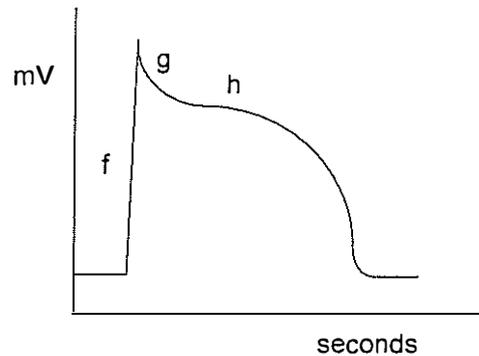


PHYSIOLOGY

1. Regarding this diagram of a cardiac muscle action potential



- A. f on the diagram is called phase 1 of the action potential
 - B. The phase designated by h is due to calcium influx only
 - C. The absolute refractory period coincides with phases f, g and h
 - D. The above action potential usually lasts < 50 ms
 - E. Is the same shape as pacemaker tissue action potential
2. With respect to nerve fibre types
- A. The speed on conduction is inversely proportional to the diameter of the fibre
 - B. C fibres are more susceptible to local anaesthetics than A fibres
 - C. A δ fibres are concerned primarily with somatic motor function
 - D. Pain may be relayed by all fibre types
 - E. A α fibres are efferent only
3. Excitatory amino acids in the brain are
- A. Glutamate and GABA
 - B. GABA and Glycine
 - C. Glutamate and Glycine
 - D. Glycine and Aspartate
 - E. Glutamate and Aspartate
4. The opioid δ receptor is involved in
- A. Analgesia
 - B. Respiratory depression
 - C. Miosis
 - D. Dependence
 - E. All of the above

5. In visceral smooth muscle
 - A. Calcium for contraction is released from sarcoplasmic reticulum
 - B. Membrane potential has a resting value of -90 mV
 - C. The excitation contraction coupling time is rapid (<10 ms)
 - D. Muscle contracts when stretched in absence of innervation
 - E. Binding of acetyl choline to nicotinic receptors increases calcium influx

6. Inhibitory post synaptic potentials involve
 - A. Localised increase in membrane permeability to Na
 - B. Localised decrease in membrane permeability to Cl
 - C. Localised increase in membrane permeability to Po₄
 - D. Localised increase in membrane permeability to Cl
 - E. Localised decrease in membrane permeability to K

7. In skeletal muscle relaxation
 - A. There is a spread of depolarization along T tubules
 - B. Calcium is released from Troponin
 - C. There is increased Na and K conduction in the end plate membranes
 - D. A resting membrane potential of -65 mV is finally reached
 - E. Mg has a crucial role

8. Regarding synapses
 - A. The synaptic cleft is 30-50 nm wide
 - B. Transmitters are released from synaptic knobs secondary to Na trigger
 - C. Amount of transmitter released is proportional to Ca efflux
 - D. Ach is present in granulated vesicles in synaptic knob
 - E. The EPSP is caused by Na influx

9. Which of the following is an inhibitory neurotransmitter
 - A. Gallamine
 - B. Acetyl choline
 - C. Glutamate
 - D. Glycine
 - E. Aspartate

10. Given an Hb of 140 g/L, how many mLs of O₂ is carried in 1L of 100% saturated blood
 - A. 5 mL
 - B. 100 mL
 - C. 200 mL
 - D. 500 mL
 - E. 1L

11. Substances metabolised by the lung include the following EXCEPT
 - A. Serotonin
 - B. Noradrenaline
 - C. Acetyl choline
 - D. Glutamic acid
 - E. Bradykinin

12. Substances synthesised by the lung include all the following EXCEPT

- A. Arachidonic acid
- B. Histamine
- C. Kallikrein
- D. Angiotensin I
- E. Surfactant

13. Compliance is

- A. Increased in pulmonary oedema
- B. Increased in collapsed lungs
- C. Decreased with age
- D. The change in pressure per unit change in lung volume
- E. Increased in emphysema

14. In a healthy person in standard conditions with a PO_2 of 60 mmHg, which is the correct Hb saturation

- A. 75%
- B. 90%
- C. 95%
- D. 57%
- E. 85%

15. Pulmonary compliance

- A. Is decreased in emphysema
- B. Is defined as the change in pressure per unit change in volume
- C. Compliance is slightly greater when measured during deflation than when measured during inflation
- D. Is increased by pulmonary fibrosis
- E. Is independent of lung volume

16. With regard to pulmonary function

- A. Tidal volume is the volume of each maximal inspiration
- B. Residual volume is the volume remaining at the end of passive expiration
- C. Residual volume can be measured directly
- D. Vital capacity is equivalent to the total of inspiratory reserve volume, tidal volume and expiratory reserve volume
- E. Tidal volume is measured by single breath nitrogen technique

17. Exposure to altitude

- A. Shifts the O_2 -Hb dissociation curve to the right due to alkalosis
- B. Is associated with an increase in RBC 2,3-DPG
- C. Is associated with a decrease in P_{50}
- D. Is associated with a respiratory acidosis
- E. Has no effect on erythropoietin secretion

18. Heart rate is accelerated by
- A. Grief
 - B. Increased baroreceptor activity
 - C. Increased atrial stretch receptor activity
 - D. Expiration
 - E. A direct effect of angiotensin
19. Vagal stimulation of SA node
- A. Leads to increased conductance of calcium into the cell
 - B. Leads to increased conductance of K into the cell
 - C. Leads to raised intracellular cAMP
 - D. Decreases the slope of the prepotential of the SA node
 - E. Inhibits the B1 receptor directly
20. The ejection fraction represents
- A. % of blood remaining in the ventricle following systole
 - B. % of atrial volume ejected into the ventricles with atrial systole
 - C. Aortic blood flow
 - D. % of ventricular volume ejected with each stroke
 - E. Left ventricular pressure
21. The C wave of the jugular venous pressure corresponds to
- A. Atrial systole
 - B. Rise in atrial pressure prior to tricuspid opening
 - C. Aortic valve snapping shut
 - D. Bulging of the tricuspid valve into the atrium
 - E. Atrial diastole
22. Regarding cardiac output, which one of the following is INCORRECT
- A. Resting cardiac output correlates with body surface area
 - B. Cardiac output is not affected by moderate changes in environmental temperature
 - C. Heterometric regulation is changing contractility of the heart independent of length
 - D. The output per minute per square metre of body surface is the cardiac index
 - E. Cardiac output is not affected by sleep
23. The rate of pacemaker cells in the heart can be slowed by all of the following EXCEPT
- A. More negative diastolic potential
 - B. Reduction of the slope of diastolic depolarisation
 - C. More positive threshold potential
 - D. Prolongation of action potential
 - E. Increased phase 4 depolarisation slope

24. Concerning the Islets of Langerhans
- A. The B cells make up 90% of the islets
 - B. The D cells secrete pancreatic polypeptide
 - C. Beef insulin is structurally more like human insulin than pork insulin is
 - D. The release of insulin involves depolarisation of the cell membrane, causing opening of calcium channels
 - E. Hyperkalaemia increases the secretion of insulin
25. In the thyroid gland
- A. Passage of iodide from the thyroid cells into the colloid is an active process
 - B. RT3 is inert
 - C. Most T4 is metabolised to T3
 - D. Thyroglobulin is formed in the colloid
 - E. Thyroxine binding globulin has the highest capacity to bind thyroid hormones in the plasma
26. The effects of thyroid hormones include all of the following EXCEPT
- A. Increased activity of Na/K ATPase
 - B. Increased nitrogen excretion
 - C. Increased levels of catecholamines
 - D. Increased carbohydrate absorption from the gut
 - E. Increased alpha myosin heavy chains in cardiac muscle fibres
27. Concerning insulin
- A. Alpha adrenergic stimulation inhibits insulin secretion
 - B. Theophylline inhibits insulin secretion
 - C. Insulin has a half life of about 30 minutes in the circulation
 - D. Insulin inhibits K uptake into muscle and adipose cells
 - E. Somatostatin stimulates insulin secretion
28. Actions of glucocorticoids include all of the following EXCEPT
- A. Gluconeogenesis in the liver
 - B. Maintenance of myocardial contractility
 - C. Inhibition of glucose uptake by muscle and adipose tissue
 - D. "Permissive" effect on Angiotensin II
 - E. Decrease in vascular resistance
29. Concerning calcium metabolism
- A. The net effect of parathyroid hormone is to decrease serum phosphate
 - B. Vitamin D decreases renal excretion of both Ca and Po₄
 - C. Calcitonin is secreted by parathyroid chief cells
 - D. Insulin decreases bone formation
 - E. Thyroid hormones decrease calcium excretion in urine

30. Which of the following is true of the renin angiotensin system
- A. Renin causes release of aldosterone
 - B. Increased Na reabsorption at the macula densa causes increased renin secretion
 - C. Angiotensinogen is converted to Angiotensin I in the lungs
 - D. Prostaglandins increase the secretion of renin
 - E. Oestrogens decrease production of angiotensinogen
31. Concerning vasopressin
- A. Diabetes insipidus is characterised by polydipsia and polyuria
 - B. Secretion of vasopressin is stimulated by alcohol
 - C. Surgical stress inhibits secretion of vasopressin
 - D. Preprooxyphysia is the precursor of vasopressin
 - E. Vasopressin is absent in hippopotamuses
32. Which of the following is true concerning temperature regulation
- A. Vapourisation of sweat accounts for 70% of heat loss
 - B. Increased TSH is an important response to cold
 - C. Anterior hypothalamic stimulation causes shivering
 - D. Bacterial toxin act on the OVLT to produce fever
 - E. None of the above
33. With respect to thirst, which of the following is true
- A. Angiotensin II acts on the supraoptic nucleus to stimulate thirst
 - B. Drinking and vasopressin secretion are regulated in much the same way
 - C. Dry mucous membranes stimulate thirst via the hypothalamus
 - D. Secretion of oxytocin causes thirst due to its similarity to vasopressin
 - E. ACE inhibitors decrease thirst in response to hypovolaemia by decreasing Angiotensin II
34. Which of the following is true concerning the heart
- A. Increased volume work produces an increase in O₂ consumption than increased pressure work
 - B. Cardiac work is the product of heart rate and stroke volume
 - C. The heart in its rested state gains 60% of its caloric requirements from fat
 - D. The work of the left ventricle is twice that of the right due to higher pressures in the systemic circulation
 - E. Increased preload has a greater effect on O₂ consumption of the heart than increased afterload

35. Of the following, which is correct
- A. The normal cardiac index is 3.2L
 - B. Increased heart rate with exercise in a transplanted heart is due to a heterometric regulation mechanism
 - C. Increased heart rate with exercise in a transplanted heart is due to a homometric regulation mechanism
 - D. The normal ejection fraction is 65%
 - E. All of the above
36. Which of the following does NOT cause an increase in cardiac output
- A. Eating
 - B. Moderate increase in environmental temperature
 - C. Pregnancy
 - D. Exercise
 - E. Anxiety
37. Blood flow
- A. In the right coronary artery is greater in systole than diastole
 - B. Is increased in the cerebral circulation by hyperventilation
 - C. Is greater in the epicardial arteries than the subendocardial arteries at the left ventricle in diastole
 - D. Is lower towards the centre than the periphery of large vessels
 - E. In the left coronary artery is decreased by moderate hypoxaemia
38. Myocardial contractility is increased by all of the following EXCEPT
- A. Activation of adenylyl cyclase
 - B. Vagal stimulation
 - C. Digoxin
 - D. Mobilisation of calcium from longitudinal tubule systems
 - E. None of the above
39. All of the following are true of venule walls except
- A. Are slightly thinner than capillaries
 - B. Are thin and easily distended
 - C. Contain relatively little smooth muscle
 - D. Venoconstriction is caused by noradrenergic nerves and noradrenaline
 - E. All are correct
40. Which of the following is incorrect concerning biophysical characteristics of blood flow
- A. Blood flow can be measured by the Poiseuille-Hagan formula even though blood is not a perfect fluid
 - B. Viscosity of blood is a function of the haematocrit
 - C. Blood flow is normally laminar
 - D. Velocity is proportional to flow (Q) divided by the area (A)
 - E. Critical closing pressure occurs when capillary pressure exceeds tissue pressure

41. Which of the following is incorrect
- A. The law of Laplace explains the difference between intraluminal and transmural pressure
 - B. The smaller the radius of a blood vessel the lower the wall tension to balance distension pressure
 - C. Veins are referred to as capacitance vessels and arterioles as resistance vessels
 - D. The recoil effect in blood vessels is known as the Windkessel effect
 - E. The mean pressure is the average pressure in the cardiac cycle and is calculated as diastolic pressure plus $\frac{1}{3}$ pulse pressure
42. Concerning capillary circulation, which of the following is incorrect
- A. 5% of circulating blood is in the capillaries at any one time
 - B. Transport of substances from the capillaries into tissue occurs via fenestrations, vesicular transport and cytoplasmic transport
 - C. The rate of transport along a capillary depends on Starling forces
 - D. Oncotic and filtration pressure gradients are the same for all capillaries
 - E. Transit time from arteriolar and to venular end, averages 1-2 seconds
43. All of the following concerning lymphatics and lymph flow are true EXCEPT
- A. The normal lymph flow is 2-4 L/24 hours
 - B. The two types of lymph vessels are interstitial and collecting
 - C. Collecting lymphatics have valves and smooth muscles in their walls
 - D. Flow in the collecting lymphatics is aided by skeletal muscle movements
 - E. Functions of the lymphatics are recycling of protein and transport of long chain fatty acids
44. The volume of fluid in the interstitial space is dependent upon all of the following except
- A. Capillary pressure
 - B. Capillary filtration coefficient
 - C. The cross sectional area of the capillary bed
 - D. The ratio of pre capillary to post capillary venular resistance
 - E. The oncotic pressure
45. Causes of increased interstitial fluid volume and oedema include all of the following except
- A. Arteriolar constriction and venular dilation
 - B. Increased venous pressure
 - C. Decreased plasma protein level
 - D. Venous obstruction
 - E. Substance P

46. Factors increasing blood flow through the venous system include which of the following
- A. Fluctuations in negative pressure during expiration
 - B. Intra abdominal pressure rises during expiration due to abdominal muscle contraction
 - C. The absence of valves in the system
 - D. Contractions of skeletal muscle
 - E. The high cross sectional area of the great veins
47. Concerning venous pressure, which of the following is false
- A. Because sagittal sinus veins have rigid walls and cannot collapse, the pressure in the upright position is subatmospheric
 - B. The central venous pressure is normally 4-6 mmHg but varies with respiration
 - C. Central venous pressure rises during negative pressure breathing
 - D. Elevated central venous pressure occurs with expanded blood volume
 - E. Peripheral venous pressure rises with increasing distance from the heart
48. Which of the following are true of CD4+ cells
- A. Are derived from bone marrow
 - B. Do not have Fc receptors
 - C. Have class II MHC receptors
 - D. Can be inactivated by cyclosporin (IL1 gene transcription inhibition)
 - E. are unaffected by cytokines
49. Which is true of Hb
- A. Abnormalities can lead to haemolysis in conditions such as spherocytosis and sickle cell anaemia because of increased RBC fragility
 - B. HbF has a lower affinity for 2,3 DPG and thus oxygen of HbA
 - C. Is the major oxygen and CO₂ carrier
 - D. Colours the blood; oxygenated (red), methaemoglobin (blue)
 - E. In normal venous blood carries 6 atoms of oxygen per molecule and so is 75% saturated with oxygen
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 - B. When incompatible between recipient and donor at transfusion usually result in recipient haemoagglutination
 - C. can help determine parenthood, eg. the child of parents who are both type B must be type B
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 - E. Rh incompatibility between mother and foetus may necessitate intrauterine transfusion of the foetus with maternal compatible blood

51. Anticlotting mechanisms include
- A. conversion of thrombin to protein C activator
 - B. Antithrombin III inactivation of activated factor VIII
 - C. Inactivation of tissue plasminogen activator
 - D. Inhibition of fibrinogen degradation products by thrombin
 - E. thromboxane A₂, prostacyclin activity: the latter promoting vascular spasm and platelet aggregation, the former the reverse
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- A. cell membrane Na/K ATPase activity is stimulated, eg. digitalis
 - B. ligand gated Ca channels are opened for longer periods
 - C. it is tetanic (individual responses fused before relaxation can occur)
 - D. the average sarcomere length increases
 - E. adrenaline activates B₁ receptors
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- A. is a consequence of the plateau (phase 2, Ca in) of depolarisation at the SA node
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- A. Starling's law of the heart explains homometric regulation of cardiac output
 - B. compliance equals $1/R$, is reduced by scarring resulting in reduced heterometric response to preload
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60. Characteristics of the brain, CSF and cerebral circulation include
- A. CSF volume of 150mL at a lumbar pressure of 0-100 mm CSF
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 - Weight of 1.4 kg suspended in CSF from dura mater by arachnoid trabeculae
 - Susceptibility to convulsions at normal blood sugar levels in diabetics
 - Oxygen consumption of 25 mL/min, ie. 10% of total body consumption

89. Which pattern of laboratory findings in the table below is most consistent with a diagnosis of diabetes insipidus:

	24 Hr Urine Volume	Ketones	Glucose	Protein
A.	4.0	+	0	0
B.	6.2	2+	4+	0
C.	1.6	0	0	4+
D.	6.4	0	0	0
E.	5.0	0	0	3+

90. Angiotensin II causes
- Greater constriction of efferent than afferent arterioles
 - Greater constriction of afferent than efferent arterioles
 - Constriction of afferent arterioles only
 - Constriction of efferent arterioles only
 - Has no effect on arteriolar constriction
91. With regard to tuboglomerular feedback
- The GFR increases when flow through the distal tubule increases
 - The macula densa on the afferent arteriole is the sensor
 - The afferent arteriole is constricted by Thromboxane A₂
 - It is designed to maintain sodium reabsorption
 - It does not operate in individual nephrons

92. With respect to the counter current system
- A. The loops of Henle act as counter current exchangers
 - B. Solutes diffuse out of vessels conducting blood towards the cortex
 - C. Water diffuses out of ascending vessels
 - D. Water diffuses into the collecting ducts
 - E. Counter current exchange is passive and can operate even if counter current multiplication ceases
93. Regarding the osmolality of renal tubular fluid, it is
- A. Hypotonic in the loop of Henle
 - B. Isotonic in the proximal tubule
 - C. Hypertonic in the distal tubule
 - D. Hypotonic in the collecting duct
 - E. Hypotonic in the proximal tubule
94. Renal autoregulation of GFR helps prevent large fluctuations in GFR despite wide variations in arterial blood pressure. With regard to autoregulation, which is true
- A. The macula densa cells sense change in afferent arteriolar pressure
 - B. Falling GFR results in a feedback to decrease efferent arteriolar pressure
 - C. Falling GFR results in an increase in renin secretion from macula densa cells
 - D. Decreased macula densa concentration of NaCl results in dilation of afferent arterioles
 - E. Decreased GFR decreases NaCl reabsorption in the ascending loop of Henle
95. What is the clearance of a substance when its concentration in plasma is 1 mg/ml, its concentration in urine is 10 mg/ml and the urine flow is 2 mL/min
- A. 2 mL/min
 - B. 10 mL/min
 - C. 20 mL/min
 - D. 200 mL/min
 - E. Clearance cannot be determined from the information given
96. Regarding the proximal tubule, the following statements are true except
- A. Na is cotransported out of the tubule with glucose
 - B. Na is actively transported into the intercellular spaces by Na/K ATPase
 - C. The cells are characterised by a brush border and tight junctions
 - D. Vasopressin increases the permeability to water by causing the rapid insertion of water channels into the luminal membrane
 - E. Water moves passively out of the tubule along osmotic gradients
97. With regard to the effect of hormones on renal tubules, which is correct
- A. Aldosterone increases K reabsorption from the distal tubule
 - B. Angiotensin II increases H⁺ secretion from the proximal tubules
 - C. ADH increases water reabsorption in the proximal tubule
 - D. Atrial natriuretic peptide decreases Na reabsorption from the proximal tubules
 - E. Parathyroid hormone increases phosphate reabsorption

98. The thin ascending loop of Henle is
- A. Relatively permeable to water
 - B. Relatively impermeable to Na
 - C. Permeable to both water and Na
 - D. Relatively impermeable to water
 - E. Relatively impermeable to both water and Na
99. Action potential initiation in the sinoatrial and atrioventricular nodes results from
- A. Na influx
 - B. K influx
 - C. Ca influx
 - D. Na and Ca influx
 - E. Increased K conductance
100. As a percentage of total blood volume, which of the following values are correct
- A. 40% is in the pulmonary circulation
 - B. 13% is in the systemic arteries
 - C. 20% is in the systemic arterioles and capillaries
 - D. 30% is in the veins
 - E. none of the above are correct
101. Which is not correct about reflex mechanisms acting on the circulation
- A. The baroreceptors in the carotid bodies are stimulated when blood pressure increases
 - B. The Bainbridge reflex causes increase in heart rate
 - C. The Cushing reflex is a special central nervous system ischaemic response resulting from increased intracranial pressure
 - D. The maximum firing per change in pressure of the carotid baroreceptors occurs at a mean arterial pressure of 90 mmHg
 - E. The glossopharyngeal nerve is involved in baroreceptor reflex system
102. When the cholinergic vagal fibres to nodal tissues are stimulated
- A. The membrane becomes hyperpolarised
 - B. The slope of the prepotential is decreased
 - C. Acetylcholine decreases conductance to Ca via muscarinic receptors
 - D. Acetylcholine increases the permeability of nodal tissues to potassium via muscarinic receptors
 - E. All of the above are true
103. Heart rate is accelerated by
- A. Decreased activity of baroreceptors in the left ventricle
 - B. Increased activity of baroreceptors in the pulmonary circulation
 - C. Increased intracranial pressure
 - D. Expiration
 - E. Increased activity of baroreceptors in the arteries

104. Regarding coronary blood flow

- A. Systolic blood flow in subendocardial arteries is greater than in the epicardial
- B. Less than 50% of oxygen is removed during passage when in the resting state
- C. The coronary circulation is well supplied by parasympathetic vasodilatory fibres
- D. Sympathetic vasoconstrictory fibres predominate in epicardial vessels
- E. None of the above

105. Regarding isometric ventricular relaxation

- A. It occurs late in diastole
- B. Ventricular filling occurs
- C. Intraventricular pressure remains constant during this phase
- D. It ends when the AV valve close
- E. It ends when the AV valves open

106. Local vasoconstriction results from

- A. Increased potassium concentration
- B. Increased magnesium concentration
- C. Increased sodium concentration
- D. Decrease in pH
- E. Increased calcium concentration

107. With regard to ascending to high altitudes

- A. There is a linear decrease in inspired oxygen pressure with increasing altitude
- B. The partial pressure of water vapour in moist inspired air decreases with P_{iO_2}
- C. At 19 200 m, barometric pressure = 47 mmHg, P_{iO_2} then is approx. 9 mmHg
- D. At peak at Mt Everest, barometric pressure = 380 mmHg, P_{iO_2} there is approx. 70 mmHg
- E. In permanent residents of the Andes, arterial and venous PO_2 is half normal levels

108. A 28 year old lady has taken an overdose of sedatives causing her to hypoventilate. Given that her arterial PCO_2 is now doubled to 80 mmHg, which of the following is most likely to be correct given that she is breathing room air at normal barometric pressures

- A. Arterial PO_2 will be approximately 70 mmHg
- B. Arterial PO_2 will be approximately 35 mmHg
- C. Arterial Hb O_2 saturation will be approximately 50%
- D. Arterial Hb O_2 saturation will be approximately 80%
- E. Arterial Hb O_2 saturation will be approximately 27%

109. Which of the following has the greatest effect on the ability of the blood to transport oxygen

- A. The capacity of the blood to dissolve oxygen
- B. The amount of Hb in the blood
- C. The pH of the plasma
- D. The CO_2 content of red blood cells
- E. The temperature of the blood

110. The Haldane effect describes
- A. The shift to the right of the oxygen dissociation curve caused by increased PCO₂
 - B. The enhanced loading of CO₂ in the presence of deoxygenated Hb
 - C. The shift of chloride ions into red blood cells to balance HCO₃⁻ shift from those cells
 - D. The action of carbonic anhydrase on carbonic acid
 - E. None of the above
111. With regard to CO₂ carriage in the blood
- A. Dissolved CO₂ has an insignificant role in the carriage of CO₂ in the blood
 - B. HCO₃⁻ production is fast in plasma
 - C. Ionic dissociation of carbonic acid in the red cell is fast without an enzyme
 - D. The CO₂ concentration in blood is independent of the saturation of Hb with oxygen
 - E. The majority of CO₂ is carried in the blood in the forms of dissolved CO₂ and carbamino compounds
112. Substances cleared from the circulation by the lungs include all the following except
- A. Angiotensin II
 - B. Serotonin
 - C. Leukotrienes
 - D. Bradykinin
 - E. Prostaglandin
113. With regard to the normal Hb-oxygen dissociation curve, which is the most likely to be correct
- A. When arterial PO₂ = 60 mmHg, Hb saturation is ~ 80%
 - B. When arterial PO₂ = 40 mmHg, Hb saturation is ~ 75%
 - C. When arterial PO₂ = 30 mmHg, Hb saturation is ~ 40%
 - D. Acidosis shifts the curve to the left
 - E. Decreased PCO₂ shifts the curve to the right
114. Increased lung compliance is associated with
- A. Increasing age
 - B. Increasing pulmonary venous pressure
 - C. High expanding pressures
 - D. Interstitial fibrosis
 - E. Low lung volumes associated with hypoventilation

115. The following physiological events that occur in the body are listed in random sequence
- Decreased CSF pH
 - Increased PaCO₂
 - Increased CSF PCO₂
 - Stimulation of medullary chemoreceptors
 - Increased PACO₂

What is the usual sequence

- a,b,c,d,e
 - d,a,c,b,e
 - c,d,e,b,a
 - e,b,c,a,d
 - e,c,b,d,a
116. In relation to acid base balance in the body
- Respiratory compensation in metabolic alkalosis is limited by carotid and aortic chemoreceptor response
 - HCO₃ concentration will decrease in compensated respiratory acidosis
 - The rate of renal H⁺ secretion is not affected by PCO₂ in respiratory acidosis
 - Chloride excretion is decreased in respiratory acidosis
 - Hepatic glutamine synthesis is decreased in chronic metabolic acidosis
117. The action potential of a neuron
- Is initiated by efflux of Na
 - Is terminated by efflux of K
 - Declines in amplitude as it moves along the axon
 - Results in transient reversal of the concentration gradient of Na across the cell membrane
 - Is not associated with any net movement of Na or K across the cell membrane
118. The functions of tropomyosin in skeletal muscle include
- Releasing calcium after an action potential
 - Sliding on actin to produce shortening
 - Binding to myosin during contraction
 - Acting as a "relaxing protein" at rest by covering up the sites where myosin binds to actin
 - Generating ATP which passes to the contractile mechanism
119. Regarding the autonomic nervous system
- Does not have a reflex arch like somatic nervous system
 - Has Dopamine is the main transmitter
 - Has cholinergic division which increases activity of the intestinal musculature and increases gastric secretion
 - Neurotransmitter Noradrenaline is metabolised by pseudocholinesterase
 - Is not involved with visceral sensation

120. Lymph flow is
- A. An average 500 mL/hr into the circulation
 - B. Proportional to interstitial fluid pressure
 - C. Increased with decreased interstitial fluid protein
 - D. Decreased with contraction of muscles
 - E. Decreased with elevated capillary pressure
121. Regarding extracellular volume maintenance
- A. Control of sodium balance is the major mechanism maintaining ECF volume
 - B. A rise in ECF volume stimulates vasopressin secretion
 - C. Osmotic stimuli override volume stimuli in the regulation of vasopressin secretion
 - D. Vasopressin causes Na retention by the kidney
 - E. Angiotensin II inhibits aldosterone secretion
122. Regarding renal compensation in respiratory acidosis and alkalosis
- A. The rate of HCO_3^- reabsorption is inversely proportional to the arterial PCO_2
 - B. In respiratory acidosis, HCO_3^- reabsorption is reduced
 - C. Changes in plasma chloride concentration are proportional to HCO_3^- concentration
 - D. In respiratory alkalosis, renal H^+ secretion is increased
 - E. HCO_3^- reabsorption depends upon the rate of H^+ secretion by the renal tubular cells
123. Regarding calcium metabolism
- A. Approximately 60% of filtered calcium is reabsorbed by the kidney
 - B. Absorption of calcium in the gastrointestinal tract is mainly by passive diffusion
 - C. The extent of calcium binding by plasma proteins is inversely proportionate to the plasma protein level
 - D. Levels of 1,25 dihydroxycholecalciferol fall in the presence of increased plasma calcium
 - E. The majority of calcium present in bone is readily exchangeable
124. Toxins that increase the cAMP content of the intestinal mucosa cause diarrhoea because they
- A. Increase Cl^- secretion into the intestinal lumen
 - B. Increase Na absorption in the small intestine
 - C. Increase K^+ secretion into the colon
 - D. Increase Na/ K^+ cotransport K^+ secretion into the colon
 - E. None of the above
125. Which of the following is not synthesised in postganglionic sympathetic neurons
- A. L-dopa
 - B. Dopamine
 - C. Noradrenaline
 - D. Adrenaline
 - E. Acetylcholine

126. All of the following affect glomerular filtration except
- A. Changes in renal blood flow
 - B. Urethral obstruction
 - C. Dehydration
 - D. Oedema outside the renal capsule
 - E. Glomerular capillary permeability
127. The thick ascending limb of the loop of Henle
- A. Is impermeable to water
 - B. Has maximal permeability to NaCl
 - C. Is relatively permeable to water
 - D. Is impermeable to NaCl
 - E. Is a site where there is no active transport of sodium
128. In the normal bladder, micturition
- A. Is initiated by the pelvic nerves
 - B. Is coordinated in the lumbar portion of the spinal cord
 - C. Is initiated at a volume of 600 mLs
 - D. Is significantly affected by sympathetic nerves
 - E. Is not facilitated at the level of the brain stem
129. Regarding Starling's forces operating at the capillaries
- A. There is a net outward force of about 0.3 mmHg
 - B. The filtration coefficient describes the rate of plasma proteins being filtered from the microcirculation
 - C. Rate of filtration is roughly equal in the different tissues of the body
 - D. Mean capillary pressure is normally greater than plasma colloid osmotic pressure
 - E. Lymphatics play no role in maintaining equilibrium of the forces
130. Thyroxine (T₄)
- A. Secretion is regulated by positive feedback at the hypothalamus
 - B. Is transported principally by albumin in the blood
 - C. Causes increased LDL in plasma
 - D. Is physiologically more active than T₃
 - E. Increases beta receptors in the cardiovascular system
131. Regarding insulin
- A. It increases amino acid uptake
 - B. Its absorption is not affected by the site of injection
 - C. It causes reduced K⁺ uptake by cells
 - D. It increases protein catabolism
 - E. It is secreted by the alpha cells in the islets of Langerhan
132. In the autonomic nervous system, beta agonism results in
- A. Constriction of the renal vasculature
 - B. Decreased velocity of conduction in the atrioventricular node
 - C. Decreased velocity of conduction in the HIS/Purkinje system
 - D. Decreased ventricular contractility
 - E. Increased insulin and glucagon secretion
133. The reticular activating system

- A. Has depressed conduction during anaesthesia
 - B. Is located in the pons
 - C. Is a simple collection of parallel nerve fibres
 - D. Has no input from the cranial nerves
 - E. Is electrically isolated from the cerebral cortex
134. The content of chylomicrons includes
- A. Apoprotein E and Apoprotein A
 - B. Cholesterol 30%, protein 20%, triglyceride 50%
 - C. Lethicin 10%, Cholesterol 25%, Triglyceride 65%
 - D. Protein 2%, Cholesterol 5%, Triglyceride 90%
 - E. The enzyme protein phospholipase
135. Regarding calcium metabolism
- A. The adult human body contains 15% of its body mass as calcium
 - B. Calcium is passively absorbed from the intestinal brush border
 - C. Oestrogen inhibits osteoclasts
 - D. TNF inhibits osteoclasts
 - E. Corticosteroids stimulate osteoblasts
136. With regard to contraction and relaxation of skeletal muscle, all the following are true except
- A. Contraction involves the release of potassium from the terminal cisterns
 - B. Relaxation involves the release of calcium from troponin
 - C. Prior to contraction, increased sodium and potassium conduction occurs in the end-plate membrane
 - D. Relaxation involves cessation of the interaction between actin and myosin
 - E. Contraction involves inward spread of depolarisation along T tubules
137. Regarding nerve fibres
- A. Type C myelinated fibres in the dorsal root conduct impulses concerning pain and temperature
 - B. Type A alpha unmyelinated fibres conduct impulses concerning proprioception
 - C. Type A beta unmyelinated fibres conduct impulses concerning light touch
 - D. Type A gamma unmyelinated fibres conduct impulses to muscle spindles
 - E. Type B myelinated fibres are located in preganglionic autonomic region
138. With regard to chemoreceptors, all the following are correct except
- A. The medullary chemoreceptors respond to a change in blood PCO₂
 - B. The medullary chemoreceptors respond to blood [H⁺]
 - C. The predominant peripheral chemoreceptors are located in the carotid and aortic bodies
 - D. The peripheral chemoreceptors respond to PO₂
 - E. The peripheral chemoreceptors respond to blood [H⁺]

139. Functions of the lung include all of the following except
- A. Synthesis of phospholipids
 - B. Synthesis of protein
 - C. Carbohydrate metabolism
 - D. Inactivation of bradykinin
 - E. Removal of dopamine
140. Hypoxaemia is caused by all of the following except
- A. Anaemia
 - B. Pulmonary fibrosis
 - C. Left to right shunt
 - D. Residing at high altitude
 - E. Hypoventilation
141. Vital capacity in an average sized male is equal to
- A. 3600 mL (approx)
 - B. Tidal volume plus inspiratory reserve volume
 - C. Total lung capacity minus residual volume
 - D. Functional residual capacity plus inspiratory capacity
 - E. Expiratory reserve volume plus tidal volume and inspiratory capacity
142. Regarding the cardiac cycle
- A. In tachycardia, the duration of systole is shortened relatively more than diastole
 - B. The v-wave is caused by the bulging of the tricuspid valve into the atria
 - C. The third heart sound is due to rapid ventricular emptying
 - D. The end-diastolic ventricular volume is 180 mL (approx)
 - E. Isovolumetric ventricular relaxation occurs after closure of the aortic and pulmonary valves
143. The action potential of cardiac pacemaker cells
- A. Is not affected by calcium current
 - B. Is mainly due to sodium influx
 - C. Shows a decreased prepotential slope with sympathetic stimulation
 - D. Exhibits a prepotential initially caused by decreased potassium efflux
 - E. Show no spontaneous rhythmicity
144. All of the following statements regarding the atrial natriuretic peptide (ANP) are true except
- A. It causes natriuresis
 - B. It lowers blood pressure
 - C. Circulating ANP has a short half life
 - D. ANP has the greatest affinity for the ANPR-B receptor on the glomerulus
 - E. It is released when atrial muscle is stretched

145. Arteriolar constriction is caused by
- A. Kinins
 - B. Decreased noradrenergic discharge
 - C. Circulating angiotensin I
 - D. Circulating Na/K ATPase inhibitor
 - E. Decreased pH
146. Factors affecting the activity of the vasomotor area in the medulla are
- A. Inhibitory inputs from carotid and aortic chemoreceptors
 - B. Direct stimulation by CO₂
 - C. Excitatory inputs from the carotid, aortic and cardiopulmonary baroreceptors
 - D. Excitatory input from lungs
 - E. Inhibitory input from cortex via hypothalamus
147. Regarding cardiovascular regulatory mechanisms, all of the following are true except
- A. Decreases in oxygen tensions and increases in local carbon dioxide concentration lead to coronary arterial dilatation
 - B. Circulating vasoconstrictor hormones include angiotensin II and aldosterone
 - C. Vasomotor control is mediated by baroreceptor reflexes
 - D. Increased baroreceptor activation slows down heart rate
 - E. The vasomotor area is stimulated by hypoxia and PCO₂
148. Poiseuille's Equation states
- A. Flow is proportional to density
 - B. Viscosity multiplied by flow is proportional to the pressure gradient
 - C. Flow is inversely proportional to the radius⁴
 - D. Flow is not related to the length of the tube
 - E. Flow is proportional to the radius²

PHYSIOLOGY ANSWERS

1. C	21. D	41. A	61.D	81. C	101. A
2. B	22. C	42. D	62. B	82. E	102. E
3. E	23. E	43. B	63. C	83. C	103. A
4. A	24. D	44. C	64. A	84. B	104. D
5. D	25. B	45. A	65. E	85. D	105. E
6. D	26. C	46. D	66. B	86. D	106. E
7. B	27. A	47. C	67. D	87. D	107. D
8. E	28. C	48. B	68. A	88. D	108. D
9. D	29. B	49. E	69. E	89. D	109. B
10. C	30. D	50. A	70. B	90. A	110. B
11. D	31. A	51. A	71. C	91. C	111. C
12. D	32. E	52. D/E	72. E	92. B	112. A
13. E	33. B	53. C	73. B	93. B	113. B
14. B	34. C	54. E	74. A	94. D	114. A
15. C	35. C	55. C	75. B	95. C	115. D
16. D	36. B	56. B	76. B	96. D	116. A
17. B	37. A	57. D	77. E	97. B	117. B
18. C	38. B	58. B	78. A	98. D	118. D
19. D	39. A	59. D	79. A	99. C	119. C
20. D	40. E	60. D	80. D	100. B	120. B

- | | |
|--------|--------|
| 121. A | 141. C |
| 122. E | 142. E |
| 123. D | 143. D |
| 124. A | 144. D |
| 125. D | 145. D |
| 126. D | 146. B |
| 127. A | 147. B |
| 128. A | 148. B |
| 129. A | |
| 130. E | |
| 131. A | |
| 132. E | |
| 133. A | |
| 134. D | |
| 135. C | |
| 136. A | |
| 137. E | |
| 138. B | |
| 139. E | |
| 140. C | |

Physiology MCQs:

Ganong Chapter 1:

1. Which if the following is NOT true of a 70 kg. male:
 - a) 60% of the total body mass is water.
 - b) 8% of total body mass is blood.