Cardiovascular system
1) The SA node is the normal pacemaker because of its:
   a) rate of impulse discharge
   b) location in the atrium
   c) neural control
   d) muscular structure
   e) relative position to the A.V node.

2) The SA node is the normal pacemaker because:
   a) is the most rapidly discharging part
   b) is the most richly supplied by nerve endings.
   c) located in the atrium.
   d) all of the above

3) Regarding the S-A node:
   a) cells within the S-A node act as heart pacemaker because their
      membrane depolarized to threshold and initiate an action
      potential.
   b) acetyl choline increases the slope of the pace-maker potential.
   c) sympathetic stimulation decreases the slope of the pace-maker
      potential.
   d) the pace-maker cells within the S-A node are neurons rather than
      myocytes.

4) About the cardiac muscle all the following are true except:
   a) It has low electric resistance of the membrane at the intercalated discs
   b) It forms true syncytium.
   c) It obeys the all or none law.
   d) there is almost a special capillary for each muscle fiber.

5) The cardiac muscle fibers:
   a) are unstriated muscle fibers
   b) form true syncytium
   c) are poor in mitochondria
   d) have low resistance bridges & tight gap junctions.

6) In the heart, all the following are true except:
   a) the pericardium limits sudden dilatation of the ventricles
   b) the left ventricle gives an aid to the right ventricle
   c) the left atrium is the first part to contract.
   d) the left side of the intervent. septum is depolarized before the
      right side.
7) The fibers of the A-V bundle & its branches:
   a) conduct impulses very slowly
   b) are highly contractile
   c) are modified muscle fibers
   d) are nerve fibers.

8) The cardiac tissue with the slowest rhythmicity is the:
   a) S.A node without vagal tone
   b) S.A node with vagal tone.
   c) ventricular muscle.
   d) AV node.
   e) Purkinje fibers.

9) The action potential of cardiac muscle differs from that of skeletal muscles in:
   a) it is propagated more slowly.
   b) it is shorter in duration
   c) it has a higher amplitude
   d) it has no plateau.
   e) all of the above

10) In the heart all the following are true except:
    a) the right ventricle is thicker than the left ventricle
    b) the excitation wave cannot spread directly from the atria to the ventricles
    c) contraction normally begins in the right atrium
    d) the ventricles contract almost simultaneously
    e) the S.A node is the normal pacemaker.

11) When the bundle of His is completely interrupted, the:
    a) ventricles contract at a rate of 30-40 beats / minutes.
    b) atria beat irregularly
    c) QRS complexes vary in shape from beat to beat.
    d) P-R interval remains constant from beat to beat
    e) S.A node stops discharging.

12) About the Purkinje tissue, all the following are true except:
    a) they are modified myocardial cells
    b) they are confined to the ventricles
    c) they are primitive nerve tissue
    d) they conduct impulses as some nerves
    e) they excite the interventricular septum before the ventricular walls.
13) The S.A node:
   a) but not the A.V node receives a parasympathetic nerve supply
   b) is connected by a thin band of purkinje fibers to the A.V node
   c) has a faster rate of diastolic depolarization during vagal activity
   d) has a faster rate of diastolic depolarization at 39 C than at 37 C
   e) is a secondary cardiac pacemaker.

14) The left vent. has a thicker wall than the right ventricle because:
   a) it is richer in blood supply
   b) it ejects blood through a narrower orifice
   c) it ejects a greater cardiac output.
   d) it ejects blood against a higher pressure
   e) it contracts at a higher rate.

15) The atrio-ventricular valves:
   a) have three cusps for each valve
   b) their closure is initiated when the ventricular pressure exceeds atrial pressure
   c) open by contraction of papillary muscles.
   d) none of the above.

16) All the following are correct except:
   a) the left atrial wall is about the same thickness as the right atrium
   b) the left ventricle is separated from the left atrium by a bicuspid valve.
   c) Purkinje system allows the excitation of all ventricular muscle fibers
to occur at nearly the same time.
   d) the right heart receives oxygenated blood from the four pulmonary veins.

17) The action potential of the cardiac muscle is characterized by the presence of plateau which:
   a) in the ventricular muscle it reached 100 m sec
   b) in the artial muscle, it reached 300 m sec
   c) it result from a balance between Ca++ influx and K+ efflux.
   d) it result from an inflow of Cl- and outflow of bicarbonate ions.

18) It is impossible to tetanize a heart because:
   a) there is a long mechanical refractory period
   b) the refractory period and the mechanical contractile response are of almost equivalent duration.
   c) the heart muscles do not contain Ca++.
   d) the mechanical contractile event is usually shorter than the duration of the electrical depolarization.
19) The absolute refractory period in the ventricle:
   a) increases during sympathetic stimulation.
   b) coincides with the phase of rapid depolarization and the plateau.
   c) corresponds with the whole duration of action potential.
   d) it is shorter than the ARP of skeletal muscle.

20) Under normal conditions, the capillaries:
   a) contain about 25% of the total blood volume.
   b) have a very rapid flow rate
   c) have a higher pressure than that in the arterioles
   d) are all opened at rest
   e) contain about 5% of the total blood volume.

21) About the cardiac conductivity, all the following are true except:
   a) it is slowest in the A-v node
   b) it is maximal in the purkinje fibers.
   c) it is slowest in the ventricular ms.
   d) it is decreased by vagal stimulation
   e) it occurs through modified cardiac muscle fibers.

22) About the pacemaker potential, all the following are true except:
   a) it's amplitude is -80 to -90 mv
   b) it is unstable during rest.
   c) its slope is decreased by increased permeability to K+
   d) the firing level occurs at a potential difference of about -45 mv.
   e) repolarization is one slow phase.

23) The main function of the cardiac purkinje system is to:
   a) prevent premature ventricular beats.
   b) coordinate the valve movements with myocardial contraction
   c) enable all parts of the ventricle to contract simultaneously
   d) delay the systole until the ventricles fill.

24) Propagation of the action potential through the heart is fastest in the:
   a) SA node
   b) atrial muscle
   c) AV node
   d) purkinje fibers
   e) ventricular muscle.
25) Myocardial contractility is best correlated with the intracellular concentration of:
   a) Na+
   b) K+
   c) Ca++
   d) Cl

26) The cardiac muscle is characterized by having all the following except:
   a) intercalated disk connecting ms.
   b) A T system located at the Z line
   c) The same refractory period characteristics as the skeletal ms.
   d) Acts as a physiological syncytium

27) The greatest percentage of blood volume is found in the:
   a) Heart
   b) Aorta
   c) Distributing arteries and arterioles
   d) capillaries
   e) venules and veins

Choose whether these statements are true or false:
28 - Cardiac muscle contractility
   a) depends on an interaction between actin and myosin filaments.
   b) is enhanced when the serum potassium rises above normal
   c) is lost if the bathing is made calcium free
   d) is reduced by the local application of acetylcholine

29 - In the heart, purkinje tissue cells:
   a) are modified myocardial cells
   b) are confined to the ventricles
   c) can conduct impulses as fast as some nerves
   d) excite the myocardium of the interventricular system before the outer walls of the ventricles.

30 - When the bundle of His is completely interrupted, the:
   a) ventricles typically contract at about 30 – 40 beats/min
   b) atria beat at an irregular rate.
   c) PR interval on the ECG is longer than normal but remains constant from beat to beat
   d) QRS complex varies in shape from beat to beat.
31 - **Functions of atria:**
a) blood reservoirs when the venous return accumulates during ventricular systole
b) pumping 30% of venous return into the ventricles during their systole
c) atria contains the SAN & AVN
d) atria, specially the right, contain receptors for many cardiac reflexes

32 - **Transmission of cardiac impulse occurs through the atria by:**
a) the right and left atrial mass
b) the anterior interatrial band to the left atrium
c) the AVB
d) the anterior, middle, and posterior internodal bundles, directly to the AVN.

33 - **In the heart:**
a) systolic contraction normally begins in the left atrium
b) excitation spreads directly from atrial to ventricular fibres
c) atrial and ventricular muscle contracts simultaneously in systole
d) the contracting ventricles shorten from apex to base

34 - **The absolute refractory period in the ventricles:**
a) is the period when the ventricles are completely inexcitable
b) corresponds to the period of ventricular depolarization
c) corresponds to the period of ventricular contraction
d) is shorter than the corresponding period in atrial muscle
e) decreases during sympathetic stimulation of the heart

35 - **Sinoatrial node cells are:**
a) found in both atria
b) innervated by the vagus
c) unable to generate impulses when completely denervated
d) connected to AV node by fine bundles of purkinje tissue
e) stable with regard to their membrane potentials

36 - **The strength of contraction of left ventricular muscle increases when:**
a) end-diastolic ventricular filling pressure rises
b) serum potassium levels rise
c) blood calcium levels fall
d) strenuous exercise is undertaken
e) peripheral resistance is increased
37 - The purkinje tissue cells in the heart:
   a) conduct impulses faster than some neurons
   b) are larger than ventricular myocardial cells
   c) lead to contraction of the base before the apex of the heart
   d) are responsible for the short duration of the QRS complex
   e) are responsible for the configuration of the QRS complex.

Choose the correct answer:

38. Ventricular pressure is higher than the atrial pressure in all phases of the cardiac cycle except in:
   (A) isometric contraction phase.
   (B) atrial systole phase.
   (C) maximum ejection phase.
   (D) reduced ejection phase.

39. Diacrotic notch is due to:
   (A) sudden closure of AV valves.
   (B) sudden closure of aortic valve.
   (C) sudden decrease in aortic pressure.
   (D) marked decrease in ventricular pressure.

40. All are involved in ventricular filling except:
   (A) atrial systole phase.
   (B) maximum ejection phase.
   (C) maximum filling phase.
   (D) reduced filling phase.

41. AV valves are opened in:
   (A) isometric contraction phase.
   (B) atrial systole phase.
   (C) protodiastolic phase.
   (D) maximum ejection phase.

42. The longest phase in cardiac cycle is:
   (A) maximum ejection phase.
   (B) reduced filling phase.
   (C) maximum filling phase.
   (D) protodiastolic phase.
43. **Systolic pressure in right ventricle is:**
   (A) 35 mmHg.
   (B) 25 mmHg.
   (C) 15 mmHg.
   (D) 45 mmHg.

44. **All cardiac valves are opened in:**
   (A) isometric relaxation phase.
   (B) isometric contraction phase.
   (C) maximum filling phase.
   (D) all of the above.
   (E) none of the above.

45. **C wave in jugular venous pulse occurs in:**
   (A) isometric contraction phase.
   (B) isometric relaxation phase.
   (C) maximum ejection phase.
   (D) atrial systole phase.

46. **Y wave in jugular venous pulse occurs in:**
   (A) isometric contraction phase.
   (B) isometric relaxation phase.
   (C) maximum filling phase.
   (D) maximum ejection phase.

47. **A-C interval is prolonged in:**
   (A) A-V nodal rhythm.
   (B) first degree heart block.
   (C) pulmonary hypertension.
   (D) none of the above.
   (E) all of the above.

48. **Cannon waves appear in:**
   (A) Complete heart block.
   (B) AV nodal rhythm.
   (C) ventricular extrasystole.
   (D) none of the above.
   (E) all of the above.
49. **Diacrotic wave is caused by:**
   (A) escape of blood from the aorta to the periphery.
   (B) elastic recoil of the aorta leading to increased aortic pressure.
   (C) aortic regurgitation of blood.
   (D) increase aortic distension.

50. **Pulses alternans occurs in:**
   (A) extrasystoles.
   (B) arteriosclerosis.
   (C) heart failure.
   (D) constrictive pericarditis.

51. **Water hammer pulse occurs in:**
   (A) arteriosclerosis.
   (B) hyperthyroidism.
   (C) aortic regurgitation.
   (D) all of the above.
   (E) none of the above.

52. **Pulsus deficit is detected in:**
   (A) complete heart block.
   (B) atrial fibrillation.
   (C) heart failure.
   (D) sinus tachycardia.

53. **P wave is due to:**
   (A) atrial depolarization.
   (B) atrial repolarization.
   (C) atrial systole.
   (D) atrial diastole.

54. **QRS complex lies in:**
   (A) isometric contraction phase.
   (B) isometric relaxation phase.
   (C) maximum filling phase.
   (D) maximum ejection phase.

55. **QRS complex is due to:**
   (A) ventricular repolarization.
   (B) ventricular depolarization.
   (C) atrial depolarization.
   (D) atrial repolarization.
56. **QRS complex begins before the mechanical ventricular response by:**
   (A) 0.01 sec.
   (B) 0.15 sec.
   (C) 0.02 sec.
   (D) 0.03 sec.

57. **P-R interval is prolonged in all the following cases except:**
   (A) A-V nodal rhythm.
   (B) atrial hypertrophy.
   (C) high vagal tone.
   (D) first degree heart block.

58. **P-R interval is present in these cases except:**
   (A) high vagal tone.
   (B) complete heart block.
   (C) sympathetic overactivity.
   (D) atrial hypertrophy.

59. **Prolonged a-c interval in jugular venous pulse indicates:**
   (A) first degree heart block.
   (B) complete heart block.
   (C) AV nodal rhythm.
   (D) all of the above.
   (E) non of the above.

60. **The longest wave in ECG is:**
    (A) P wave.
    (B) T wave.
    (C) Q wave.
    (D) R wave.
    (E) S wave.

61. **T wave is inverted in:**
    (A) muscular exercise.
    (B) sympathetic overactivity.
    (C) coronary ischemia.
    (D) hyperthyroidism.

62. **Abnormalities in T wave is usually linked to abnormalities in:**
    (A) Q-T interval.
    (B) S-T segment.
    (C) P-R interval.
    (D) A-C interval.
63. **In ventricular filling phase, it:**
(A) depends mainly on atrial contraction.
(B) begins during isometric relaxation phase.
(C) gives rise to a third heart sound.
(D) consumes much energy by ventricles.

64. **P wave is inverted in:**
(A) A-V nodal rhythm.
(B) atrial fibrillation.
(C) atrial flutter.
(D) heart block.

65. **First heart sound occurs in:**
(A) isometric contraction phase.
(B) atrial systole phase.
(C) isometric relaxation phase.
(D) maximum filling phase.

66. **Second heart sound is due to:**
(A) closure of AV valves.
(B) closure of semilunar valves.
(C) closure of all valves.
(D) opening of AV valves.

67. **From the causes of diastolic murmur:**
(A) stenosis of aortic valve.
(B) stenosis of pulmonary valve.
(C) stenosis of mitral valve.
(D) intraventricular septal defect.

68. **During the reduced ejection phase, which one of the following is true:**
(A) left atrial pressure is falling.
(B) aortic pressure is falling below left ventricular pressure.
(C) the A-V valves are closed.
(D) left ventricular pressure is constant.
(E) the QRS complex terminates just before this phase.

69. **The incisura or diacrotic notch in the aortic pressure curve is:**
(A) of unknown mechanism.
(B) indicative of cardiovascular disease.
(C) coincident with the second heart sound.
(D) absent in arteriosclerosis.
(E) felt easily in normal radial pulse.
70. **The P wave of the ECG occurs at:**
   (A) the beginning of atrial contraction.
   (B) the end of atrial contraction.
   (C) the beginning of ventricular contraction.
   (D) the end of ventricular contraction.
   (E) none of the above.

71. **Match the following events indicating the order in which they occur starting from the P-wave:**
   (A) aortic valve closes - first event
   (B) Q-wave - second event
   (C) T-wave - third event
   (D) A-V valves close - fourth event
   (E) aortic valve opens - fifth event

72. **A huge a-wave is observed in the jugular venous pulse curve in:**
   (A) atrial fibrillation.
   (B) atrial flutter.
   (C) mitral stenosis.
   (D) tricuspid stenosis.
   (E) tricuspid regurgitation.

73. **Within the jugular venous pulse, the C-wave:**
   (A) occurs at the onset of expiration.
   (B) occurs during atrial systole.
   (C) is the result of bulging of mitral and tricuspid valves into the atria.
   (D) occurs as a result of bulging of semilunar valves into the aorta and pulmonary artery respectively.
   (E) none of the above.

74. **The peak velocity of blood flow in the ascending aorta is:**
   (A) about 10 cm/sec.
   (B) less than that in the carotid artery.
   (C) much slower than in capillaries.
   (D) inversely proportional to the cross-sectional area.

75. **All are involved in ventricular isometric contraction phase except:**
   (A) the ventricular pressure increases very rapidly.
   (B) the ventricular volume decreases markedly.
   (C) the atrial pressure increases due to sudden closure of A-V valves.
   (D) the first heart sound.
   (E) Q wave starts about 0.02 sec. before start of this phase.
76. **The shortest phase in cardiac cycle is:**
   (A) maximum ejection phase.
   (B) reduced ejection phase.
   (C) maximum filling phase.
   (D) reduced filling phase.
   (E) protodiastolic phase.

77. **The systolic pressure in the left ventricle is:**
   (A) 130 mmHg.
   (B) 110 mmHg.
   (C) 150 mmHg.
   (D) 80 mmHg.
   (E) 100 mmHg.

78. **All cardiac valves are closed in what phase (phases) of the cardiac cycle:**
   (A) isometric relaxation phase.
   (B) maximum filling phase.
   (C) reduced filling phase.
   (D) all of the above.
   (E) none of the above.

79. **As regard the standard limb leads of ECG, lead II represents:**
   (A) the potential difference between the left arm and the right arm.
   (B) the potential difference between the left leg and the left arm.
   (C) the potential difference between the left leg and the right arm.
   (D) none of the above.

80. **In augmented unipolar limb leads, it is obtained by connecting:**
   (A) the 3 limb electrodes (central terminal i.e. potential is zero) against the exploring electrode which record the potential at the point where it is placed.
   (B) 2 limb electrodes (central terminal) against the 3rd one (exploring electrode).
   (C) one limb electrode (central terminal) against 2 limb electrodes connected together as the exploring electrode.
   (D) none of the above.

81. **Einthoven’s triangle is an equilateral triangle, the sides of which represent:**
   (A) the 3 standard limb leads.
   (B) the 3 unipolar limb leads.
   (C) combination of both the standard and unipolar leads.
   (D) the heart lies at the top of this triangle.
   (E) none of the above.
82. **The exploring electrode of V₁ of unipolar chest leads of ECG is placed at:**
   (A) fourth intercostal space at left sternal border.
   (B) fourth intercostal space at right sternal border.
   (C) fifth intercostal space at midclavicular line.
   (D) fifth intercostal space at anterior axillary line.
   (E) fifth intercostal space at mid axillary line.

83. **Einthoven’s law states that at any given movements the voltage in:**
   (A) lead I equals the sum of voltage in lead II and lead III.
   (B) lead III equals the sum of LI and LII.
   (C) lead II equals the sum of LI and LIII.
   (D) lead I should equal lead III.
   (E) lead II should equal lead III.

84. **Which is determined by ECG:**
   (A) mechanical performance of the heart.
   (B) cardiac output.
   (C) systolic and diastolic information.
   (D) effects due to changes in fluid electrolytes.
   (E) venous return to heart.

85. **Before using the electrocardiograph, the usual voltage calibration is that:**
   (A) 1 mv signal produces 0.1 mm defection.
   (B) 1 mv signal produces 10 mm defection.
   (C) 10 mv signal produces 10 mm defection.
   (D) 100 mv signal produces 10 mm defection.
   (E) 1 mv signal produces 100 mm defection.

86. **At the horizontal axis of ECG paper, each millimeter represents:**
   (A) 0.4 sec.
   (B) 0.04 sec.
   (C) 0.004 sec.
   (D) 0.01 sec.
   (E) 0.001 sec.

87. **As regard the U wave of ECG:**
   (A) it is usually absent.
   (B) it probably represents the repolarization of papillary muscles.
   (C) its duration is about 0.05 second.
   (D) all of the above.
   (E) none of the above.
88. The beginning of ascending limb of arterial pulse wave coincides with which wave of the jugular venous pulse curve:
   (A) beginning of c wave
   (B) beginning of a wave
   (C) beginning of v wave.
   (D) beginning of y wave.
   (E) beginning of x wave.

89. ECG record gives valuable information about all of the following except:
   (A) disturbance of rhythm and conduction.
   (B) relative size of heart chamber.
   (C) cardiac output.
   (D) ischemic changes of the myocardium.
   (E) the influence of same drugs.

90. The P-R interval of ECG:
   (A) represents the conductivity of AV bundle.
   (B) has a duration that varies from 0.25 to 0.3 second.
   (C) is the interval from the beginning of P wave to the beginning of T waves.
   (D) all of the above.
   (E) none of the above.

91. Prolonged P-R interval occurs in the following conditions:
   (A) 1st degree A-V heart block.
   (B) high vagal tone.
   (C) atrial hypertrophy.
   (D) all of the above.
   (E) none of the above.

92. T wave of ECG is inverted in:
   (A) cardiac ischemia.
   (B) ventricular hypertrophy.
   (C) bundle branch block.
   (D) all of the above.
   (E) none of the above.

93. P wave of ECG is absent in:
   (A) atrial hypertrophy.
   (B) ventricular extrasystole.
   (C) heart failure.
   (D) supraventricular tachycardia.
   (E) none of the above.
94. **The S-T segment of ECG:**
   (A) is not usually isoelectric.
   (B) is measured from the beginning of S to beginning of T.
   (C) represents complete depolarization of the ventricles.
   (D) is usually prolonged in myocardial ischemia.
   (E) is shortened in nodal rhythm.

95. **The Q-T interval of ECG:**
   (A) is measured from the beginning of Q wave to the beginning of T wave.
   (B) it represents the total time taken for depolarization and repolarization of ventricular muscle.
   (C) it is prolonged in hypercalcemia.
   (D) it is shortened in hypocalcemia.
   (E) all of the above.

96. **The Q-T interval of the ECG is prolonged in all of the following except:**
   (A) hypocalcemia.
   (B) myocardial ischemia.
   (C) hypertension.
   (D) digitalis toxicity.

97. **All the following conditions can be diagnosed by palpating radial pulse except:**
   a. Pulsus deficit.
   b. Bradycardia.
   c. Pulsus alternans
   d. Ventricular hypertrophy.
   e. Pulsus bigeminus.

98. **Arterial pulsations:**
   a. due to expansion of the arterial wall during systole.
   b. conducted from one segment to the next without movement of the blood.
   c. recorded from the proximal end of a ligated artery.
   d. all of the above.
   e. None of the above.

99. **Bipolar (standard) limb leads:**
   a. measure the difference of electric potential between 2 limbs.
   b. include a VL, a VR and a VF.
   c. are represented by letter V.
   d. are not sufficient to calculate the electrical axis of ventricular depolarization.
   e. None of the above.
100. The duration of cardiac cycle with a heart rate of 75 beat/minute is;
   a. 2.0 second.
   b. 0.2 seconds.
   c. 0.8
   d. 1.5 seconds.

101. Rapid ventricular filling:
   a. depends mainly on atrial systole.
   b. Marks the beginning of ventricular relaxation.
   c. Gives rises to third heart sound in healthy people.
   d. Responsible for the production of first heart sound.

102. A-C interval in jugular venous pulse curve:
   a. represents ventricular systole.
   b. has a duration 4 to 6 millisecond.
   c. Is prolonged in atrial fibrillation.
   d. corresponds to P-R interval of ECG.

103. In the heart, cardiac muscle is not found in the:
   a. interatrial septum.
   b. interventricular septum.
   c. SA node.
   d. Valve cusps.

104. The "C" wave of atrial pressure curve is due to:
   a. Atrial systole.
   b. Ventricular systole.
   c. Atrial diastole.
   d. ventricular diastole.

105. Chronotropism refers to:
   a. Rhythmicity.
   b. Conductivity.
   c. Excitability.
   d. Contractility.

106. Which of the following is not seen during isovolumetric (isometric) ventricular
contraction:
   a. increase of intraventricular pressure.
   b. The semilunar valves remain closed.
   c. Ejection of blood from the ventricles.
   d. C wave of JVP.
107. **In healthy ventricles, the force of contraction:**
a. Decreases with sympathetic stimulation.
b. Increases with increased end-diastolic volume within physiological limits.
c. Does not influence the cardiac output.
d. Is always the same.

108. **The principle of Einthoven’s triangle has been based on:**
a. Standard limb leads.
b. Augmented limb leads.
c. Chest leads.
d. All of the above.

109. **When compared the first heart sound, the second heart sound:**
a. Is less loud.
b. Has a longer duration.
c. Has a higher pitch.
d. Is less likely to be split during inspiration.

110. **When compared to normal subject, trained athletes have a:**
a. Smaller stroke volume.
b. Faster resting heart rate.
c. Larger heart.
d. Decrease in the number of mitochondria in skeletal muscle fibers.

111. **The tendency of blood flow to be turbulent increases when there is:**
a. Decrease in blood flow velocity.
b. Decrease viscosity of blood.
c. None of the above.
d. All of the above.

112. **Which of the following is responsible for the fourth heart sound:**
a. Opening of mitral valve.
b. Atrial systole.
c. Opening of semilunar valve.
d. Rapid ventricular filling.

113. **Which of these is not true of an arterial pulse?**
a. Expansible nature.
b. Better felt than seen.
c. Better seen than felt.
d. Not related to movement of blood in arteries.
114. Baroreceptors of carotid sinus and aortic arch are sensitive to;
   a. increase in systolic pressure.
   b. increase in venous pressure.
   c. increase in pulse pressure.
   d. increase in ventricular pressure.

115. Which of the following is mainly concerned with regulation of heart rate and blood pressure.
   a. Alam-Smirk reflex.
   b. Marey’s law.
   c. Starling law.
   d. None of the above.

116. In respiratory sinus arrhythmia the heart rate;
   a. is regular.
   b. increases during inspiration.
   c. decreases during inspiration.
   d. increases during expiration.

117. Respiratory sinus arrhythmia is a;
   a. pathological condition.
   b. normal phenomenon.
   c. disease of SA node.
   d. disease of conducting system.

118. The average normal electrical axis of the heart is;
   a. 60
   b. 0.
   c. -30.
   d. 90.

119. Buffer nerves are branches of;
   a. Vagus and glossopharyngeal nerves.
   b. Trigeminal nerves.
   c. Facial nerves.
   d. None of the above.

120. The first heart sound coincides with;
   a. isometric contraction phase.
   b. isometric relaxation phase.
   c. Ejection phase.
   d. Protodiastolic phase.
121. During ventricular ejection, the smallest pressure difference is between the;
   a. pulmonary artery and left atrium.
   b. right ventricle and right atrium.
   c. left ventricle and aorta.
   d. left ventricle and left atrium.

122. Persistence of a patent ductus arteriosus following birth causes;
   a. diastolic murmur.
   b. systolic murmur.
   c. continous murmur.
   d. Gallop rhythm.

123. Increasing vagal stimulation of the heart will cause an increase in;
   a. heart rate.
   b. P-R interval.
   c. Ventricular contractility.
   d. Ejection fraction.
   e. Cardiac output.

124. Blood pressure increases and heart rate decreases in response to;
   a. Exercise.
   b. increased body temperature.
   c. exposure to high altitude.
   d. Increased intracranial tension.
   e. Haemorrhage.

125. The ECG is least effective in detecting abnormalities in;
   a. the position of the heart in the chest.
   b. Atrioventricular conduction.
   c. cardiac rhythm.
   d. cardiac contractility.
   e. Coronary blood flow.

126. All of the following chemical substances decreases heart rate except;
   a. Digitalis.
   b. Morphine.
   c. Pilocarpine.
   d. Acetylcholine.
   e. Histamine.
127. Trigger zones include all these areas except;
   a. Carotid sinus.
   b. Eye ball.
   c. Larynx.
   d. Epigastrium.
   e. Apex of the heart.

128. As regard carotid sinus syndrome all of the following is correct except;
   a. It occurs in normal subject especially young adults.
   b. Slight pressure on carotid sinus leads to a bradycardia, hypotension and loss of consciousness.
   c. Denervation of the hypersensitive carotid sinus cure the condition.
   d. The carotid sinus is abnormally sensitive.

129. Stimulation of arterial baroreceptors leads to all of these except;
   a. inhibition of the vasomotor centers.
   b. stimulation of the respiratory center.
   c. inhibition of secretion of antidiuretic hormone.
   d. slowing of the heart rate.
   e. inhibition of adrenaline secreting center.