ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2018
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALISATION PAPER FOR PHYSIOTHERAPY

Date : 7 October 2018
Total Marks : 100
Writing Time : 150 minutes (2.5 hours)
Reading Time : 15 Minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
   - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
     Part II - 4 Short Answer Questions

     All questions under SECTION A are COMPULSORY.
   - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **10 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions (30 marks)

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. The ankle and the foot are complex structures that work together during gait to provide balance as the body walks over an uneven ground. The ankle joint is responsible for
   a) lateral and medial adjustments.
   b) stability and forward motion.
   c) stability, lateral and medial adjustments.
   d) stability, forward motion and medial adjustments.

2. A patient complains of lower back pain that radiates down to the medial malleolus. On assessment, the patellar tendon reflex is decreased. The patient has difficulty walking on the toes. Sensation is decreased on the medial aspect of the tibia and medial malleolus. The patient is suspected of herniated nucleus pulposus. The root most likely affected is
   a) L3
   b) L4
   c) L5
   d) S1

3. A physiotherapist asks a female patient suspected of S1 nerve root compression to try waling on her toes. This test aims to check for muscle weakness. Walking on toes aims to tests which of the following muscles of the lower extremity?
   a) Flexor digitorum longus
   b) Flexor digitorum brevis
   c) Sartorius
   d) Extensor hallucis longus

4. A patient who has had a stroke is assessed by the physiotherapist before starting a course of physiotherapy intervention. On assessment, the patient demonstrates contralateral weakness, contralateral sensory loss of the toes, foot and leg, and inability to make decisions. Urinary incontinence is also noted. The artery that was most likely affected is:
   a) Internal carotid artery
   b) Vertebral artery
   c) Anterior cerebral artery
   d) Middle cerebral artery

5. An infant is diagnosed with correctible talipes equinovarus involving the right foot. The physiotherapist expects the following corrective interventions for the patient EXCEPT:
   a) Manipulation
   b) Casting
   c) Splintage
   d) Cincinnati incision

6. Assessment of a 3-month-old child reveals a palpable clunk when the left hip is reduced in and out the acetabulum. The child is suspected of developmental dysplasia of the hip with subluxation. Which of the following statements most accurately describes a subluxation?
   a) It refers to antenatal dislocation of the hip.
   b) It describes the ability to sublux the hip with passive movements.
   c) It involves incomplete contact between the articular surfaces of the femoral head and the acetabulum.
   d) It refers to complete absence of contact between the articular surface of the femoral head and acetabulum.

7. A physiotherapist is planning a treatment program for a patient who is recently diagnosed with lumbar spinal stenosis. The program would consists of conservative treatment modalities, including exercise and activity. Which of the following is LEAST likely included in the exercise program?
   a) Lumbar extension exercise
   b) Spinal flexion exercise
   c) Abdominal muscle strengthening
   d) Inclined treadmill testing

8. A patient demonstrates loss of muscle strength in all four extremities due to a spinal cord injury. Which of the following is accurately derived from the finding?
   a) The injury in the spinal cord involves the first lumbar segment.
   b) The patient's abdominal muscle strength is intact.
   c) The injury involves a segment below the first thoracic spinal nerve.
   d) The injury involves one of the cervical spinal segments.

9. A patient who complains of fatigue, difficulty swallowing, and weakness is diagnosed with myasthenia gravis. The physiotherapist, who is teaching the patient with various conservation methods, understands that this condition is most likely caused by which of the following?
   a) Insufficient secretion of acetylcholine
   b) Insufficient dopamine level
   c) Demyelination of the neurons
   d) Inflammation of the arachnoid and pia matter of the central nervous system

10. A distant runner has a transient episode of complete motor paralysis with minimal sensory involvement in the left lower extremity. The patient's history includes a recent compartment syndrome injury, which is believed to be strongly associated with the patient's symptoms at consult. The patient's acute nerve injury is most likely cause by which of the following mechanism?
    a) Mechanical injury
    b) Stretch injury
    c) Crush and percussion injury
    d) Penetrating trauma

11. Healing of injuries occurs in three phases: inflammation phase, proliferation phase, and remodeling phase. Which of the following occurs during the inflammation phase?
    a) Wound contraction
    b) Increased proteoglycans
    c) Increased extracellular collagen synthesis
    d) Neutrophil migration

12. Which of the following indicates accurate differences between effects of heat and those of cryotherapy?
    a) Heat therapy decreases muscle spasm; cold therapy increases muscle spasm.
    b) Heat therapy induces decreased tissue metabolism; cold therapy increase tissue metabolism.
    c) Heat therapy reduces spasticity caused by an upper motor neuron lesion; cold therapy decreases spasticity caused by an upper motor neuron lesion.
    d) Heat therapy sustains increased muscle contraction; cold therapy about 27 degree Celsius decreases the ability of muscle to sustain contraction.

13. A therapeutic exercise program usually consists of three steps that have to be followed sequentially to be effective. The first step is of the program consists of exercises that aim to regain flexibility and range of motion. Although flexibility and range of motion exercises are commonly interchanged, there are technical differences to consider. Which of the following accurately describes flexibility?
    a) It is affected by strength and mobility of joint capsule.
    b) It refers to the amount of movement possible at a given joint.
    c) It refers to the mobility and length to which muscles can extend.
    d) It refers to the maximum force that a muscle can exert.

14. The following are the physiological response to cold therapy during the first 15 to 20 minutes of cold exposure EXCEPT:
    a) Decreased circulation
    b) Decreased tissue stiffness
    c) Decreased arthrogenic muscle inhibition
    d) Decreased muscle spasms

15. A physiotherapist is evaluating a female patient who complains of moderate joint pain and morning stiffness lasting longer than 30 minutes. The patient has a reactive rheumatoid factor. The patient is diagnosed with rheumatoid arthritis. This musculoskeletal disorder is best described by which of the following statements?
    a) It is a degenerative joint disease that mainly affects the weight-bearing joints
    b) It is a chronic systemic inflammatory disease due to an immune complex disorder
    c) It is an age-related metabolic disease
    d) It is a degenerative disorder of the joints caused by wear and tear

16. Strains and sprains are among the most commonly reported musculoskeletal injuries. These injuries account for about 50% of work-related injuries. Sprains and strains are commonly interchanged, but they are two different injuries. Which of the following statements accurately describes these injuries?
    a) Strain cause joint instability.
    b) Sprain causes increased pain with isometric contraction of the muscle.
    c) Sprain is characterized by increased pain with joint motion.
    d) Strain involves an injury to ligament that is surrounding a joint.

17. When utilizing heat modalities, the physiotherapist considers the different conductivity properties of each tissue type. Which of the following tissues has the highest thermal conductivity?
    a) Muscle
    b) Skin
    c) Adipose tissue
    d) Cortical bone

18. A female patient reveals that there are times when her hands usually fall asleep. On history taking, the patient says that things usually slip from her gingers, without her noticing. The numbness is usually severe at night. Which of the following statements relate to these symptoms?
    a) Cubital tunnel syndrome and ulnar nerve
    b) Carpal tunnel syndrome and median nerve
    c) Guyon's tunnel syndrome and ulnar nerve
    d) Radial groove syndrome and radial nerve

19. Exercise is an essential part of anterior shoulder dislocation rehabilitation program as it can have a positive effect on muscular tissue and muscular strength. A physiotherapist gradually initiates a group of exercises that involve constant velocity of shoulder movement with variable resistance. The resistance is given throughout the muscle action to allow maximum tension. This type of exercise is classified as:
    a) Isokinetic
    b) Isometric
    c) Isotonic
    d) Aerobic

20. A physiotherapist is treating an elderly patient after a prolonged admission in an acute care facility. The patient is maintained on pain medications and diuretics. Before starting an exercise session, the patient complains of fatigue, leg cramps and palpitations. The therapist suspects that these signs and symptoms are indicative of:
    a) Arterial claudication
    b) Hyperglycemia
    c) Hypokalemia
    d) Deep vein thrombosis

21. A 55-year-old non-atheletic and healthy patient is referred for an exercise program. For beginners, a good target heart rate should be 60% of the maximum heart rate. What is the correct target heart rate during exercise for the patient?
    a) 99
    b) 105
    c) 165
    d) 175

22. Compared to an individual who lives a sedentary lifestyle, a physically fit person usually demonstrates a different physiological profile. The following are the characteristic features of improved endurance EXCEPT:
    a) Greater muscle strength.
    b) Better adaptation of circulation and respiration to effort.
    c) Lower blood pressure on exercise.
    d) Lower heart rate on exercise.

23. A female patient is about to get married in three months. The patient would like to delay pregnancy at least one year after the wedding. The physiotherapist is correct to inform the patient that which of the following is the most EFFECTIVE contraception?
    a) Intrauterine device
    b) Progestin-only pill
    c) Progestin-estrogen contraceptives
    d) Mifepristone

24. A female patient informs a physiotherapist that she has been having problems with sexual intercourse and physical sexual responses since the spinal cord injury. The injury occurred a year-and-half before consult. The history of the patient reveals complete motor neuron injury affecting the S2-S5 segments. Which of the following sexual dysfunctions is most likely reported by the patient?
    a) Absence of vaginal lubrication with sexual stimulation
    b) Involuntary tightness of the vagina
    c) Difficulty achieving orgasm
    d) Loss sexual desire

25. A physiotherapist reviews the medication list of a patient who is maintained on bronchodilators for the management of bronchial asthma. Which of the following is a common side effect of bronchodilators?
    a) Hypertension
    b) Sedation
    c) Tachycardia
    d) Muscle spasm

26. A female patient with trigeminal neuralgia is prescribed to undergo non-pharmacologic and pharmacologic intervention to control and manage pain. Which of the following medications is most likely prescribed to the patient as it is considered the first-line therapy for trigeminal neuralgia?
    a) Gabapentin
    b) Carbamazepine
    c) Phenytoin
    d) Baclofen

27. A physiotherapist is observing a patient who is walking with crutches. The patient advances both crutches forward, and then swings both legs past the crutches at the same time. Based on the sequence, the patient is demonstrating which crutch gait?
    a) Two-point crutch gait
    b) Swing-to crutch gait
    c) Swing-through crutch gait
    d) Tripod crutch gait

28. A physiotherapist is treating a patient with inability to extend the cervical spine more than 30% of its normal range due to central cervical pain at the C5-C6 level. The patient has been complaining of cervical pain for the past three days. A positional release is performed by the therapist. Which of the following is the most appropriate method in opening the affected foramen?
    a) Forward flexed, side-bent ipsilaterally, and partially rotated contralaterally
    b) Forward flexed, side-bent contralaterally, and partially rotated contralaterally
    c) Forward flexed side-bent ipsilaterally, and rotated contralaterally
    d) Forward flexed, side-bent contralaterally, and rotated contralaterally

29. Open-chain exercises or closed-chain exercises are usually part of the exercise prescription given to a patient. Which of the following activities is classified as an open-chain exercise?
    a) Bicep curls
    b) Squats
    c) Push-ups
    d) Leg press

30. A physiotherapist is instructing a person who had a left CVA and right lower extremity hemiparesis to use a quad cane. Which of the following is the most appropriate gait sequence?
    a) Place the cane in the patient's right upper extremity, encourage cane, then right lower extremity, then left upper extremity gait sequence.
    b) Place the cane in the patient's left upper extremity, encourage cane, then right lower extremity, then left upper extremity gait sequence.
    c) Place the cane in the patient's left upper extremity, encourage cane, then left lower extremity, then right upper extremity gait sequence.
    d) Place the cane in the patient's right upper extremity, encourage cane, then left lower extremity, then right upper extremity gait sequence.

PART II – Short Answer Questions (20 marks)

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. Draw a labelled diagram of a neuron. Describe grading and features of peripheral nerve injury (2+3).
2. Define joint. Classify & sub-classify the joints with examples. Illustrate wherever necessary. (1+4)
3. List five factors that increase risk of disc herniation. How will you educate a patient to prevent low back pain? (2+3)
4. Explain Pain. Provide methods of pain assessment and evaluation. Mention pain intervention strategies (1+2+2)

SECTION B

Case Study

Choose either Case I OR Case II from this section. Each case study carries 50 marks.

Case I

Mr. Wangyel, 69 years old, father of three children, developed sudden onset of nausea and vomiting on 22/09/2018 and was brought to ER. It was accompanied by severe head ache and loss of consciousness. On urgent CECT Brain, it was shown as acute bleed on his left brain, with increased mid line shift to right. His vitals recorded BP: 220/100mmHg. He is a known case of Chronic Kidney Disease for 2 years requiring frequent Hemo-dialysis. He is referred to Physiotherapy for Mobility Rehabilitation.

1. What is the likely diagnosis of Mr. Wangyel? Define it. (1+1).
2. What is the likely cause of above diagnosis in his case? Describe the pathophysiology of it. (1+2)
3. On examination he is drowsy, responds to only loud commands disarticulated, and doesn't move his right side of his body. Grade his GCS. (2)
4. How will you perform a complete Neurological examination of his right side weakness? (5)

5. The mechanism of recovery after stroke comes in two stages. The first stage of recovery occurs within the first three to six months. The second stage occurs after this time period. Mention events that occur in the first stage and in the second stage. (1+1)
6. Elaborate 7 Stages of Brunnstrom motor recovery in stroke. (5)
7. Mention three differences in signs and symptoms of right and left hemispheric damage. (3)
8. What are the higher mental functions? Elaborate each of them. (10)
9. Draw a labelled diagram of cortico-spinal tract? Mention the applied anatomy of it. (3+2)
10. What are the short term goals of rehabilitation for Mr. Wangyel? (2)
11. Explain the principles of motor learning? (3)
12. What is outcome measure? Choose one outcome measure that you will apply for his mobility impairment.(1+1)
13. Mention three clinical features of Left Middle Cerebral Artery Stroke? (3)
14. Mention major differences between types of Aphasia. (3)

Case II

A 57 year old woman is admitted to ward via the ER. She has been feeling unwell for 4 days with increasing cough and breathlessness and difficulty clearing her sputum. She is a known case of COPD and, HTN, GERD, and OA of both knees. She is on regular medications and lives with her children. Her vitals recorded as BP= 130/85mmHg, RR= 25 breathes /min, temperature of 38.5 degree Celsius, PR= 110 beats/min. Chest X-ray revealed hyperinflation of lungs, flattened diagram and prominent vascular markings. ABG on admission showed respiratory acidosis with CO2 retention, she needed 28 percent of O2 support via facemask to maintain normal saturation.

Objective examination revealed barreled shaped chest, prominent use of accessory muscles, chest expansion symmetrical, but poor. Auscultation revealed decreased breathe sounds with inspiratory crackles more on RLL and prolonged expiratory phase. Her cough was productive with mucous and purulent sputum, but has difficulty in expectorating it.

1. What is Exacerbation of COPD? Define Breathlessness. (2+1)
2. Is the patient febrile? Define fever. (2)
3. Why did the Chest X ray showed hyperinflated lung? (1)
4. What are the signs of CO2 retention besides ABG reading? (2)
5. Explain the usage of accessory muscles. What is pursed-lip breathing? (1+1)
6. Why does chest X-ray show prominent vascular markings? What is Cor Pulmonale? What does ECG reveal of Cor pulmonale? (3)

7. What methods will you use to help expectorate the sputum? Mention the Postural drainage position for RLL drainage? (2+2)

8. Mention any two bronchodilators? Explain the action of bronchodilators on the lungs. (2+2)

9. Describe your role as a physiotherapist in Pulmonary Rehabilitation of a COPD patient. Mention 4 long term goals for the patient. (2+3)

10. Draw a labelled diagram of broncho-pulmonary segments. (5)

11. What is the principle on which the ventilation of lungs take place? Explain normal mechanics of ventilation. (1+3)

12. What is type I respiratory failure? (1)

13. Define Bronchiectasis**.** (1)

14. What is the goal of pulmonary rehabilitation? (2)

15. Cardiac rehabilitation program is divided into four stages: acute phase, convalescent phase, training phase, and maintenance. Mention what type of treatment you will provide in each phase of the program. (4)

16. Explain suctioning procedures to aid clearance of the airways. Mention different routes of suctioning. (3+3)

17. What are the components of pulmonary function test? (1)

TASHI DELEK