

CARDIOVASCULAR SYSTEM

1. Which of the following is part of the reflex response to an increase in arterial pressure?

- a) Decreased firing of carotid sinus baroreceptors
- b) Increased sympathetic activity to the ventricles
- c) Increased parasympathetic activity to the SA Node**
- d) Increased parasympathetic activity to the arterioles of skeletal muscles & skin
- e) Increased parasympathetic stimulation to the ventricles

2. Correct sequences of steps in short-term compensation for hemorrhage include:

- a) Decreased arterial pressure → Increased baroreceptor firing rate
- b) Increased formation of Angiotensin II → Increased renin released by kidneys
- c) Decreased excretion of Na⁺ and water → Increased aldosterone formation
- d) Decreased firing of baroreceptors → Increased sympathetic activity**
- e) Decreased atrial volume → Increased volume receptor firing rate

3. Venous Return:

- a) Is increased on standing
- b) Decreases by deep inspiration
- c) Is decreased by venoconstriction
- d) When increased, activates Bainbridge reflex**
- e) When increased, increases end-systolic volume

4. The nerve supply to the heart is as follows:

- a) SA Node is innervated by sympathetic only
- b) Atrial muscle is innervated by both sympathetic & parasympathetic**
- c) Right vagus supplies SA node & AV node
- d) Left vagus supplies SA node
- e) Parasympathetic supplies ventricular muscle

5. Which of the following is not a characteristic of cardiac muscle?

- a) It's a syncytium of muscle fibers
- b) There are intercalated discs
- c) Gap junctions cause spread of depolarization
- d) Has myosin and actin muscles**
- e) There are paracellular spaces

6. The pacemaker prepotential:

- a) Is due to a slow decrease in K⁺ influx
- b) Is a slow increase in Resting Membrane Potential
- c) Maintained by opening of long acting Ca²⁺ channels
- d) Is augmented by opening of transient Ca²⁺ channels
- e) Occurs only in the SA node**

7. Parasympathetic stimulation results in:

- a) Decreases K⁺ efflux in cardiac muscle
- b) Increases Ca²⁺ influx in SA node
- c) Bradycardia
- d) Increases Na⁺ influx
- e) Increasing slope of prepotential

8. Which of the following is true of the electrical activity of cardiac muscle?

- a) Increased extracellular K⁺ causes depolarization
- b) Repolarization is due to Na⁺ current
- c) Extracellular Na⁺ affects the pacemaker potential
- d) Plateau of action potential is due to Ca²⁺ influx
- e) Initial repolarization is due to delayed K⁺ efflux

9. The conductive system of the heart does not include:

- a) Internodal pathways
- b) Bundle of His & its branches
- c) Purkinje system of fibers
- d) Interventricular septum
- e) AV node

10. Which of the following is not true of the ECG?

- a) Needs six pairs of electrodes
- b) Is useful in detection of arrhythmias
- c) It is recorded from limb leads
- d) Its amplitude indicates the mass of cardiac muscle
- e) The PR interval indicates strength of contraction

11. In a normal ECG:

- a) The P wave indicates the condition of the conductive system
- b) The P wave represents depolarization of atrial myocardium
- c) QRS complex is mainly negative due to spread of depolarization down
- d) QRS is due to depolarization in the ventricular septum
- e) The T wave is a positive wave in all chest leads

12. Which of the following is true of the cardiac cycle?

- a) Ventricular diastole follows atrial systole
- b) Ventricular systole causes an immediate rise in aortic pressure
- c) The beginning of systole causes closure of AV valves
- d) Closure of semi-lunar valves gives rise to first heart sound
- e) Isovolumetric relaxation occurs at the end of diastole

13. In the atrial pressure wave:

- a) The maximum pressure is about 12 mmHg
- b) Pressure remains constant while AV valves are closed
- c) The C wave is due to bulging of AV valve during ventricular filling
- d) The V wave is due to filling of the ventricles
- e) The A wave is due to atrial systole

14. Protodiastole:

- a) Is characterized by a rapid rise in aortic pressure
- b) Occurs at the onset of diastole
- c) Is a period in the cardiac cycle with constant blood pressure
- d) Is the last one-third of diastole
- e) Is a period of slow ejection from the ventricles

15. Which of the following statements is true of the heart sounds?

- a) The first sound is of high pitch
- b) The first sound is of longer duration than the second**
- c) They are produced by abnormal valves
- d) The second sound is heard best at the apex
- e) The second sound is due to the closure of AV valves

16. Pressure in the pulmonary artery is:

- a) Higher than that in the right atrium
- b) About 25 mmHg during systole
- c) About 80 mmHg during diastole
- d) Is lower than that in the right ventricle
- e) Is regulated by parasympathetic innervation

17. The following is not correct about baroreceptors:

- a) Found in the wall of carotid sinuses
- b) Found in the aortic arch
- c) Monitor pressure in the arterial system
- d) Send impulses through the glosso-pharyngeal nerve
- e) Normally fires during late systole**

18. Chemoreceptors are:

- a) Found in aortic and carotid sinuses
- b) Stimulated best by hypercapnoea
- c) Send impulses to vasomotor center through vagus nerve
- d) Have a high blood flow rate
- e) Are not sensitive to hydrogen ion concentration**

19. At rest the LV end-systolic volume is:

- a) 10 mL
- b) 30 mL
- c) 50 mL**
- d) 120 mL
- e) 140 mL

20. The best site to measure mixed venous PO₂ is:

- a) Superior Vena Cava
- b) Right Atrium
- c) Pulmonary Artery**
- d) Pulmonary Vein
- e) Left Ventricle

21. The atrial contraction component of ventricular filling is:

- a) 5%
- b) 10%
- c) 30%**
- d) 50%
- e) 80%

22. The lowest intrinsic discharge activity resides in the:

- a) SA Node
- b) AV Node**
- c) Bundle of His
- d) Bundle of branches
- e) Purkinje fibers

23. The highest oxygen extraction is found in the:

- a) Resting skeletal muscles
- b) Heart
- c) Kidney
- d) Brain**
- e) Skin

24. With a mixed venous oxygen content of 110 ml/L and an arterial oxygen content of 150 ml/L an oxygen uptake of 280 ml/min, the cardiac output is:

- a) 5 liters/ min
- b) 6 liters/ min
- c) 7 liters/ min**
- d) 8 liters/ min
- e) 9 liters/ min

25. The pulmonary valve closes when the pressure in the right ventricle is about:

- a) 0 mmHg
- b) 15 mmHg**
- c) 30 mmHg
- d) 50 mmHg
- e) 120 mmHg

26. The velocity of blood flow is the slowest in:

- a) Capillaries**
- b) Pulmonary vein
- c) Small arteries
- d) Inferior Vena Cava
- e) Arterioles

27. The volume of blood is greatest in:

- a) Systemic capillaries
- b) Veins**
- c) Arteries
- d) The spleen
- e) The heart

28. Which of the following results in increased stroke volume?

- a) a) An increase in end-diastolic volume
- b) An increased after-load
- c) Parasympathetic stimulation
- d) An increase in the heart rate
- e) Venodilation

29. During the cardiac cycle, closure of the aortic valve occurs at:

- a) The end of isovolumetric contraction
- b) The beginning of rapid ejection phase
- c) c) The beginning of isometric relaxation
- d) The end of systole
- e) The end of rapid filling phase

30. SA node is the pacemaker of the heart because:

- a) Location in the right atrium
- b) Neural control
- c) Natural leakiness to Cl⁻
- d) Natural leakiness to K⁺
- e) e) Fastest rate of discharge

31. Stroke Volume:

- a) Is the volume of blood pumped by the heart per minute
- b) Decreases by increased end-diastolic volume
- c) c) Is decreased by increased afterload
- d) From the left ventricle is more than from the right ventricle
- e) Multiplied by heart rate gives cardiac index

32. In the ECG, the T wave denotes:

- a) Atrial contraction
- b) Atrial depolarization
- c) c) Ventricular repolarization
- d) SA node depolarization
- e) Ventricular contraction

33. Cardiac Output (in liters per minute) divided by the heart rate (in beats per minute) equals to:

- a) Cardiac Index
- b) Cardiac Efficiency
- c) Mean Arterial Pressure
- d) d) Stroke Volume
- e) Blood Velocity

34. The segment of the vascular bed responsible for local regulation of blood flow in most tissues is:

- a) Distributing arteries
- b) Large veins
- c) Capillaries
- d) Venules
- e) e) Arterioles

35. Absolute refractory period of the heart:

- a) Corresponds to the duration of relaxation
- b) Lasts till half of cardiac contraction
- c) Shorter than refractory period in skeletal muscle
- d) Lasts till cardiac contraction**
- e) The heart can be stimulated by very strong stimulus

36. First heart sound occurs at the beginning of:

- a) Isometric relaxation
- b) Isotonic relaxation
- c) Isovolumetric contraction**
- d) Isovolumetric relaxation
- e) Atrial contraction

37. In the heart, within physiological limits the force of contraction is directly proportional to the:

- a) Pacemaker activity
- b) AV nodal delay
- c) Initial length of cardiac muscle**
- d) Respiratory rate
- e) Vagal stimulation

38. Cardiac muscle has a long refractory period because:

- a) The impulse takes about 0.2 s to travel from SA to AV node
- b) It obeys the all-or-none law
- c) Of the delay in Na^+ influx
- d) Of Ca^{2+} influx**
- e) Is more permeable to K^+

39. Stimulation of baroreceptors leads to:

- a) Tachycardia
- b) Increased stroke volume
- c) Stimulation of vasomotor center
- d) Vasoconstriction
- e) Decreased arterial blood pressure

40. The fourth heart sound is due to:

- a) Closure of mitral and tricuspid valve
- b) Iso-volumetric contraction
- c) Iso-volumetric relaxation
- d) Ventricular filling
- e) Atrial systole

41. Frank Straling's law of the heart:

- a) Explains the tachycardia caused by increased venous return
- b) Explains the tachycardia of exercise
- c) Does not operate when the person is at rest
- d) Explains the increased venous return when end-diastolic volume is increased
- e) Explains the increased stroke volume when end-diastolic volume is increased

42. The work done by the right ventricle is much less than that done by the left ventricle because its:

- a) Wall is thinner
- b) Stroke volume is less
- c) Preload is less
- d) Afterload is less
- e) Systolic pressure is less

43. The following are not signs of pure right ventricular failure:

- a) Increased central venous pressure
- b) Central venous engorgement and pulsations
- c) Pulmonary oedema
- d) Hepatomegally
- e) Sacral oedema

44. The blood vessel responsible for local regulation of blood flow in most tissues is:

- a) Distributing arteries
- b) Large veins
- c) Capillaries
- d) Venules
- e) Arterioles

45. The heart rate is increased by all the following *except*:

- a) Fever
- b) Increased venous return
- c) Atropine
- d) Hypothyroidism
- e) Adrenaline

46. Stroke Volume:

- a) Increases as a result of increased afterload
- b) Equals end-diastolic volume minus end-systolic volume
- c) Increases as heart rate is increased by electrical pacing
- d) Is increased by parasympathetic stimulation
- e) Is increased by Ca²⁺ channel blocks

47. A drug that increases the heart rate from 70 to 100 beats per minute could be:

- a) Stimulation of B-1 adrenergic receptors
- b) Inhibitor of alpha adrenergic receptors
- c) Stimulation of muscarinic cholinergic receptors
- d) Inhibitor B-2 adrenergic receptors
- e) Digitalis

48. A high preload is indicated by:

- a) Blood volume
- b) Pulmonary pressure
- c) End-diastolic volume
- d) Systolic blood pressure
- e) Diastolic blood pressure

49. Regurgitation of aortic valve leads to:

- a) A decrease in diastolic pressure
- b) A decrease in oxygen-consumption by the ventricles
- c) A decrease in heart rate
- d) A systolic murmur
- e) A decreased end-systolic volume

50. Which of the following results in a decreased stroke volume?

- a) An increase in end-diastolic volume
- b) An increased afterload
- c) Parasympathetic stimulation
- d) A decrease in total peripheral resistance
- e) Increased residual volume

51. An increase in pulse pressure can be caused by:

- a) Parasympathetic stimulation
- b) Generalized vasodilation
- c) Severe hemorrhage
- d) Aortic stenosis
- e) Heart failure

52. On assuming the upright posture, one would expect:

- a) Stimulation of Renin-angiotensin system
- b) Increased pulmonary artery pressure
- c) A decrease in pulse rate
- d) Venodilation
- e) An increase in renal blood flow

53. Central venous pressure increases:

- a) In hypovolaemia
- b) By sympathetic stimulation
- c) When total peripheral resistance increases
- d) When the cardiac output decreases
- e) With increased sodium loss

54. Infusion of nor-adrenaline is expected to produce:

- a) A decrease in firing-rate of baroreceptors
- b) A reflex brachycardia
- c) A decrease in total peripheral resistance
- d) Increased myocardial contractility due to B2 receptors
- e) An increase in cardiac output

55. Stroke volume is decreased when:

- a) The sympathetic nerves are stimulated
- b) The arterial blood pressure falls
- c) Vagal centers are stimulated
- d) The end-diastolic volume is increased
- e) A patient stands up

56. Generalized vasoconstriction may be produced by:

- a) Exposure to heat
- b) Parasympathetic stimulation
- c) An increase in vasomotor tone
- d) When the depressor center is stimulated
- e) An exposure to a large dose of histamine

57. Arterial vasoconstriction in a limb leads to:

- a) An increase in capillary pressure
- b) A decrease in arteriovenous oxygen difference
- c) Diminished filtration in capillary bed
- d) An increase in blood pH leaving the limb
- e) Venoconstriction

58. Which of the following is the most important in determining the total peripheral resistance?

- a) Blood viscosity
- b) Concentration of plasma protein
- c) Arteriolar diameter
- d) Cardiac Output
- e) Metabolic autoregulation

59. Venodilation at rest leads to:

- a) A decrease in venous return
- b) A drop in arterial blood pressure
- c) Flushing of the skin
- d) A decrease in peripheral resistance
- e) Increased capillary fluid exchange

60. Stroke Volume:

- a) Is normally about 90mL
- b) Depends on Bainbridge reflex
- c) Decreases when the heart rate increases
- d) Increases when the end-diastolic volume increases
- e) Is mainly controlled by vagal fibers

- 61. Starling's Law of the heart describes the relationship between:**
- a) The heart rate and stroke volume
 - b) The end-diastolic volume cardiac output
 - c) The blood pressure and heart rate
 - d)** The initial length of cardiac muscle fibers and force of contraction
 - e) Sympathetic stimulation stroke volume
- 62. Increased pressure in the carotid sinus leads to:**
- a) An increase in vasomotor tone
 - b)** Increase in vagal tone
 - c) Reflex vasoconstriction
 - d) Venoconstriction
 - e) Tachycardia
- 63. In the jugular pulse wave the wave "C":**
- a) Occurs before the "a" wave
 - b) Is due to atrial systole
 - c) Closure of the atrioventricular valve
 - d) Co-occurs with the atrial pulse wave
 - e)** Is due to bulging of tricuspid valves
- 64. The first heart sound:**
- a) Is due to vibrations in the aorta on closure of the semilunar valves
 - b) Is caused by closure of tricuspid valve
 - c) Occurs at the end of isometric contraction of the ventricle
 - d)** Is caused by closure of both atrioventricular valves
 - e) Is short of high pitch
- 65. The Cardiac output is:**
- a) The volume of blood pumped by the heart in one minute
 - b)** Equal to the heart rate multiplied by the stroke volume
 - c) Measured by dilution method
 - d) Increased on standing up
 - e) Greater in left ventricle than the right
- 66. The chemoreceptors are found in:**
- a) The lungs
 - b) Glomus bodies
 - c)** Aortic arch
 - d) Carotid sinus
 - e) Medulla
- 67. Local vasodilation can be produced by:**
- a) Neural reflexes
 - b)** Myogenic autoregulation
 - c) An increase in PO_2
 - d) A decrease in H^+ concentration
 - e) Synthesis of ATP

68. The following are expected to increase the cardiac output *except*:

- a) Eating
- b) Adrenaline Infusion
- c) Moderate rise in environmental temperature
- d) A 10 degree rise in body temperature
- e) Pregnancy

69. Regarding the cardiac cycle which of the following is incorrect?

- a) The first heart sound occurs at the start of isovolumetric contraction
- b) The "v" wave of atrial pressure occurs during diastole
- c) The third heart sound occurs during ventricular diastole
- d) The second heart sound occurs in late systole
- e) Ventricular systole continues after the end of the ECG wave

70. The Frank-Starling law explains all the following except:

- a) Increase in cardiac with increase in venous return
- b) Maintenance of stroke volume in the phase of increased afterload
- c) Matching left ventricular output with right ventricular output
- d) The increased contractility induced by sympathetic stimulation
- e) The normal cardiac output in hypertensive patients

71. A drug that increases the heart rate from 70 to 100 beats per minute could be:

- a) A B1-adrenergic receptor antagonist
- b) A cholinergic receptor antagonist
- c) A cholinergic receptor agonist
- d) A B2 adrenergic receptor agonist
- e) A non-cholinergic, non-adrenergic agonist

72. Excitation of the ventricles:

- a) Proceeds from the subendocardium to the subepicardium
- b) Leads to excitation of the atria
- c) Results from the action of norepinephrine on ventricular muscle
- d) Occurs 2.2 seconds following atrial excitation
- e) Results from pacemaker potentials in ventricular cells

73. AV nodal cells:

- a) Exhibit action potentials characterized by rapid depolarization
- b) Conduct impulses more slowly than either atrial or ventricular cells
- c) Are capable of pacemaker activity at an intrinsic rate of 100 beat per minute
- d) Exhibit increased permeability to Na⁺ during the prepotential
- e) Show a steep pre-potential when exposed to acetylcholine

74. Stroke Volume:

- a) Increases as a result of increased afterload
- b) Equals end-diastolic volume minus end-systolic volume
- c) Increases as the heart rate is increased by electrical pacing
- d) Is increased by parasympathetic stimulation
- e) Is increased by Ca-channel blockers

75. Coronary blood flow of the left ventricle:

- a) Is mainly regulated by sympathetic supply to coronary arterioles
- b) Increases when sympathetic nerves to the heart are blocked
- c) Is highest during systole because of myocardial activity
- d)** Increases when myocardial metabolism increases
- e) All of the above are correct

76. The strength of myocardial contraction:

- a) Increases as a result of increased afterload
- b) Equals end-diastolic volume minus end-systolic volume
- c) Increases as heart rate increases by electrical pacing
- d) Is increased by parasympathetic stimulation
- e) Is increased by calcium channel blockers

77. Increased arterial blood pressure leads to:

- a) Decreased firing of carotid sinus baroreceptors
- b) Increased sympathetic activity to the ventricles
- c)** Increased parasympathetic activity to the sinoatrial node
- d) Increased parasympathetic activity to arterioles of skeletal muscles and skin
- e) Increased parasympathetic stimulation to the ventricles

78. Which of the following is likely to cause postural hypotension?

- a) Drugs that block muscarinic cholinergic receptors
- b) Decreased firing rate of baroreceptors while standing
- c) Exposure to cold environment
- d) Drugs that block cholinergic receptors in skeletal muscle vessels
- e) Drugs that activates cholinergic receptors in autonomic ganglia

79. Stimulation of parasympathetic nerves to the heart:

- a) Causes tachycardia
- b)** Makes the prepotential more horizontal
- c) Decreases the rate of potassium efflux in the sino-atrial node
- d) Prolongs the refractory period
- e) Shortens the duration of the cardiac cycle

80. The prepotential of the pacemaker is mainly due to:

- a) Calcium influx in the early phase
- b) Increased K⁺ efflux
- c) Increased chloride influx
- d)** Decreased K⁺ efflux
- e) Decreased Na⁺ influx

81. The vessels responsible for regulation of blood pressure:

- a) Medium-size arteries
- b) Small veins
- c) Capillaries
- d) Venules
- e) Arterioles

82. The advantage of the Starling mechanism in the heart is to:

- a) Decrease fluid loss from the cardiac capillaries
- b) Ensure that the ventricles operate at an optimum length
- c) Couple the efficiency of muscle contraction to the heart rate
- d) Match the output of one ventricle to that of the other
- e) Ensure that the right and left arterial pressure are equal

83. An increase in arterial pulse pressure is observed in association with:

- a) Exposure to cold
- b) An increased peripheral resistance
- c) Hypothyroidism
- d) An increased vagal activity
- e) Muscular exercise

84. A decrease in carotid sinus pressure would lead to a decrease in:

- a) Heart rate
- b) Myocardial contractility
- c) Total peripheral resistance
- d) Capacity of venous system
- e) Cardiac output

85. In the ECG, the QRS wave is due to:

- a) Atrial contraction
- b) Atrial depolarization
- c) Ventricular depolarization
- d) SA node depolarization
- e) Ventricular contraction

86. In the ECG, the P wave denotes:

- a) Atrial contraction
- b) Atrial depolarization
- c) Ventricular repolarization
- d) SA node depolarization
- e) Ventricular contraction

87. Stimulation of sympathetic nerves to the heart:

- a) Causes tachycardia via alpha-adrenergic receptors
- b) Makes the prepotential more horizontal
- c) Decreases the rate of potassium efflux in the SA node
- d) Prolongs the nodal delay
- e) Has no effect on the duration of the cardiac cycle

88. Concerning the heart sounds:

- a) The first heart sound is due to closure of the atrioventricular valves
- b) The second heart sound is due to opening of the aortic and pulmonary valves
- c) The third heart sound is due to atrial systole
- d) The first heart sound occurs at the beginning of the isovolumetric relaxation phase
- e) The second heart sound is followed by isovolumetric contraction phase

89. In the normal ECG the duration of PQ interval is usually:

- a) 0.10 sec
- b) 0.15 sec
- c) 0.30 sec
- d) 0.45 sec
- e) 0.60 sec

90. Starling's Law of the heart:

- a) States that at a given end-diastolic pressure, norepinephrine increases the volume
- b) States that increased end-diastolic volume leads to an increased stroke volume**
- c) Is primarily the result of changes in the firing rate of sympathetic nerves to the ventricles
- d) Is independent of the venous return
- e) Describes the myocardial response to an increased heart rate

91. In the heart, transmission of impulses is fastest in:

- a) Atrial muscles
- b) Bundle of His
- c) Ventricular muscles
- d) Purkinje fibers**
- e) AV nodal fibers

92. The force of contraction of cardiac muscle is a function of:

- a) Initial muscle length**
- b) Body temperature
- c) Duration of the action potential
- d) End-systolic volume
- e) Number of impulses that reach the muscle cell per unit time

93. The second heart sound occurs:

- a) During protodiastole
- b) During isovolumetric relaxation**
- c) During isovolumetric contraction
- d) 0.5 seconds after the first heart sound
- e) At the peak of ejection period

94. The P wave of the ECG:

- a) Occurs during rapid atrial inflow
- b) Follows the "a" wave of atrial pressure
- c) Is essential for development of normal QRS complex
- d) Occurs during ventricular diastole
- e) Is prominent in atrial fibrillation

95. Which is true of cardiac muscle:

- a) All cardiac muscle cells have pacemaker potentials
- b) The rate of cardiac muscle contraction is always set by nerves to the heart
- c) Impulses spread easily from one muscle cell to another
- d) Cardiac muscles look smooth under the microscope
- e) Cardiac muscles have relatively short refractory periods compared to skeletal muscles

96. Stimulation of the right vagus nerve:

- a) Increases the heart rate
- b) Increases arterial blood pressure
- c) Has a reduced effect after administration of physostigmine
- d) Has a reduced effect after administration of atropine
- e) Has a reduced effect after administration of pronaolol

97. Which of the laws explain the relationship between vessel wall tension and vessel radius:

- a) Poiseuille's Law
- b) Ohm's Law
- c) Starling's Law
- d) LaPlace's Law
- e) Reynold's Law

98. Which of the following are not innervated by sympathetic nerves?

- a) Large arteries
- b) Arterioles
- c) Venules
- d) Capillaries
- e) Large veins

99. Which of the following substances will be most likely to dilate systemic arterioles:

- a) Endothelin
- b) ADH
- c) Histamine
- d) Noreadrenaline
- e) Aldosterone

100. Resistance to venous return:

- a) Is higher during exercise than at rest
- b) Equals to the slope of the venous return curve
- c) Is reduced by sympathetic stimulation
- d) Increases by increase in circulatory filling pressure
- e) Increased by constriction of arterioles

101. Closure of the aortic valve occurs at:

- a) The end of isovolumetric contraction
- b) The beginning of isometric relaxation
- c) The end of systole
- d) The end of rapid filling phase
- e) The beginning of rapid ejection phase

102. An increase in the pulse pressure can be caused by:

- a) Parasympathetic stimulation
- b) Generalized vasodilation
- c) Sympathetic stimulation
- d) Venodilation
- e) Heart failure

103. The contribution of atrial contraction to ventricular filling is greatest:

- a) When sympathetic stimulation is pronounced
- b) At rapid heart rates
- c) When atria and ventricles contract simultaneously
- d) During atrial fibrillation
- e) During bradycardia

104. The baroreceptor reflex mainly regulates:

- a) Stroke volume
- b) Heart rate
- c) Mean arterial blood pressure
- d) Systolic blood pressure
- e) Diastolic blood pressure

105. Which of the following is a characteristic of cardiac muscle?

- a) It has a long refractory period compared to skeletal muscle
- b) There are electrical synapses
- c) Gap junctions cause limitation of depolarization
- d) Has myosin but no actin molecules
- e) There are para cellular spaces

106. Factors affecting the strength of ventricular muscle include:

- a) Parasympathetic inhibition
- b) The length of muscle fibers
- c) The length of plateau phase
- d) Sympathetic stimulation
- e) End-systolic volume

107. Stimulation of parasympathetic supply to the heart results in:

- a) Decrease K^+ efflux in cardiac muscle
- b) Increases Ca^{2+} influx in SA node
- c) Increased delay in AV node
- d) An increase in Cl^- influx
- e) Opening of sodium channel

108. The following increase the cardiac output *except*:

- a) Sympathetic stimulation
- b) Venodilation
- c) Fever
- d) Anemia
- e) Exercise

109. The cardiac output is increased:

- a) By stimulation of sympathetic beta-1 receptors
- b) Increased impedance in the aortic arch
- c) By high pressure in the arterial system
- d) By impulses through the glosso-pharyngeal nerve (ix)
- e) In hypothyroidism

110. Ventricular Depolarization:

- a) Follows immediately after the closure of atrioventricular valves
- b) Occurs during mid systole
- c) Depends on sympathetic stimulation
- d) Occurs 0.2 sec following atrial excitation
- e) Results from pacemaker cells in ventricular cells

111. The isovolumetric relaxation phase of the ventricles:

- a) Is associated with rapid filling
- b) Occurs during late diastole
- c) Ends by opening of the atrioventricular valves
- d) Results in falling of ventricular pressure by about 10 mmHg
- e) Is marked by the first heart sound

112. Factors that increase the stroke volume include:

- a) An increased afterload
- b) A high end-diastolic volume
- c) An increased heart rate
- d) Parasympathetic stimulation
- e) Ca²⁺ channel blockers

113. After a loss of one liter of blood:

- a) The heart rate decreases slightly
- b) Baroreceptors increase their discharge
- c) The chemoreceptors have no role
- d) The end diastolic volume increases
- e) There is increased vasomotor tone

114. A large infarct affecting the left ventricle causes:

- a) Pulmonary capillary hydrostatic pressure to decrease
- b) Left ventricular end systolic pressure to increase
- c) Heart rate to decrease
- d) The systolic blood pressure to decrease
- e) Congestion of the liver

115. The blood vessels responsible for exchange between plasma & interstitial fluid are:

- a) Distributing arteries
- b) Large veins
- c) The capillaries
- d) The venules
- e) Arterioles

116. Conduction velocity of cardiac impulse is slowest in:

- a) Atrial myocardial fibers
- b) AV nodal fibers
- c) Purkinje fibers
- d) Ventricular myocardial fibers
- e) His bundle fibers

117. The contribution of atrial contraction to ventricular filling is greatest:

- a) When vagal activity is pronounced
- b) At rapid heart rates
- c) When atria and ventricles contract simultaneously
- d) During atrial fibrillation
- e) Early during ventricular diastole

118. The most important function of the Starling mechanism in the heart is:

- a) To decrease fluid loss from the cardiac capillaries
- b) To ensure that the ventricles operate at an optimum length
- c) To couple the efficiency of muscle contraction to the heart rate
- d) To match the output of one ventricle to that of the other
- e) To ensure that right and left atrial pressures are equal

119. The highest coronary blood flow occurs:

- a) Early during systole
- b) When the left ventricular pressure is high
- c) At the beginning of isovolumetric contraction
- d) Towards the end of ventricular diastole
- e) At the beginning of diastole

120. Which of the following results in an increased stroke volume?

- a) An increase in end-diastolic volume
- b) An increased afterload
- c) Parasympathetic stimulation
- d) An increase in the heart rate
- e) Venodilation