternate between movements, like flipping the hands.

**30. Derived Positions from Sitting:**

a. Half-Kneeling Position: One knee and one foot on the ground, the other leg bent at a 90-degree angle.

b. Long Sitting Position: Sitting with legs extended straight in front.

**31. Definition of 10 RM:**

10 RM (Repetition Maximum) refers to the maximum weight a person can lift for a given exercise with proper form for a total of 10 repetitions before fatigue sets in.

**32. Definition of Work and Endurance:**

Work is the force applied to an object multiplied by the distance it moves. Endurance is the ability to perform sustained work over an extended period without fatigue.

**33. Difference between Spasticity and Tightness:**

Spasticity is increased muscle tone due to neurological conditions, causing involuntary muscle contractions. Tightness refers to limited flexibility or range of motion in a muscle or joint.

**34. "Break Test":**

A break test is used to assess muscle strength by applying resistance against a muscle's contraction. If the muscle "breaks" or gives way under the resistance, it indicates weakness.

**35. Therapeutic Effects of Exercise in Water:**

a. Buoyancy reduces joint impact, making it suitable for rehabilitation.

b. Hydrostatic pressure aids in reducing swelling and promoting circulation.

**36. Two Mat Activities:**

a. Bridging: Lying on the back and lifting the hips off the mat to engage the core and glutes.

b. Supine Leg Raises: Lying on the back and raising one or both legs to work on hip and core strength.

**37. Definition of Good Posture:**

Good posture involves maintaining a balanced alignment of body parts to minimize strain on muscles and joints. It promotes optimal function and prevents musculoskeletal issues.

**38. Two Derived Positions:**

a. Prone on Elbows: Lying face down with the upper body supported on the forearms.

b. Sitting on Heels: Kneeling and sitting back onto the heels, with the knees and feet together.

**39. Components of a Gait Cycle:**

The gait cycle includes:

a. Stance Phase: Foot contact, midstance, propulsion.

b. Swing Phase: Initial swing, mid swing, terminal swing.

**40. Definition of Stretching:**

Stretching is the practice of lengthening muscles or soft tissues to improve flexibility and range of motion. It can be done actively or passively.

**41. Principles of Manual Muscle Testing (MMT):**

a. Gravity-Eliminated: Muscle testing is often performed in positions where gravity is eliminated to isolate specific muscle groups.

b. Break Test: Muscle strength is assessed by applying resistance against a muscle contraction until the muscle gives way (breaks).

**42. Ballistic Stretching:**

Ballistic stretching involves using momentum and bouncing movements to stretch muscles. It can be risky due to the potential for injury and is generally not recommended.

**43. Advantages of Mat Exercises:**

a. Minimal Equipment: Mat exercises often require minimal or no equipment.

b. Versatility: They can be adapted for various fitness levels and target multiple muscle groups.

**44. Uses of Massage:**

a. Muscle Relaxation: Massage helps relieve muscle tension and promote relaxation.

b. Pain Management: It can reduce pain and discomfort by improving circulation and releasing endorphins.

**45. Uses of Endurance Exercise:**

a. Cardiovascular Health: Endurance exercises improve heart and lung function.

b. Weight Management: They help burn calories and support weight loss or maintenance.

**46. Uses of Treadmill:**

a. Cardiovascular Fitness: Treadmills provide controlled aerobic workouts.

b. Gait Analysis: They can be used to assess walking and running patterns.

**47. BRIME:**

BRIME stands for Balanced Reciprocal Inhibition in Muscular Enhancement. It's an approach in which the agonist muscle is contracted while the antagonist muscle is inhibited to enhance the agonist's effectiveness.

**48. Definition of Stride Length:**

Stride length is the distance covered during a single stride, typically measured from the heel strike of one foot to the heel strike of the same foot on the next step.

**49. Isokinetic Exercises:**

Isokinetic exercises involve using specialized equipment to maintain a constant speed of movement, ensuring resistance matches the individual's effort throughout the range of motion.

**50. Vo2 Max:**

Vo2 Max represents the maximal oxygen uptake during intense exercise. It indicates an individual's cardiovascular fitness and endurance capacity.

**51. Active and Inactive Posture:**

Active posture involves using muscle engagement to maintain an upright position. Inactive posture relies on external support, such as leaning on a wall or sitting with backrest.

**52. Types of Receptors:**

Receptors include:

a. Proprioceptors: Sense body position and movement.

b. Thermoreceptors: Detect temperature changes.

c. Nociceptors: Respond to pain.

d. Mechanoreceptors: Detect mechanical stimuli.

**53. Definition of Accommodation:**

Accommodation refers to the process by which the eyes adjust their focus to view objects at varying distances, involving changes in the curvature of the lens.

**54. Types of Effleurage:**

a. Superficial Effleurage: Light gliding strokes to warm up tissues and distribute oil.

b. Deep Effleurage: Deeper strokes targeting underlying muscles for relaxation.

**55. Hold Relax Technique:**

The hold-relax technique is used in proprioceptive neuromuscular facilitation (PNF) stretching. It involves a passive pre-stretch followed by an isometric contraction of the target muscle, then relaxation to achieve a greater range of motion.

**56. Uses of Static Cycle:**

a. Cardiovascular Conditioning: Static cycling improves heart and lung fitness.

b. Low-Impact Workout: It's gentle on joints and suitable for rehabilitation or low-impact exercise.

**57. Definition of Tightness and Contracture:**

Tightness refers to a reduced range of motion due to muscle tension. Contracture is a severe and often permanent tightening of muscles or connective tissues, leading to significant loss of movement.

**58. Definition of Pinch Grip:**

A pinch grip is a type of grip between the thumb and one or more fingers, like holding a pen. It's essential for fine motor tasks.

**59. Three-Point Gait:**

The three-point gait is a walking pattern using crutches or assistive devices. It involves moving both crutches forward followed by the injured or weaker leg.

**60. Kneading:**

Kneading is a massage technique that involves pressing, rolling, and manipulating soft tissues with the hands. It helps release tension and improve blood flow.

**61. Self Stretching:**

Self-stretching involves an individual using their own body to create a stretch. It's a method of improving flexibility and range of motion.

**62. Motor Unit:**

A motor unit consists of a motor neuron and the muscle fibers it controls. When the motor neuron fires, all the muscle fibers in its motor unit contract simultaneously.

**63. Indications of Resisted Exercise:**

Resisted exercises are indicated for:

a. Strengthening muscles.

b. Improving muscle endurance.

c. Rehabilitation after injuries.

**64. Indications of Axillary Crutches:**

Axillary crutches are indicated for individuals with:

a. Temporary lower limb injuries.

b. Balance or stability issues.

**65. Oxford Method of Muscle Testing:**

The Oxford Method is a system of grading muscle strength using a scale from 0 to 5, with 0 being no movement and 5 indicating normal strength against resistance.

**66. Goals of PNF (Proprioceptive Neuromuscular Facilitation):**

Goals of PNF include:

a. Increasing flexibility and range of motion.

b. Enhancing strength and stability.

c. Improving neuromuscular control and coordination.

**67. Definition of Cadence:**

Cadence refers to the rhythm or pace of a repetitive movement, such as the number of steps per minute during walking or running.

**68. Buoyancy:**

Buoyancy is the upward force exerted by a fluid (like water) on an object immersed in it. In water, buoyancy supports body weight, reducing impact on joints.

**69. Third-Order Lever:**

In a third-order lever, the effort is between the fulcrum and the load. This type of lever provides a mechanical advantage, with the effort being less than the load.

**70. Frontal Plane:**

The frontal plane divides the body into front and back halves. Movements in the frontal plane include side bending and abduction/adduction of limbs.

**71. Movable Pulley:**

A movable pulley is a type of pulley system where the pulley itself moves along with the load being lifted. It changes the direction of the force applied, allowing easier lifting of heavy loads.

**72. Contraindication of Passive Movements in High Fever:**

High fever can increase metabolic demand, muscle tone, and sensitivity to touch. Passive movements during high fever can further exacerbate these effects and potentially lead to discomfort, muscle spasm, or increased body temperature.

**73. Pulleys:**

Pulleys are simple machines used to lift or move objects. They consist of a grooved wheel and a rope or chain. They change the direction of force and can provide mechanical advantage in lifting heavy loads.

**74. Line of Gravity:**

The line of gravity is an imaginary vertical line passing through the center of gravity of an object or body. It determines stability and balance.

**75. Joint Shapes:**

Joint shapes vary based on their function. Examples include hinge joints (elbow), ball-and-socket joints (hip), and gliding joints (wrist).

**76. Ironing:**

Ironing is a massage technique involving broad, flat, and gliding strokes using the palms of the hands. It helps spread oil or lotion and provides relaxation.

**77. Two-Joint Muscle:**

A two-joint muscle crosses and acts on two joints. For example, the hamstrings cross the hip and knee joints.

**78. Barrier Concept:**

The barrier concept in joint mobilization refers to the end range of joint motion where resistance is felt due to tension in tissues. Mobilization techniques aim to gradually overcome these barriers to improve joint range.

**79. Rhythmic Initiation:**

Rhythmic initiation is a technique used in neuromuscular facilitation (PNF) stretching. It involves passive movement followed by active-assistive movement and then active movement to enhance motion control.

**80. Physiological Relaxation:**

Physiological relaxation involves reducing muscle tension and promoting a state of rest. Techniques like deep breathing and meditation can induce physiological relaxation.

**81. Reach Standing:**

Reach standing is a functional movement pattern that involves transitioning from sitting to standing while reaching for support. It helps assess balance and mobility.

**82. Friction:**

Friction is the resistance encountered when two objects come into contact and move against each other. It's an important factor in various movements and activities.

**83. Inertia:**

Inertia is the resistance of an object to changes in its state of motion. An object at rest tends to stay at rest, and an object in motion tends to stay in motion unless acted upon by an external force.

**84. Parallelogram Law of Vectors:**

The parallelogram law states that if two vectors are represented by the sides of a parallelogram, then the diagonal represents the resultant of the vectors.

**85. Third Order Lever:**

In a third-order lever, the effort is between the fulcrum and the load. These levers don't provide a mechanical advantage but allow for greater range of motion.

**86. Hooke's Law:**

Hooke's Law states that the force required to stretch or compress an elastic material is directly proportional to the displacement produced, as long as the limit of elasticity is not exceeded.

**87. Pelvic Tilt:**

Pelvic tilt refers to the anterior or posterior rotation of the pelvis. An anterior tilt involves tilting the front of the pelvis downward, and a posterior tilt involves tilting the back of the pelvis downward.

**88. Progressive-Resisted Exercise:**

Progressive-resisted exercise involves gradually increasing resistance or load over time to challenge and improve muscle strength and endurance.

**89. Non-Weight Bearing Exercises:**

Non-weight bearing exercises are activities that don't involve supporting body weight through the legs or lower limbs. They are often used in rehabilitation to minimize stress on joints.

**90. Lateral Tilting of Pelvis:**

Lateral tilting of the pelvis refers to the side-to-side movement of the pelvis, involving a downward movement of one side and an upward movement of the other.

**91. Acceleration:**

Acceleration is the rate of change of velocity of an object. It occurs when the speed or direction of motion changes.

**92. Ergometer:**

An ergometer is a device used to measure work done during exercise. Examples include stationary bikes and treadmills equipped with monitoring systems.

**93. Plyometric Training:**

Plyometric training involves rapid and explosive movements that utilize the stretch-shortening cycle of muscles. It's used to improve power and athletic performance.

**94. Elasticity:**

Elasticity is the property of a material to return to its original shape after being deformed. It's a crucial factor in the functioning of muscles and connective tissues.

**95. Aims of Exercise Therapy:**

a. Improve or restore physical function.

b. Reduce pain and discomfort.

c. Enhance flexibility, strength, and endurance.

d. Promote overall well-being and quality of life.

**96. Acceleration (Reiterated):**

Acceleration is the rate of change of velocity. It's the increase in speed or change in direction over time.

**97. Momentum:**

Momentum is the product of an object's mass and velocity. It reflects an object's quantity of motion and is conserved in the absence of external forces.

**98. Angle of Pull:**

The angle of pull refers to the angle at which a muscle's force is applied relative to the bone it moves. It affects the muscle's effectiveness in producing movement.

**99. Waddling Gait:**

The waddling gait is a walking pattern characterized by a wide and unsteady side-to-side movement of the hips. It's often associated with certain musculoskeletal or neuromuscular conditions.

**100. General Contraindications for Active Exercise:**

Contraindications include:

a. Acute pain or inflammation.

b. Severe cardiac conditions.

c. Uncontrolled hypertension.

d. Recent surgery or injury.

**101. Kinetic Energy:**

Kinetic energy is the energy possessed by an object due to its motion. It depends on mass and velocity and can be transformed into other forms of energy.

**102. Stride Stand:**

Stride stand is a stance where the feet are positioned slightly apart, providing a stable base for balance and functional activities.

**103. Factors Causing Bad Posture:**

Factors include:

a. Weak muscles.

b. Poor ergonomics.

c. Muscle imbalances.

d. Lack of awareness.

e. Structural abnormalities.

**104. Fast Twitch Fatigue Resisted Muscle Fiber:**

Fast-twitch fatigue-resistant muscle fibers are a type of muscle fiber that contracts rapidly and is resistant to fatigue. They contribute to sustained, powerful movements.

**105. Parameters Used in Traction:**

Parameters include:

a. Force or weight of traction.

b. Duration of treatment.

c. Angle of pull.

d. Patient positioning.

**106. Circular Kneading:**

Circular kneading is a massage technique involving circular movements with the hands, applying pressure to the underlying tissues. It's used to release tension and improve circulation.

**107. Angle of Pull:**

The angle of pull refers to the angle at which a muscle's force is applied relative to the bone it moves. It affects the muscle's effectiveness in producing movement.

**108. Muscle Tone:**

Muscle tone is the inherent tension present in a muscle at rest. It helps maintain posture, stability, and readiness for movement.

**109. Facilitation:**

Facilitation involves enhancing neural pathways to promote efficient muscle contraction and movement patterns. It's often used in rehabilitation settings.

**110. Static Posture:**

Static posture refers to the body's alignment and positioning while at rest or during non-moving activities. It influences musculoskeletal health.

**111. High Standing:**

High standing refers to standing on the toes or the balls of the feet. It engages calf muscles and can be used for balance training.

**112. Goniometer:**

A goniometer is a measuring instrument used to assess joint angles and range of motion. It's commonly used in physical therapy and rehabilitation.

**113. Gravity:**

Gravity is the force that attracts objects with mass toward one another. It affects posture, movement, and exercise.

**114. Limb Length Assessment:**

Limb length assessment involves measuring the true or apparent length of limbs to identify discrepancies, assess alignment, and plan interventions.

**115. Newton's Law of Inertia:**

Newton's First Law of Motion states that an object at rest will remain at rest, and an object in motion will continue moving at a constant velocity, unless acted upon by an external force.

**116. Translatory Motion:**

Translatory motion refers to motion in which an object moves along a straight line, without rotation. It involves linear displacement and is a common type of movement.

**117. Definition of Pulley:**

A pulley is a simple machine consisting of a grooved wheel that rotates around an axle. It's used to change the direction of force or transmit force.

**118. Multipennate Muscle:**

A multipennate muscle is a muscle with multiple sets of fibers that insert diagonally into a central tendon from different angles. This arrangement increases the muscle's force-generating capacity.

**119. Stroking Manipulation:**

Stroking manipulation is a massage technique involving light gliding strokes applied to the body. It's often used in the initial stages of a massage session to warm up the tissues.

**120. Passive Range of Motion:**

Passive range of motion refers to the extent of movement that can be achieved when an external force moves a joint or body part without the person using their own muscles.

**121. Concentric Contraction:**

Concentric contraction occurs when a muscle shortens as it generates force against a resistance. It's the type of contraction used when lifting a weight.

**122. Rhythmic Initiation (Reiterated):**

Rhythmic initiation is a technique used in neuromuscular facilitation (PNF) stretching. It involves passive movement followed by active-assistive movement and then active movement to enhance motion control.

**123. Motor Unit:**

A motor unit consists of a motor neuron and the muscle fibers it innervates. When the motor neuron fires, all the muscle fibers in its motor unit contract together.

**124. Synergist:**

A synergist is a muscle that assists the action of the prime mover muscle to produce a desired movement. It helps stabilize joints and refine movements.

**125. Support:**

Support refers to maintaining stability and balance by engaging muscles or using external aids such as crutches or braces.

**126. Posture Tone:**

Posture tone is the muscle tension required to maintain an upright posture against the force of gravity. It contributes to postural stability.

**127. D2 Flexion:**

D2 flexion is a movement pattern involving diagonal flexion of the upper extremity in a specific plane. It's often used in rehabilitation exercises.

**128. D1 Flexion:**

D1 flexion is another diagonal movement pattern involving flexion of the upper extremity, but in a different plane from D2. It's used in movement retraining.

**129. Hubbard Tank:**

A Hubbard tank is a large pool used for aquatic therapy and rehabilitation. It provides buoyancy, resistance, and temperature control to aid in various exercises.

**130. Precautions and Contraindications of Stretching:**

- Precautions:
- Avoid overstretching to prevent injury.
- Warm up before stretching to avoid muscle strain.
- Avoid aggressive stretching for individuals with joint instability.
- Contraindications:
- Acute injuries or inflammation.
- Recent fractures or surgeries.
- Nerve-related conditions like radiculopathy.
- Ligamentous laxity.

**131. Effects and Uses of Half Lying Position:**

❖ Effects:

- Provides support and relaxation.
- Reduces pressure on the lower back.

❖ Uses:

- Posture correction and alignment.
- Relaxation during certain exercises or stretches.

**132. Delayed Onset of Muscle Soreness (DOMS):**

DOMS is muscle soreness that develops 24-48 hours after strenuous exercise. It's caused by microscopic damage to muscle fibers and is a natural part of muscle adaptation.

**133. Isokinetic Exercise:**

Isokinetic exercises involve using specialized equipment to maintain a constant speed of movement throughout the entire range of motion. It's used for strength and rehabilitation.

**134. Frenkel's Exercise for the Legs in Standing:**

Frenkel's exercise involves rhythmic movements to improve coordination and proprioception. In standing, it could include lifting the legs in various patterns to enhance balance and control.

**135. Indications and Contraindications for Mulligan's Technique:**

- ❖ Indications:
    - Joint pain or dysfunction.
    - Restricted range of motion.
- ❖ Contraindications:
    - Severe pain.
    - Inflammation
    - Instability.

**136. Definition of Percussion Manipulation and Two Uses:**

Percussion manipulation is a massage technique involving rhythmic tapping or striking. Uses include:

Loosening mucus in the chest during respiratory therapy.

Stimulating circulation and relaxation of muscles.

**137. Meditation:**

Meditation is a practice involving focused attention to achieve mental clarity, relaxation, and inner peace. It has numerous physical and mental health benefits.

**138. Examples of All Orders of Levers:**

a. First-order lever: Seesaw (fulcrum between effort and load).

b. Second-order lever: Wheelbarrow (load between fulcrum and effort).

c. Third-order lever: Tweezers (effort between fulcrum and load).

**139. Limitations of Goniometry:**

a. Accuracy depends on examiner's skill.

b. Limited for complex joint movements.

c. Doesn't measure muscle length or soft tissue restriction.

d. May not account for compensatory movements.

**140. Stretching Techniques for Calf Muscle Tightness:**

a. Gastrocnemius Stretch: With straight knee.

b. Soleus Stretch: With bent knee.

c. Wall Stretch: Using a wall for support.

**141. Functional Re-Education and Stages from Lying to Sitting:**

Functional re-education is restoring functional movements after an injury. Stages include:

a. Supine to sidelying.

b. Sidelying to sitting on edge of bed.

c. Sitting on edge of bed to standing.

**142. Types of Resisted Exercises with Examples:**

a. Isometric: Plank hold.

b. Isotonic Concentric: Bicep curl.

c. Isotonic Eccentric: Lowering in a push-up.

**143. Tests of Sensation:**

Tests like light touch, sharp-dull discrimination, and two-point discrimination assess the sensitivity and integrity of sensory pathways.

**144. Definition of Coordination and Non-Equilibrium Tests:**

Coordination is the ability to perform smooth, controlled movements. Non-equilibrium tests include:

- Finger-to-Nose Test.
- Heel-to-Shin Test.

**145. Pulmonary Function Tests:**

Pulmonary function tests measure lung capacity and function, including parameters like forced vital capacity (FVC) and forced expiratory volume (FEV1).

**146. Biaxial Joint Movement:**

Biaxial joint movement occurs around two perpendicular axes, allowing motion in two planes. Examples include the condyloid joint of the wrist and the saddle joint of the thumb.

**147. Diaphragmatic Breathing Exercise:**

Diaphragmatic breathing, also known as deep belly breathing, involves using the diaphragm for inhalation and exhalation. It helps improve lung function and relaxation.

**148. Purpose and Uses of Bridging:**

- Purpose:
- Strengthening the glutes, hamstrings, and core.
- Mobilizing the spine.
- Uses:
- Rehabilitation after lower back injuries.
- Improving pelvic stability.

**149. Definition of Hooke's Law:**

Hooke's Law states that the force required to stretch or compress an elastic material is directly proportional to the amount of deformation produced.

**150. Stride Stance:**

Stride stance is a standing position with one foot forward and the other foot behind. It provides stability and balance during certain activities.

**151. Agility Exercises:**

Agility exercises involve quick changes in direction, speed, and body position. They enhance dynamic balance, coordination, and reaction time.

**152. Buoyancy and its Clinical Significance:**

Buoyancy is the upward force exerted by a fluid on an object immersed in it. In aquatic therapy, buoyancy reduces the impact on joints and allows for pain-free movement during exercises.

153. **Stunt and Spurt Muscles**:

Stunt muscles are slow-growing muscles with a high endurance capacity. Spurt muscles are fast-growing muscles with a higher potential for hypertrophy.

**154. Break Test:**

The break test is a method used in manual muscle testing. It involves applying resistance to assess the strength of a muscle contraction until the muscle breaks under resistance.

**155. Derived Positions Attainable from Lying Position:**

Derived positions include:

a. Supine to Side-Lying.

b. Supine to Sitting.

c. Supine to Hook-Lying.

**156. Closed Chain Exercises:**

Closed chain exercises involve movement of a distal joint while the proximal joint remains fixed. Examples include squats and push-ups.

**157. Precautions and Contraindications for Hydrotherapy:**

- Precautions:
- Cardiovascular conditions.
- Respiratory conditions.
- Contraindications:
- Open wounds or infections.
- Uncontrolled seizures.
- Severe fear of water.

**158. Causes for Impaired Balance:**

a. Vestibular disorders.

b. Neurological conditions.

c. Musculoskeletal injuries.

d. Aging-related changes.

**159. Causes for Incoordination:**

a. Neurological disorders.

b. Muscle weakness.

c. Medication side effects.

d. Joint instability.

160. **Contraindications for Mobilization Technique:**

Contraindications include:

Active infection or inflammation.

Fractures or suspected fractures.

Joint instability.

Recent surgery.

Severe pain.

**160. Facilitated Stretching:**

Facilitated stretching involves a partner providing assistance to increase the intensity of a stretch. It uses proprioceptive neuromuscular facilitation (PNF) techniques to enhance flexibility.

**161. Degrees of Relaxation:**

Degrees of relaxation refer to different levels of muscle tension, ranging from complete relaxation to maximal contraction. It's important for controlling movement and reducing muscle strain.

**162. Principles for Isometric Exercise Prescription:**

a. Duration: Typically held for 5-10 seconds.

b. Intensity: High intensity for muscle activation.

c. Frequency: Multiple sets throughout the day.

d. Rest: Adequate rest between repetitions.

**163. Uses of Mat Exercise:**

a. Core strengthening.

b. Flexibility improvement.

c. Rehabilitation after injuries.

d. Balance and coordination training.

**164. SAID Principle:**

The SAID (Specific Adaptations to Imposed Demands) principle states that the body will adapt specifically to the type of stress or demand placed on it during training.

**165. Limitations of Manual Muscle Testing:**

a. Subjectivity of examiner's force application.

b. Difficulty testing certain muscle groups.

c. Doesn't provide information about muscle function in dynamic activities.

**166. Dynamic Power Tests:**

Dynamic power tests measure an individual's ability to generate force quickly, often involving explosive movements. Examples include vertical jump tests.

**167. Macqueen Training:**

Macqueen training is a type of circuit training involving a sequence of exercises targeting different muscle groups. It's designed for general fitness and endurance.

**168. Three Uses of Active Exercises:**

a. Muscle strengthening.

b. Enhancing joint stability.

c. Improving cardiovascular fitness.

**169. Vertical Suspension:**

Vertical suspension refers to lifting a part of the body off the supporting surface while maintaining contact with it. It's often used to challenge balance and stability.

**170. Muscle Tone and Postural Tone:**

Muscle tone refers to the inherent tension present in a muscle at rest. Postural tone is the muscle tone required to maintain an upright posture against gravity.

**171. Four Uses of Effleurage:**

Effleurage is a massage technique involving gliding strokes. Uses include:

a. Relaxation and stress reduction.

b. Enhancing circulation.

c. Warming up tissues before deeper techniques.

d. Application of oils or lotions.

**172. Equilibrium:**

Equilibrium is a state of balance achieved when opposing forces or factors are balanced and stable.

**173. Normal End Feel:**

Normal end feel is the sensation felt by a therapist during passive joint movement when normal anatomical structures provide resistance, such as soft tissue approximation or bone contact.

**174. Endurance Test:**

An endurance test assesses a person's ability to sustain a specific activity or movement over a prolonged period. It's commonly used to evaluate cardiovascular fitness.

**175. Two-Point Gait:**

Two-point gait is a walking pattern using two crutches or canes and both legs. The sequence involves moving one crutch and the opposing leg together, then repeating with the other side.

**176. Rhythmic Stabilization and Its Uses:**

Rhythmic stabilization is a PNF technique involving isometric contractions against alternating resistance. Uses include:

**177. Improving stability and coordination.**

Enhancing joint proprioception.

Reducing muscle guarding.

**178. Trigger Point Release:**

Trigger point release involves applying pressure to specific knots in muscles, known as trigger points, to alleviate pain and tension. Techniques include deep pressure and stretching.

**179. Picking Up Manipulation:**

Picking up manipulation is a massage technique involving lifting and squeezing a muscle to promote circulation, relaxation, and relief from muscle tension.

**180. Uses of Yoga in Physiotherapy:**

a. Improving flexibility and joint range of motion.
b. Enhancing posture and alignment.
c. Stress reduction and relaxation.
d. Rehabilitating injuries and managing pain.

**181. Measurement of Apparent Limb Length:**

Apparent limb length is measured using a tape measure from a reference point, such as the anterior superior iliac spine, to a specific landmark on the body. It helps identify limb length discrepancies.

**182. Centralization in McKenzie Method:**

Centralization refers to the phenomenon where radiating pain in the extremities moves closer to the spine during specific movements in the McKenzie Method. It's considered a positive sign of improvement.

**183. Effects and Uses of Active Assisted Exercises:**

Effects:

Improved joint range of motion.

Increased muscle activation.

Uses:

Rehabilitation after injury or surgery.

Enhancing joint mobility without straining.

**184. Delayed Onset of Muscle Soreness (DOMS) (Reiterated):**

DOMS is muscle soreness that develops 24-48 hours after intense exercise. It's caused by microscopic muscle fiber damage and is a normal part of training adaptation.

**185. Components of D1 Flexion Pattern in Upper Extremity:**

The components involve a diagonal movement pattern that crosses the body in a specific plane. For upper extremity D1 flexion:

Shoulder flexion and adduction.

Elbow flexion and forearm supination.

Wrist and finger flexion.

**186. Classification of Passive Movements Delivered to a Joint:**

Passive movements can be classified as:

a. Accessory movements: Gliding, rolling, and spinning.

b. Physiological movements: Flexion, extension, abduction, adduction, etc.

**187. Causes for Incoordination:**

a. Neurological disorders.

b. Muscle weakness.

c. Joint instability.

d. Medication side effects.

**188. Properties of Water:**

a. Buoyancy: Supports body weight.

b. Resistance: Provides gentle resistance to movement.

c. Hydrostatic Pressure: Aids in reducing swelling.

d. Thermal Properties: Allows temperature control.

**189. Postural Drainage and Two Indications:**

Postural drainage is a technique where body positioning is used to help drain mucus from the lungs. Indications include:

Conditions with excess mucus (e.g., cystic fibrosis).

Atelectasis (collapsed lung tissue).

**190. Importance of Warm-Up Period in Aerobic Exercise:**

The warm-up period gradually increases heart rate, circulation, and muscle temperature. It prepares the body for more intense aerobic activity, reducing the risk of injury and improving performance.

**191. Multiple Angle Isometrics:**

Multiple angle isometrics involve performing isometric contractions at various joint angles to strengthen muscles at different positions, improving strength throughout the range of motion.

**192. Derived Positions from Sitting:**

a. Supine.

b. Prone.

c. Side-Lying.

**193. Four Principles of Manual Muscle Testing:**

a. Stabilization: Stabilize proximal joints to isolate the muscle being tested.

b. Gravity Elimination: Use gravity to minimize its effect on testing.

c. Break Test: Gradually increase resistance to assess muscle strength.

d. Substitution Prevention: Prevent compensatory movements during testing.

**194. Principles of Training with Walking Aids:**

a. Proper Fit: Ensure correct height and alignment.

b. Weight-Bearing Progression: Gradually increase weight bearing as tolerated.

c. Gait Training: Teach proper gait pattern and posture.

d. Bilateral Support: Encourage use of walking aids on both sides for balance.

**195. Open and Closed Chain Exercise for Quadriceps:**

Open Chain: Leg extension with resistance machine. The foot is not fixed.

Closed Chain: Squats or leg press. The foot is fixed on the ground or a platform.

**196. Parameters Measured in Pulmonary Function Testing:**

a. Forced Vital Capacity (FVC).
b. Forced Expiratory Volume in 1 second (FEV1).
c. Peak Expiratory Flow (PEF).
d. Forced Expiratory Flow (FEF25-75%).

**197. Local and General Endurance:**

Local endurance refers to the ability of specific muscles to sustain contractions. General endurance relates to overall cardiovascular fitness and the ability to sustain prolonged activity.

**198. Centre of Gravity (COG) and Line of Gravity (LOG):**

COG is the point where the body's mass is evenly distributed. LOG is the vertical line passing through COG, determining stability and balance.

**199. Pendular Exercises:**

Pendular exercises involve passive, gentle swinging movements of a limb in response to gravity. They're often used to promote joint mobility and reduce stiffness.

**200. Lateral Costal Expansion Exercise:**

This exercise involves inhaling deeply to expand the ribs laterally, promoting improved lung expansion and breathing mechanics.

**201. Test for Neuromuscular Deficiency:**

A muscle strength or function test assesses muscle performance and identifies neuromuscular deficiencies that could impact movement and function.

**202. Indications for Trigger Point Release:**

Trigger point release is indicated for:

a. Muscle pain or tension.

b. Muscle knots or trigger points.

c. Musculoskeletal pain syndromes.

**203. Principle of Meditation:**

The principle involves focusing the mind and eliminating distractions to achieve mental clarity, relaxation, and self-awareness.

**204. Passive Insufficiency with an Example:**

Passive insufficiency occurs when a muscle's length is insufficient to allow full range of motion across multiple joints simultaneously. For example, the hamstrings are passively insufficient when trying to flex the hip and extend the knee simultaneously.

**205. Factors Responsible for Good Posture:**

a. Balanced Muscle Tone.

b. Proper Alignment of Joints.

c. Adequate Core Strength.

d. Awareness and Habituation.

**206. Uses of Cool Down Exercises:**

a. Gradually decrease heart rate and circulation.

b. Prevent blood pooling in extremities.

c. Reduce muscle soreness.

d. Promote flexibility and relaxation.

**207. Coughing and Huffing:**

Coughing and huffing are respiratory exercises used to clear mucus and improve lung function in individuals with respiratory conditions. Huffing involves a forced exhalation with an open glottis.

**208. Equilibrium Board:**

An equilibrium board is a balance training device used to challenge and improve balance control and stability. It has an unstable surface that forces the body to adapt and maintain equilibrium.

**209. Diaphragmatic Breathing Exercise and Uses:**

Diaphragmatic breathing involves using the diaphragm for inhalation. Uses include:

a. Relaxation and stress reduction.

b. Improving lung expansion and oxygenation.

**210. Three Exercises to Mobilize a Stiff Shoulder:**

a. Codman's Pendulum Exercises.

b. Shoulder Flexion Against Wall.

c. Cross-Body Shoulder Stretch.

**211. Four-Point Gait Pattern:**

Four-point gait is a walking pattern using two assistive devices and both legs. The sequence involves moving one crutch, then the opposite leg, followed by the other crutch and leg.

**212. Stroking Manipulation:**

Stroking manipulation involves light gliding strokes applied to the body. It's often used to warm up tissues, promote circulation, and induce relaxation.

**213. Benefits of Asanas:**

a. Improved flexibility.

b. Enhanced muscle strength and tone.

c. Improved posture and alignment.

d. Stress reduction and relaxation.

**214. Circuit Weight Training:**

Circuit weight training involves performing a series of strength exercises with minimal rest in between. It combines cardiovascular and strength training benefits in one workout.

**215. Indication for Muscle Energy Technique:**

Muscle Energy Technique (MET) is indicated for:

Muscle imbalances and joint restrictions.

Enhancing joint range of motion.

Improving muscle coordination.

**216. Group Action of Muscles:**

Group action refers to the coordinated efforts of different muscles to produce a specific movement. It involves the prime mover (agonist), synergists, and stabilizers.

**217. Friction:**

Friction is a massage technique involving deep, circular movements applied with pressure to stimulate circulation, break down scar tissue, and reduce muscle tension.

**218. Trick Movements and Examples:**

Trick movements are voluntary actions performed without genuine effort. Examples include:

- Hoover's Sign (weak hip extension with no effort to extend the hip).
- Pseudo-Locking (fake locking of a joint).

**219. Define Prime Movers and Synergists:**

Prime Movers are the primary muscles responsible for a specific movement. Synergists are muscles that assist the prime movers to perform the movement effectively.

**220. Indications of Mat Exercises:**

a. Core strengthening.

b. Flexibility improvement.

c. Rehabilitation after injuries.

d. Balance and stability training.

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