



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCE
DEPARTMENT OF REHABILITATION MEDICINE**

ADVANCED DIPLOMA

END OF SEPT-DECEMBER 2024 TRIMESTER EXAMINATIONS

UNIT CODE: **UNIT NAME: Cardiorespiratory physiotherapy**

DATE: **Day/ Date/ AUGUST**

TIME: **TWO HOURS**

START: **0:00** **STOP : 0:00**

INSTRUCTIONS (physical exams)

1. Do not write on this question paper

(Marks and questions distribution as per program curriculum.)

INSTRUCTIONS (Online examinations)

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This online exam shall take 2 Hours
4. Late submission of the answers will not be accepted
5. Ensure your web-camera is on at all times during the examination period
6. No movement is allowed during the examination
7. Idling of your machine for 5 min or more will lead to lock out from the exam
8. The Learning Management System (LMS) has inbuilt integrity checks to detect cheating
9. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
10. In case you have any questions call the invigilator for this exam on Tel. 0705833434 and or the Head of Department on Tel 0720491032
11. For adverse incidences please write an email to: amiu.examinations@amref.ac.ke

1. The peripheral vascular system includes all arteries and veins in the body.
 - a. True
 - b. False
2. The function of blood vessels can be informed by which of the following?
 - a. Size
 - b. Location
 - c. Anatomy
 - d. Innervation
 - e. All of the above
3. Which of the following blood vessel types is most responsible for producing resistance to flow?
 - a. Artery
 - b. Arteriole
 - c. Capillary
 - d. Vein
4. The elastic and compliant components of the aorta function to dampen the pulsatile blood pressure from the left ventricle.
 - a. True
 - b. False
5. Mean arterial pressure is directly determined by cardiac output and systemic vascular resistance.
 - a. True
 - b. False
6. Resistance to flow through a vessel is most affected by changes in which of the following?
 - a. Length
 - b. Viscosity
 - c. Radius
 - d. Temperature
7. As blood vessel radius increases, so does flow through the vessel.
 - a. True
 - b. False
8. Which of the following is not an intrinsic factor that affects vascular tone?
 - a. Tissue metabolites
 - b. Myogenic factors
 - c. Neural factors
 - d. Endothelial factors
9. Sympathetic nerve activation results in vasoconstriction of vascular smooth muscle in the arteriole.

- a. True
 - b. False
10. Which of the following cause vascular smooth muscle relaxation?
- a. Epinephrine
 - b. Sympathetic stimulation
 - c. Angiotensin II
 - d. Hypoxia
11. The degree of transport across capillaries is defined by the structure of the capillary
- a. True
 - b. False
12. Which of the following is the pressure generated by albumin pulling on water?
- a. Hydrostatic
 - b. Filtration
 - c. Oncotic
 - d. Resorption
13. When the net driving force pulls fluid into the intra-vascular space, this is called...?
- a. Filtration
 - b. Hydrostatic
 - c. Resorption
 - d. Oncotic
14. Lymph nodes contain which of the following immune cells?
- a. Macrophage
 - b. Active B cell
 - c. Inactive B cell
 - d. All of the above
15. The rib cages consists of all of the following except:
- a. Thoracic vertebrae
 - b. Sternum
 - c. Clavicles
 - d. Ribs
16. The primary inspiratory muscle is the intercostals.
- a. True
 - b. False
17. What is the action of the external intercostals?
- a. Depress the diaphragm
 - b. Elevate the lateral ribs
 - c. Depress the lateral ribs
 - d. None of the above
18. Accessory muscles are used during quiet inspiration in normal anatomy/physiology.
- a. True

- b. False
19. Quiet expiration requires no muscle activation.
- True
 - False
20. The pleura have three layers: superficial, parietal, visceral.
- True
 - False
21. The superior vena cava is anterior and lateral to the trachea.
- True
 - False
22. The lingula is attached to which lobe?
- Left lower
 - Right lower
 - Right middle
 - Left upper
23. The pulmonary artery carries deoxygenated blood.
- True
 - False
24. The upper respiratory tract contains which of the following?
- Larynx
 - Pharynx
 - Nares/nose
 - All of the above
25. Which of the following is the correct order, from proximal to distal, of the bronchial tree?
- Main -> Segmental -> Secondary -> Bronchiole
 - Segmental -> Main -> Secondary -> Bronchiole
 - Main -> Secondary -> Segmental -> Bronchiole
 - Bronchiole -> Main -> Secondary -> Segmental
26. Bronchioles are surrounded by cartilage.
- True
 - False
27. Which is not a component of vital capacity?
- Tidal volume
 - Residual volume
 - Inspiratory reserve volume
 - Expiratory reserve volume
28. Total lung capacity is the maximum volume for which the lungs can be expanded.
- True
 - False
29. Normal respiratory rate is between:

- a. 2-8 breaths per minute
 - b. 12-20 breaths per minute
 - c. 22-30 breaths per minute
 - d. None of the above
30. Stimulation of sympathetic nerves causes which of the following in the lungs?
- a. Bronchial constriction
 - b. Dilation of pulmonary artery
 - c. Bronchial dilation
 - d. Increased secretion production
31. Voluntary control of breathing is initiated in what part of the brain?
- a. Brainstem
 - b. Primary motor cortex
 - c. Medulla
 - d. Limbic system
32. Movement of air through the lungs is inversely proportional to airway resistance.
- a. True
 - b. False
33. The term elasticity describes the lung's ability to expand/distend.
- a. True
 - b. False
34. What carries oxygen in the bloodstream?
- a. Red blood cell
 - b. Hematocrit
 - c. White blood cell
 - d. Plasma
35. Which of the following is the normal range for blood pH?
- a. 7.05-7.15
 - b. 7.15-7.25
 - c. 7.25-7.35
 - d. 7.35-7.45
36. Normal pCO₂ is between 35-45 mmHg.
- a. True
 - b. False
37. The Left Anterior Descending (LAD) supplies blood to the posterior and lateral left ventricle.
- a. True
 - b. False
38. The heart is innervated by what system(s)?
- a. Sympathetic

- b. Parasympathetic
 - c. Renal
 - d. *A and B
39. Which answer describes normal circulation through the right side of the heart?
- a. IVC -> Right Ventricle -> Tricuspid Valve -> Right Atrium -> Pulmonic Valve -> Pulmonary Artery
 - b. IVC -> Right Atrium -> Pulmonic Valve -> Right Ventricle -> Tricuspid Valve -> Pulmonary Artery
 - c. IVC -> Right Atrium -> Tricuspid Valve -> Right Ventricle -> Pulmonic Valve -> Pulmonary Artery
 - d. IVC -> Right Ventricle -> Pulmonic Valve -> Right Atrium -> Tricuspid Valve -> Pulmonary Artery
40. The mitral valve is typically a bicuspid valve.
- a. True
 - b. False
41. Which answer describes normal electrical conduction through the heart?
- a. AV Node -> Bundle of His -> Purkinje Fibers -> Bundle Branches -> SA Node
 - b. SA Node -> Bundle of His -> Purkinje Fibers -> Bundle Branches -> AV Node
 - c. SA Node -> AV Node -> Bundle of His -> Bundle Branches -> Purkinje Fibers
 - d. None of the above
42. Normal heart rate is commonly defined as 60-100 beats per minute in patients without cardiac pathology.
- a. True
 - b. False
43. In diastole, the atria are filling throughout.
- a. True
 - b. False
44. Which of the following occur during diastole?
- a. Ventricular ejection
 - b. Ventricular filling
 - c. Atrial Contraction
 - d. A, C
 - e. B, C
45. In diastole, the atrial-ventricular valves are closed.
- a. True
 - b. False
46. In systole, the ventricles are filling throughout.
- a. True
 - b. False
47. In systole, the semilunar valves are open.

- a. True
 - b. False
48. Which of the following occur during systole?
- a. Atrial contraction
 - b. Ventricular Ejection
 - c. Isovolumetric relaxation
 - d. Ventricular filling
49. The peak pressure generated during ventricular ejection is the diastolic blood pressure.
- a. True
 - b. False
50. Pulse pressure is the difference between systolic and diastolic blood pressure.
- a. True
 - b. False
51. Stroke volume can be expressed by which of the following?
- a. The amount of blood ejected during systole in mL
 - b. Left ventricle end diastolic volume minus left ventricle end systolic volume
 - c. A and B
 - d. None of the above
52. Which of the following are factors that affect preload?
- a. Ventricular compliance
 - b. Heart rate
 - c. Venous return
 - d. All of the above
53. Increasing cardiac stretch contributes to an increase in cardiac output by the Frank-Starling Law. Following a rise in cardiac output, blood pressure will also increase. Choose the receptor and associated location that best senses the increase in pressure.
- a. Baroreceptor - IVC
 - b. Renal glomeruli - Kidney
 - c. Baroreceptor - Aortic arch
 - d. Chemoreceptor - Medulla
54. Areas of turbulent blood flow are more likely to be sites of atherosclerosis than areas of laminar flow.
- a. True
 - b. False
55. Left ventricular systolic dysfunction is characterized by which of the following?
- a. Preserved ejection fraction
 - b. Hypertrophy
 - c. Dilation
 - d. High blood pressure
56. With normal aging there is a gradual loss of the elasticity of the lung parenchyma (portion of the lung involved in gas exchange). This loss of elasticity results in the lungs

being less able to resist the tendency of the chest wall to expand and causes the alveoli to expand and thus increase the cross-sectional area for respiration to occur.

- a. True
 - b. False
57. Starting in your 30s there a slow but gradual reduction in your FEV₁ (Forced Expiratory Volume in 1 second). This reduction is a result of.....?
- a. Increased chest wall stiffness
 - b. Loss of lung elasticity
 - c. Loss of muscular strength
 - d. This is not considered “normal aging” but a disease state
58. Both TV (tidal volume) and RV (residual volume) increase with aging.
- a. True
 - b. False
59. While VC (vital capacity) decreases with aging, total lung volume remains functionally unchanged.
- a. True
 - b. False
60. Which of the following is primarily responsible for the physiological changes resulting in poor airway clearance in the elderly client?
- a. Decreased cough strength
 - b. Decreased muscle performance
 - c. Increased mucociliary dysfunction
 - d. All are responsible
61. What is the primary age-related cause of the left ventricular hypertrophy typically observed with aging?
- a. Decreased blood volume
 - b. Decreased diastolic blood pressure
 - c. Decreased resting heart rate
 - d. Increase in peripheral resistance
 - e. Increased pulmonary capillary pressure
62. Cardiac output at rest or at any given submaximal work load is reduced in the elderly client.
- a. True
 - b. False
63. Until the formation of the umbilical cord, the embryo gets oxygen, carbon dioxide, and nutrients through a vast capillary network formed by the chorionic villi.
- a. True
 - b. False
64. The umbilical cord is made up of one vein, two arteries, and Wharton’s jelly.
- a. True
 - b. False
65. At day ____, the heart tubes complete fusing together and the heart begins to beat. This will begin bidirectional blood flow.
- a. 20
 - b. 22
 - c. 24

- d. 26
66. Which of the following is not one of the 3 shunts present in the developing fetus?
- Ductus arteriosus
 - Ductus venosus
 - Foramen atria
 - Foramen Ovale
67. While less than 25% of the fetal circulation ends up passing through the lungs, after the 20th week of gestation the fetal lungs contributes to the oxygenation of the fetal blood.
- True
 - False
68. Alveolar development, maturation and proliferation, occurs through the 8th year.
- True
 - False
69. Potential survival of the fetus is typically at _____ weeks. This is due to the number of capillaries present for gas exchange and the air-blood barrier thins enough around the saccules to support gas exchange.
- 20-22
 - 22-24
 - 24-26
 - 26-28
70. An increase in systemic blood pressure is the primary driver for the closure of the ducts that result in the fetal blood supply to bypass the lungs.
- True
 - False