BOWEN UNIVERSITY

COLLEGE OF HEALTH SCIENCES

BACHELOR OF PHYSIOTHERAPY PROGRAMME

FIRST SEMESTER EXAMINATION – 2022/2023SESSION

COURSE CODE/TITLE: PST 413/MUSCLE STRENGTHENING AND JOINT MOBILISATION

DATE: Thursday 15th MAY 2023 **TIME: 3HOURS**

INSTRUCTIONS

(i). Answer **ALL** questions;(ii) Questions 1 – 4(Section A) contains short answers questions; (iii). Choose the correct option in Questions 5 – 100(Section B) contains MCQ, choose the best (one) correct answer You can tick or circle your choice as appropriate iv) Essay, answer it in the answer booklet (Section C). (v). Return the question paper to the invigilator before leaving the examination hall

SECTION A

1) Which muscle strengthening protocol (technique) will be the most appropriate to recommend for a patient that has low cardiopulmonary endurance?

……

2) What is the full meaning of the acronym DAPRE in the strength training technique that requires both the Physiotherapist and the patient to determine when and how much a weight or resistance is increased

…….....

3) Which of the principle of muscle strengthening is described as following:
Detraining, reflected by a reduction in muscle performance, begins within a week or two after the cessation of resistance exercises and continues until training effects are lost. This is why, it is imperative that gains in strength and endurance are incorporated into daily activities as early as possible in a rehabilitation program.
……..

4) In which of the protocols of muscle strengthening is the suggested initial working weight recommenced as 6 RM

…..……..

SECTION B

5) Muscle endurance is developed by

a) Increasing the speed of movements b) Increasing the time between sets

c) Increasing the amount of weight lifted or resistance applied

d) Increasing the number of repetitions e) All of the above

6) Mrs Collins plan to exercise on a stationary cycle for 30 minutes in her target heart rate zone. Which of the following would be an appropriate cool-down routine for this activity?

a) continuing to cycle at a much slower pace for about 5 minutes, followed by light stretching
b) sitting still until the heart rate returns to its resting rate, followed by a slow-paced, 5-minute walk
c) doing standing stretches for about 5 minutes, followed by about 5 minutes of floor stretches
d) performing various strength exercises, such as push-ups and curl-ups, for about 5 minutes
e) All of the above

7) As a distance runner lifting heavy weights on the biceps is a waste of time. This is the training principle of

a) Specificity
b) Progression
c) Overload
d) Reversibility
e) SAID

8) A good training method for developing muscular power is

a) Plyometrics
b) Continuous
c) Fartlek
d) Repetition
e) Circuit training

9) A professional Boxer who becomes injured and cannot train may lose muscular endurance. This is anexample of which principle of training?

a) Specificity b) progression

c) Intensity d)reversibility e) SAID

10) Working beyond your comfort zone in training to force an adaption is a definition of whichprinciple of training?

a. progression

b. overload

c. specificity

d. intensity

e. SAID

11) Increasing your training from 3 days a week to 4 is a way of adhering to the FITT principle.Which part of the principle is this referring to?

a. type

b. time

c. intensity

d. frequency

e. repetitions

12) Which of the following is a benefit of taking part in a warm-up?

a. prevents injury
b. increases flexibly of the muscles

c. increase size of muscles

d. makes you happy

e. All of the above

13) As a physiotherapist, how should you train your patient/client in order to develop his muscular endurance?

a) Higher repetitions and lower intensity of weight

b) Lower repetitions and lower intensity of weight

c) Higher repetitions and higher intensity of weight

d) Lower repetitions and higher intensity of weight

e) Higher repetitions and higher intensity of weight

14) All of the following are factors that influence muscle tension except

a. Location of muscle
b. Cross section and size

c. Speed of muscle contraction
d. Recruitment of motor fibers
e. Fiber type distribution

15) What is the difference between hyperplasia and hypertrophy?

a. A. Hyperplasia is an increase in cross sectional area of muscle and hypertrophy is an increase in muscle fibers
b. B. Hyperplasia and hypertrophy both result in an increase in size of muscle
c. C. Hyperplasia results in an increase in size of muscle, hypertrophy does not
d. D. Hyperplasia is an increase in muscle fibers and hypertrophy is an increase in cross sectional area of muscle
e. E. None of the above are true

16) In NWB strengthening exercises to the left Quads muscles the following are true

f. Distal segment is fixed
g. Distal segment moves freely
h. Is open chained
i. A and C
j. B and C

17)To retain training adaptations, the best approach in maintenance training is to:

a) Maintain the same training frequency and number of sets for each exercise but reduce the intensity.
b) Reduce the number of sets and intensity but maintain the training frequency.
c) Reduce the number of sets and training frequency but maintain intensity.
d) Reduce intensity, frequency and the number of sets.
e) None of the above

18) In regard to principles of strength training, it is true that:

a) In weight training, progression can be achieved only by increasing the weight lifted.
b) In isokinetic training, progression can be achieved only by increasing the number of repetitions done per set.
c) One basis for specificity of movement pattern in training is that some motor units within a muscle may be preferentially activated in a particular anatomical movement.
d) All of the above
e) Only option A and B

19) The main advantage of using a circuit over a straight set system in weight training is that the circuit system:

a) Produces twice the training stimulus for increased strength and muscle mass.
b) Allows for shorter interset rest periods, and thus shortens the duration of training sessions.
c) Allows for an increased training frequency per muscle group/exercise.

d) Prevents muscle glycogen depletion during a training session
e) Option B and C only

20) Adaptations in tendons in response to strength and power training may include:

a) An increase in tendon cross-sectional area.
b) An increase in tendon stiffness.
c) An increase in tendon strain tolerance.
d) All of the above.
e) Option A and C only

21) As a result of strength training, the change in muscle tissue **least** likely to occur is:
a) Increased number of myosin filaments.
b) Increased size (diameter) of myosin filaments.
c) Increased number of myofibrils.
d) Increased size (diameter) of myofibrils.
e) Option A and C only

22) As a Physiotherapist all these are determinants resistance program EXCEPT

a) Stabilisation of the proximal or distal joint to prevent substitution

b) Alignment of the segments of the body during exercise

c) The mode of the exercise

d) Integration of exercise into functional activities

e) Volume of the exercise: Total number of sessions and exercise duration

23) Which of the following is an examples of isometric contraction exercises EXCEPT?

a) Muscle setting exercise b) Stabilisation exercise c) Multi angle isometrics d. Circuit training exercise e) Option a and b

24) Which of the following statements is TRUE?

a) Muscle power is the ability of a muscle to contract and resist fatigue over an extended period of time

b) Muscle strength is the ability of a muscle to contract and resist fatigue over an extended period of time

c) Muscle endurance is the ability of a muscle to contract and resist fatigue over an extended period of time

d) Muscle performance comprises muscle strength, endurance training and muscle power

e) All of the above

25) All the following are variations of stabilization exercise EXCEPT

a. Segmental stabilization b. Rhythmic stabilization c. Alternative isometrics d. Dynamic stabilization
e. Multiple-angle isometrics

26) Which of the following is TRUE about motor unit in muscle strengthening
a) Number of muscle fibres affect the diameter of the axon of the neuron involved b) number of muscle fibres affects the magnitude of the response to a stimulus.
c) Few motor units are recruited for gross movements
d) Fine movements requires many motor units
e) Option c and d

27) Which of the following is NOT a consideration in applying the overload principle
a) Fatigue b) Underlying pathology c) Stage of tissue healing d) Volume of exercise e) Option a and d

29) Which of the following is NOT a modalty for muscle strengthening …
a) Static exercises b) Open and closed kinetic chain exercises c) Isokinetic exercises d) Dynamic manual exercises e) Option a and d

30) All these are precautions to take during resistance exercise training EXCEPT
a) Pathophysiology of the muscles b) Exercise induced muscle soreness c) Valsalva maneuver d) Overtraining and overwork e) Option a and c

31) All the following are false about muscle contraction exercise EXCEPT
a) Isotonic exercises are required during the early stage of tissue healing
b) Isokinetic exercises require the uses of specialized machines
c) Isometric exercise increases muscle tone and bulk and the angle of the joint
d) option a and c
e) Option a and d

32) Which of the following is TRUE about closed kinetic chain exercises
a) The proximal part of the joint is fixed
b) The distal part of the joint is free to move
c) Press up exercise is an example
d) The proximal part is fixed while the distal part of the joint is free
e) Walking on the treadmill is an example

33) Which of the following is true about open kinetic chain exercises EXCEPT?
a) Push up is an example
b) Biceps curl up with dumbbell in supine lying is an example
c) Bicycle ergometry exercise to the lowerlimbs is an example
d) Option b and c
e) Walking on the treadmill is an example

34)Which of the following can be used to determine the amount of exercise (training) load i.e the intensity of exercise at the beginning of a strength training program
……..
a) Repetition maximum b) Percentage of the body weight c) Free weights d) Option a and b

35) Which of the following is FALSE?
a) Type I muscle fibres fatigue easily than Type II
b) Slow twitch fibres is recruited more during endurance training
c) Fast twitch fibres is recruited more during strength/power training
d) Type II muscle fibres fatigue easily than Type I
e) All of the above

36) Which of the following are true concerning exercise order during muscle strength training EXCEPT?
a) Small muscle groups before large muscle group
b) Multi joint motion before single-joint motion
c) Higher intensity exercise before lower intensity exercise
d) Option b and c
e) All of the above

37) All the following about intensity during muscle strengthening are false EXCEPT

a) Highly trained individuals 30%-40% of IRM

b) Patients with significant strength impairments 30%-50% of 1RM

c) Elderly/Sedentary individuals/Children/untrained individuals 80%-90% of 1 RM

d) Option a and b

e) All of the above

38) The frequency of muscle strengthening program is dependent on the following **EXCEPT**

a) Intensity and volume

b) Physiotherapist's goal and patient health status

c) Response to the strengthening program

d) Option A and B

e) Option B and C

39) All the following is true about muscle strengthening EXCEPT

a) There is direct relationship between intensity and the volume of resistance exercise

b) Passive recovery is less efficient than active recovery to neutralize the effects of fatigue

c) Recovery period is dependent on the intensity, volume of exercise and the health status

d) Prepubescent children and the elderly frequency of exercise should be between 2-3 sessions weekly.

e) Option B and C

40) The following are equipments used in muscle strengthening program EXCEPT

a) Reciprocal exercise equipment

b) Closed- chain training equipments

c) Free weights

d) Plyometric equipments

e) Option A and B

41) The following are true about Plyometric training EXCEPT

a) Stretch cycle: eccentric loading phase

b) Appropriate in the early stage of rehabilitation of active individuals requiring high level of physical performance

c) Amortization phase: period of time between stretch and shortening cycles

d) Shortening cycles: concentric phase

e) Option A and C

42) Which principles of muscle strengthening state that "If muscle performance is to improve, a load that exceeds the metabolic capacity of the muscle must be applied; and adaptive changes in the body's systems, such as improved muscle performance, in response to a resistance exercise program are transient unless training-induced improvements are regularly used for functional activities, detraining (deconditioning) set in" ?

a) Overloading and Reversibility principles
b) Reversibility and Specificity principles
c) Overloading and Specificity principles
d) Neural Adaptability and Reversibility principles
e) Overloading and Neural Adaptability principles

43) How many weeks does it take for muscle performance detraining to start taking place after cessation of resistance training?

a) 1-2 weeks
b) 2-3 weeks
c) 3-4 weeks
d) 4-5 weeks
e) 4-6 weeks

44) Concerning cross training effect aka cross education, which of the is TRUE

a) Transfer of muscle strength from a trained limb to a untrained ipsilateral limb in a resistance training program
b) Transfer of muscle strength from an unexercised limb to an exercised,contralateral limb in a resistance training program
c) Transfer of muscle strength from an non-exercised limb to a exercised,ipsilateral limb in a resistance training program
d) Transfer of muscle strength from an exercised limb to a nonexercised, contralateral limb in a resistance training program
e) Option a and b

45) Which of the following is not incorrect?

a) During immobilization of a limb due to fracture, the type I muscle fibres atrophies faster than type II muscle fibres
b) During immobilization of a limb due to fracture, the type II muscle fibres atrophies faster than type I muscle fibres
c) During immobilization of a limb due to fracture, the fast twitch fibres atrophies faster than slow twitch fibres
d) During immobilization of a limb due to fracture, the slow twitch fibres atrophies faster than fast twitch fibres
e) Option a and d

46) Compression test for shoulder joint can be used to diagnose (a) shoulder OA (b) shoulder fracture

(c) Frozen shoulder (d) shoulder dislocation

47) Trendelenburg Test confirms weakness of (a) gluteal medius (b) gluteal maximus (c) gluteal minimum (d) none of the above

48) Partick's test is used for (a) knee and Hip joint (b) elbow and shoulder joint (c) SI and Hip joint (d) Ankle and knee joint.

49) Muscle strength is assessed by (a) by using very high velocity testing to examine the peak torques produced (b) using low velocity testing to examine the torques produced.

(c)It is assessed by using slow velocity testing to examine the peak torques produced. (d) It is assessed by using medium velocity

In order to increase ROM of a stiff joints mentioned in questions 50-60, which of the following

techniques of mobilization is most appropriate considering the distal segment of such a joint.
(a) anterior glide (b) distraction (c) posterior glide (d) ventral glide (e) caudal glide
50) Flexion of elbow joint
51) Extension of knee joint
52) Flexion of the knee
53) Hip flexion
54) Wrist flexion
55) Shoulder circumduction
56) Shoulder Abduction
57) Shoulder extension
58) Hip internal rotation
59) increase movement of the fibular head
60)to reposition a posteriorly subluxed head

Use the following grades of mobilization techniques to answer Questions 61 to 65
(a) Grade 1 (b) Grade II (c) Grade III (d) Grade IV (e) Grade V
61) small amplitude movements performed with three to four oscillations per second
62) This amplitude of motion may cause slight discomfort to the patient.

63)it is sometimes better tolerated because the joint motion is very small
64) high velocity thrust at end of available range

65) this is a very relaxing treatment technique

Use the following gliding techniques to answer Questions 66 to 74 (a) dorsal (b) lateral (c) volar (d) radial (e) ulna glide
66) To increase patellar mobility
67) Increase flexion of the wrist
68) Increase extension of the wrist
69) Increase radial deviation
70) Increase ulna deviation
71) increase supination
72) increase pronation
73) the elbow flexed 70° and the forearm supinated 35° and pull the radial bone
74) the elbow flexed 70° and the forearm supinated 35° and push the radial bone

Use the following tests to answer questions 75-79: (a) Trendelenburg, (b)Patrick (c) Piriformis (d) Thomas (e) Ober

75) to determine if a patient has tightness of the tensor fasciae latae
76) to determine if a patient has tightness of the iliopsoas muscles
77) A positive test is reproduction of gluteal pain or radicular symptoms in the distribution of the sciatic nerve
78) A positive sign is indicated by the pelvis dropping toward the unsupported limb
79) a test designed to alert the examiner to the possibility of hip pathology or SI joint
80) One repetitive maximum is (a)is defined as the maximum weight the individual can lift just once (b) is define as the minimum weight the individual can lift just once (c) is

define as the maximum weight the individual can lift just ten times before fatigue (d) is define as the minimum weight the individual can lift ten times.

81) Muscle strength can be examined by measuring the following except (a) static strength (b) dynamic strength (c) strength at various speed(d) sustained contraction of a muscle for a period of time

82) Endurance can be estimated by (a) assessing the maximum number of repetitive muscle contraction somebody can perform (b) assessing the minimum number of repetitive muscle contraction somebody can perform (c) assessing the minimum number of repetitive muscle contraction somebody can perform (d) none of the above.

83) Muscular endurance can increase through the following EXCEPT (a) gain in muscular strength (b) changes in local metabolic rate (c) increase in circulatory functions (d) change in daily physical activities

84) Oxford muscle grading has how many scales (a) 2 (b) 4 (c) 5 (d) 6

85) Using oxford muscle grading scale, and manual muscle strength grading chart power 4 is equivalent to (a) poor (b) good (c) very good (d) normal

86) In femoral stress test, the stethoscope is placed over the (a) patellar (b) Thigh close to the inguinal region (c) pubic tubercle (d) over the anterior superior iliac crest.

87) Fulcrum test is used to assess (a) knee injury (b) traumatic fracture of femur (c) stress test of femur (d) Knee osteoarthritis

88) Quadrant test is for capsular tightness of the (a) Knee (b) ankle (c) shoulder (d) Hip

89) McConnel Test it is used for (a) knee joint (b) hip joint (c) patella-femoral joint (d) Shoulder joint

90) Compression test for shoulder joint can be used to diagnose (a) shoulder OA (b) shoulder fracture (c) Frozen shoulder (d) shoulder dislocation

91)Trendelenburg Test confirms weakness of (a) gluteal medius (b) gluteal maximus (c) gluteal minimum (d) none of the above

92) Patrick's test is used for (a) knee and Hip joint (b) elbow and shoulder joint (c) SI and Hip joint (d) Ankle and knee joint

93)Using a universal goniometer which is false, (a) movable arm points toward distal segment of the body (b) immovable arm point towards proximal segment (c) stationary arm points toward proximal segment d) movable arm points toward the proximal segment of the body

94)In using gravity reference goniometer, you observe (a) the angle between the long axis of the distal segment and the line of gravity (b) the angle between the long axis of the proximal segment and the centre of gravity (c) the angle between the short axis of the distal segment and the line of gravity (d) a-c

95)Waist to height ratio of ------- may predispose a man to a disease (a) 0.6 (b) 0.3 (b) 0.4 (d) 0.5

96)In measuring muscle strength, power 2 can be measured in ---------- plane (a) sagittal (b) Transverse (c) frontal (d) median

97)Wrist circumference is measured from (a) depression between the styloid process (c) styloid process (d) 5 cm below or above the wrist

98)Chest circumference is measured at the level of the (a) forth costosternal joint and sixth rib (b) Fifth costosternal joint and sixth rib (c) sixth costosternal joint and forth rib
99)Disease associated with high waist circumference includes except (a) type 2 diabetes, (b) heart disease (c) high blood pressure(d) type 1 diabetes
100) In measuring muscle strength, power 2 can be measured in ---------- plane (a) sagittal (b) Transverse (c) frontal d) horizontal

Each correct answer in section A and section B carries 1/5 mark

SECTION C

ESSAY

1) A patient came to you as a physiotherapist complaining of knee pain enumerate 7 various tests you need to perform and the indication for each of them. **(3 marks)**
2) Mention some therapeutic effects of joint mobilization techniques why it is important for patients with musculoskeletal dysfunction,**(3 marks)**
3) Design a biceps muscle training program for 35yrs old male athlete who is a heavyweight lifter using any of the protocols (techniques) of muscle strengthening. **(4 marks)**
4) As a Physiotherapist design a therapeutic guideline of Quadriceps strengthening program with proper documentation for the rehabilitation of a 72yrs old woman who underwent (Rt) total knee replacement(TKR) surgery after 2 weeks she was referred to you for rehabilitation.**(5 marks)**