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(University of Choice)  
**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2023/2024 ACADEMIC YEAR**

**THIRD YEAR, FIRST TRIMESTER EXAMINATION**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN PHYSIOTHERAPY (UPGRADING AND DIRECT)  
MAIN**

**COURSE CODE: BSP 315/ HPT 211**

**COURSE TITLE: CARDIORESPIRATORY IN PHYSIOTHERAPY 1**

**DATE: Monday 4<sup>th</sup> December 2023**

**TIME: 8:00am – 10:00am**

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**INSTRUCTIONS TO CANDIDATES**

Answer All Questions

Section A: Multiple Choice Questions (MCQ)	20 Marks.
Section B: Short Answer Questions (SAQ)	40 Marks.
Section C: Long Answer Question (LAQ)	40 Marks

TIME: 2 Hours

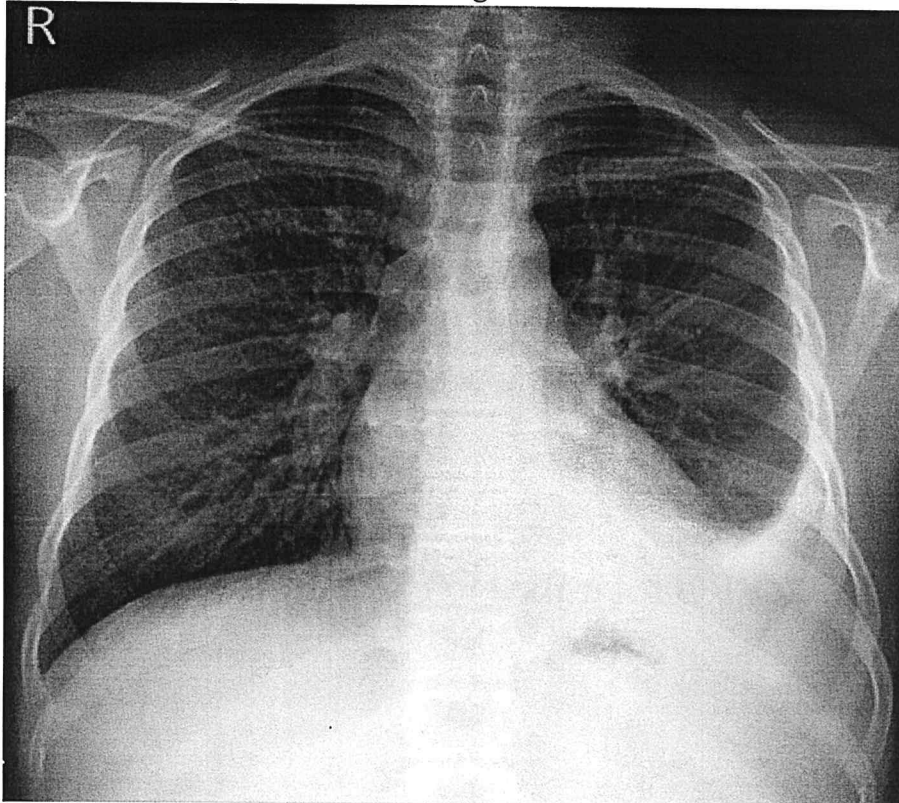
MMUST observes ZERO tolerance to examination cheating

This paper has 5 pages

## CARDIORESPIRATORY PHYSIOTHERAPY

### SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ) 20 MARKS

1. A patient has a right pleural effusion postoperatively after a right lower lobe wedge resection. Which physiotherapy treatment would be MOST effective for this patient to complete three times per day?
  - A. Acapella in postural drainage positions, 10-15 breaths each session
  - B. Segmental breathing while positioned in sitting and left sidelying, 10 minutes, three times a day
  - C. Autogenic drainage, repeating steps as needed
  - D. Percussion and shaking, 5 minutes per lobe in prone and head of bed flat
2. An elderly patient presents with severe COPD, GOLD stage 4. Which of the following physical examination findings would the therapist expect to find?
  - A. Kyphosis with an increased thoracic excursion.
  - B. Barreled chest with a decreased thoracic excursion.
  - C. Pectus excavatum with an increased thoracic excursion.
  - D. Pectus carinatum with decreased thoracic excursion.
3. Which finding is present on this image



- A. Normal X-ray image
- B. Sail sign
- C. Meniscus sign
- D. Pneumothorax
- E. Air bronchogram

4. What is the most likely cause of chest pain seen in this close-up chest X-ray image?



- A. Infection  
 B. Cancer  
 C. Trauma  
 D. Fibrosis  
 E. Sarcoidosis
5. A patient has the following pulmonary function tests results

Measure	Predicted	Observed	% predicted
Spirometry			
FVC (L)	3.19	2.48	78%
FEV <sub>1</sub> (L)	2.62	0.96	37%
FEV <sub>1</sub> /FVC (%)	82%	39%	
FEF 25-75% (L/S)	2.85	0.35	12%

What findings would you expect to see on a chest film given these PFT results?

- A. Blunted costophrenic angle  
 B. Lung hyperinflation  
 C. Pulmonary congestion  
 D. Tracheal deviation
6. A PT should be alert to recognize the signs and symptoms associated with the onset of aspiration pneumonia. Which patient diagnosis is the MOST susceptible to develop this form of pneumonia?
- A. A circumferential burn of the thorax associated with significant pain.  
 B. Severe scoliosis with compression of internal organs, including the lungs.  
 C. Amyotrophic lateral sclerosis (ALS) with dysphagia and diminished gag reflex.

- D. A complete spinal cord lesion at T2 with diminished coughing ability and forced vital capacity (FVC).
7. A patient with no significant past medical history who now presents with a bacterial pneumonia in the right anterior base would present with which of the following exam findings?
- Decreased breath sounds throughout all lung fields, increased SaO<sub>2</sub>, febrile.
  - Bronchial breath sounds at the right anterior base, increased SaO<sub>2</sub>, febrile.
  - Crackles on inspiration only at right anterior base, decreased SaO<sub>2</sub> and productive cough x 3 days.
  - Wheezes on inspiration only throughout the right lung fields, decreased SaO<sub>2</sub>, dry cough x 1 day.
8. A Physical therapist performs an evaluation of an inpatient 1 day after upper abdominal surgery. The therapist notices that there is an incentive spirometer on the patient's bedside table. What is the MOST appropriate indication for the use of incentive spirometry?
- Presence of atelectasis.
  - Signs of cognitive impairment.
  - Presence of ascites.
  - Sputum in the lungs.
9. The therapist is reading a recent report of arterial blood gas analysis with the following values:
- Fraction of inspired oxygen (FiO<sub>2</sub>) = 0.21  
 Arterial oxygen pressure (PaO<sub>2</sub>) = 53 mm Hg  
 Arterial carbon dioxide pressure (PaCO<sub>2</sub>) = 30 mm Hg  
 PH = 7.48  
 Bicarbonate ion = 24 mEq/L
- What patient state do these findings indicate?
- Metabolic alkalosis.
  - Respiratory alkalosis.
  - Metabolic acidosis.
  - Respiratory acidosis.
10. A patient in the ICU is referred to physical therapy and presents with significant shortness of breath. Notable on physical examination is a deviated trachea to the left. Which of the following processes would account for such a finding?
- Right lung collapse.
  - Left pleural effusion.
  - Right hemothorax.
  - Left pneumothorax.
11. After an uncomplicated acute myocardial infarction (MI), which graded exercise test (GXT) should be administered to the patient before hospital discharge?
- Symptom-limited GXT at 10 days post MI.
  - Low level GXT at 4 to 6 days post MI.
  - GXT to 85% age predicted maximum HR 3 to 5 days post MI.
  - GXT to 75% age predicted maximum HR 4 to 6 days post MI.

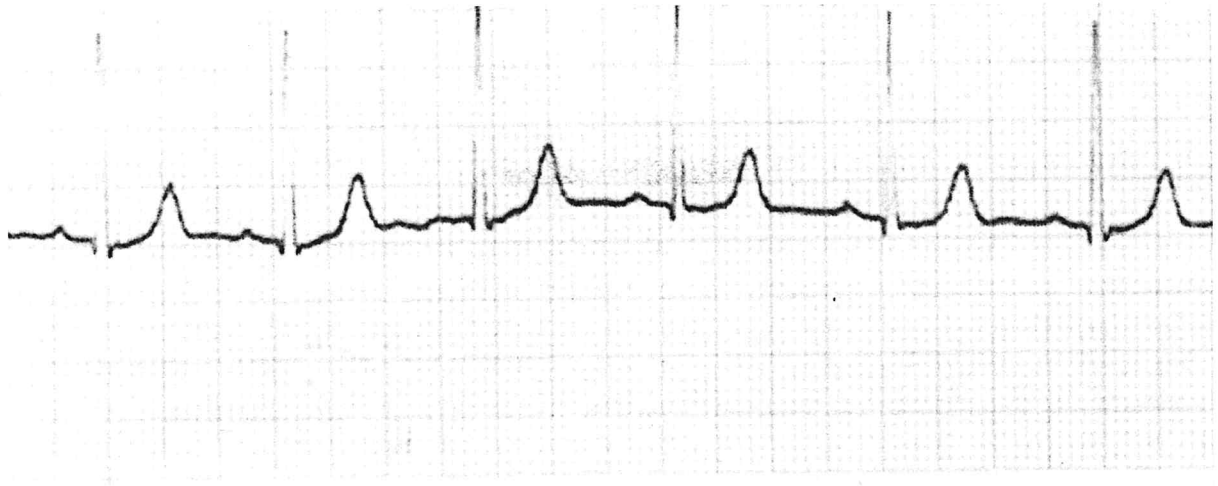
12. A physical therapist is treating a recently extubated patient with medical COPD in the medical ICU. The most recent ABGs include:  
Fraction of inspired oxygen (FiO<sub>2</sub>): 0.21  
PaO<sub>2</sub>-73mmHg  
PaCO<sub>2</sub> -64mmHg  
PH: 7.28  
Bicarbonate: 24mEq/L  
What do these findings indicate?
- Metabolic alkalosis
  - Respiratory alkalosis
  - Metabolic acidosis
  - Respiratory acidosis
13. A patient is referred for physical therapy after a graded exercise test (GXT). The physician reports the test was positive and had to be terminated in 7 minutes. Which of the following criteria is an absolute indication for terminating exercise testing?
- Mild angina and dyspnea with progressive increases in the treadmill speed and grade.
  - A hypertensive response with blood pressure of at least 170/95.
  - ST segment depression from baseline of 3-mm horizontal or down sloping depression.
  - ECG changes from baseline of 1-mm ST segment elevation.
14. A patient with a recent history of rib fractures suddenly becomes short of breath during a bout of coughing. The patient looks panicked and complains of sharp pain in the left chest. A quick screen shows a deviated trachea to the right, among other signs and symptoms. What is the MOST likely diagnosis based on these symptoms?
- Pulmonary emboli.
  - Pneumothorax.
  - Angina.
  - Mucous plugging of an airway
15. An apparently healthy individual has several risk factors for coronary artery disease. The client is interested in improving overall fitness and cardiac health. After a graded exercise test, which was asymptomatic, the client is referred for an exercise class. Which is the BEST measure of exercise intensity in a newly tested and exercising individual?
- Heart rate (HR).
  - Rating of perceived exertion (RPE).
  - MET level.
  - Respiratory rate.
16. A patient with a long history of systemic steroid use for asthma control is hospitalized with pneumonia. Which of the following is a contraindication to percussion?
- Barrel chest.
  - BP> 140/90.
  - Intercostal muscle wasting.

- D. Decreased bone density
17. What will a patient with a significant right thoracic structural scoliosis demonstrate on examination?
- A. Decreased breath sounds on the right.
  - B. Decreased thoracic rib elevation on the right.
  - C. Increased lateral costal expansion on the right.
  - D. Shortened internal and external intercostals on the right.
18. A patient with a long history of cigarette smoking has been admitted to the hospital and presents with tachycardia, signs of lung infection, abnormal breath sounds in both lower lobes, and dullness to percussion. What should the therapist's initial intervention focus on with this patient?
- A. Getting the patient to quit smoking.
  - B. Breathing reeducation to increase efficiency of ventilation.
  - C. Airway clearance and secretion removal.
  - D. Graded inspiratory muscle training.
19. Pursed lip breathing as part of the treatment regimen would be MOST appropriate for a patient with which condition?
- A. Circumferential thoracic burns.
  - B. Asbestosis.
  - C. Rib fracture.
  - D. Emphysema.
20. A therapist is planning to use percussion and shaking for assisting airway clearance with a patient diagnosed with chronic obstructive pulmonary disease (COPD). What major precaution might curtail selection of this form of intervention?
- A. A platelet count of 20,000.
  - B. Dyspnea when in the Trendelenburg position.
  - C. SaO<sub>2</sub> ranges of 88% to 94% on room air.
  - D. Functional Independence Measure (FIM) score of 4.

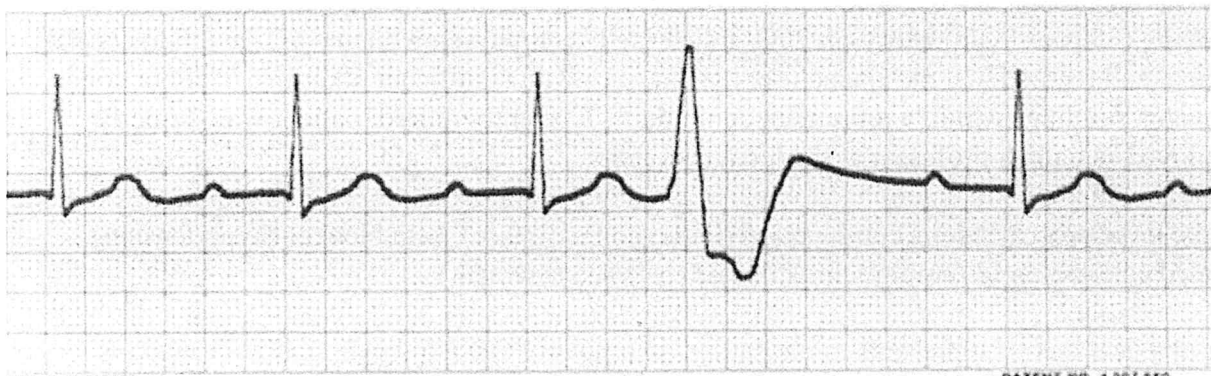
**SECTION B: SHORT ANSWER QUESTIONS (SAQ)**  
**ANSWER ALL QUESTIONS.**

**40 MARKS**

1. Use the following diagram to answer the questions



A) HEART RATE: \_\_\_\_\_ HEART RHYTHM: \_\_\_\_\_ (2.5. MARKS)  
 PULSE PALPATION: \_\_\_\_\_



B). HEART RATE: \_\_\_\_\_ HEART RHYTHM: \_\_\_\_\_ (2.5 marks)  
 PULSE PALPATION: \_\_\_\_\_

2. Describe the respiratory muscles and their function (5 marks)
3. Describe the control of breathing (5 marks)
4. How does emphysema differ from chronic bronchitis? (5 marks)
5. What scales have been developed to quantitate dyspnea? (5 marks)
6. pulmonary function test?
7. What response should you see to determine if bronchodilators have a positive effect on pulmonary function? (5 marks)
8. Describe two therapeutic techniques that can improve hypoxemia ( 5 marks)



**SECTION C: LONG ANSWER QUESTIONS (LAQS)****40 MARKS****ANSWER ALL QUESTIONS EACH ONE IS 20 MARKS**

1. The patient is a 78-year-old male recently discharged from the hospital (post-operative day #4) following admission for open cholecystectomy (midline incision). Throughout the entire post-op period, the patient noted significant incisional pain. A chest X-ray performed on post-operative day (POD) #4 revealed diffuse infiltrates within the bilateral posterior lower lobes consistent with pneumonia. The patient was insistent upon hospital discharge and consequently returned home on 2 liters of oxygen via nasal cannula with continued activity-related shortness of breath. Home PT services have been ordered.

PMH: emphysema, non-insulin dependent diabetes mellitus, early Parkinson's disease, hypertension

SH: At baseline, the patient was an independent community ambulatory with a single point cane and was able to engage in functional activities without use of home oxygen. The patient quit smoking (55 pack year history) in 2009 following his emphysema diagnosis. He reports social alcohol and recreational marijuana use. Patient lives with significant other in a 3<sup>rd</sup> floor condo (elevator building) within a retirement community. Currently retired, patient was formerly employed as a math professor at the local university.

Meds: levodopa-carbidopa combination (Parkinson's disease), beta blocker (hypertension), inhaled corticosteroid (emphysema), opioid (pain management)

The physical therapist presents to the patient's home on POD # 6 for the initial evaluation. Upon arrival, the patient is in a recliner with nasal cannula properly positioned. The patient continues with complaints of pain with movement despite adhering to his prescribed pain medication schedule. He reports being able to ambulate short household distances though is limited by shortness of breath.

- a). Instruct patient in an appropriate breathing exercise. (5 marks)
- b). Instruct patient in an appropriate mobility or standing endurance activity. (2 marks)
- c). Is a cough justified? If, so which cough is most appropriate? (2 marks)
- d). Is postural drainage/percussion/vibration justified? Explain. (5 marks)
- e). What breathing exercise(s) are indicated given the case? (2 marks)
- f). What intervention(s) to promote endurance would you select? Why? (2 marks)
- g). What factors would indicate that the activity selected was dosed for a cardiopulmonary endurance response as compared to a muscular strength response? (2marks)

2. What is submaximal exercise testing? Describe two examples of submaximal exercise testing (20Marks)