**STUDY GUIDE**
**for**
**Cardiology I**

1. The great vessels enter the heart through its

   A. base
   B. apex
   C. midline
   D. ventricles

2. The innermost layer of the heart which lines the chambers is the

   A. myocardial
   B. endocardium
   C. epicardium
   D. pericardium

3. The muscular layer of the heart is the

   A. myocardium
   B. endocardium
   C. epicardium
   D. pericardium

4. The visceral pericardium is contiguous with the

   A. myocardium
   B. endocardium
   C. epicardium
   D. pleura

5. The protective sac surrounding the heart is the
   A. myocardium
   B. endocardium
   C. epicardium
   D. pericardium

6. The inferior chambers are the
   A. atria
   B. auricles
   C. ventricles
   D. vesticles

7. The only arteries that carry oxygen-poor blood are the

   A. coronary arteries
   B. carotid arteries
   C. mesenteric arteries
   D. pulmonary arteries

8. The only veins that carry oxygen-rich blood are the

   A. vena cava
   B. pulmonary veins
   C. coronary veins
   D. jugular veins

9. The greatest muscle mass is found in the

   A. right atrium
   B. right ventricle
   C. left atrium
   D. left ventricle

10. Which valves are open during systole?

   A. Mitral and tricuspid valves
   B. Aortic and pulmonic valves
   C. AV valves
   D. none of the above

11. Which valves are open during diastole?

   A. Mitral and tricuspid valves
   B. Aortic and pulmonic valves
   C. semi-lunar valves
   D. none of the above

12. The heart muscle is perfused by the

   A. coronary arteries
   B. cerebral arteries
   C. inferior vena cava
   D. subclavian arteries

13. The development of collateral circulation is possible by the presence of

A. the coronary sinus
B. the aorta
C. anastomoses
D. automaticity

14. Blood from the coronary veins empty into the

A. right atrium
B. left atrium
C. right ventricle
D. left ventricle

15. The innermost lining of the peripheral blood vessels is the

A. tunica intima
B. tunica media
C. tunica adventitia
D. none of the above

16. The muscular layer of the peripheral blood vessels is the

A. tunica intima
B. tunica media
C. tunica adventitia
D. none of the above

17. Poiseuille's Law states that blood flow through a vessel is most dependent upon the

A. pump force
B. fluid viscosity
C. vessel length
D. vessel diameter

18. Gas exchange and cellular respiration occurs at what level of the circulation system?

A. arterioles
B. venules
C. arteries
D. capillaries

19. Which of the following does **NOT** occur during diastole?

A. ventricular filling
B. coronary artery perfusion
C. AV valves closed
D. atrial contraction

20. The amount of blood ejected by the heart in one contraction is called

A. preload
B. cardiac output
C. blood pressure
D. stroke volume

21. Which of the following does **NOT** directly affect stroke volume?

A. preload
B. afterload
C. heart rate
D. contractile force

22. Up to a point, the greater the preload, the greater the

A. contractile force
B. heart rate
C. afterload
D. blood pressure

23. The resistance against which the heart must pump is called

A. preload
B. afterload
C. Starling's affect
D. end-diastolic volume

24. Another name for preload is

A. afterload
B. end-diastolic volume
C. blood pressure
D. stroke volume

25. A person with a stroke volume of 70 ml and a heart rate of 80 has a cardiac output of

A. 5600ml
B. 1500ml
C. 560ml
D. 150ml

26. Preload is dependent upon

A. arteriole vasoconstriction
B. venous return
C. stroke volume
D. ventricular strength

27. The sympathetic nervous system innervates the heart via which receptors?

A. Beta 1
B. Beta 2
C. Alpha 1
D. Dopaminergic

28. The primary parasympathetic nerve that innervates the heart is the

A. phrenic
B. cardiac
C. vagus
D. acetylcholine

29. Which of the following could produce a parasympathetic response?

A. Bearing down on the epiglottis
B. pressure on the carotid sinus
C. bladder distention
D. all of the above

30. A positive inotropic drug increases

A. heart rate
B. conduction velocity
C. contractile force
D. refractoriness

31. A negative chronotropic drug decreases

A. heart rate
B. conduction velocity
C. contractile force
D. refractoriness

32. Specialized structures designed to speed conduction from one muscle fiber to the next are the

A. syncytial tissues
B. inotropic fibers
C. intercalated discs
D. autonomic cells

33. The ventricular syncytium occurs in an inferior to superior direction in order to

A. direct blood to the aorta and pulmonary artery
B. direct conduction to through the AV node
C. enhance conduction velocity toward the atria
D. avoid the vagus nerve

34. Which of the following is **TRUE** regarding the resting potential?

A. Sodium is pumped into the cell
B. Potassium is pumped out of the cell
C. The inside of the cell is more negative than the outside
D. The inside of the cell is more positive than the outside

35. Which of the following best characterizes the action potential?

A. Potassium is actively pumped into the cell
B. Sodium rapidly diffuses into the cell
C. The inside of the cell becomes more negative
D. The outside of the cell become more positive

36. The cells of the cardiac conductive system have

A. automaticity
B. excitability
C. conductivity
D. all of the above

37. The normal intrinsic firing rate of the SA node is

A. 20-40 beats per minute
B. 40-60 beats per minute
C. 60-100 beats per minute
D. none of the above

38. The normal intrinsic firing rate of the AV junction is

A. 20-40 beats per minute
B. 40-60 beats per minute
C. 60-100 beats per minute
D. none of the above

39. The normal intrinsic firing rate of the Purkinje system is

A. 20-40 beats per minute
B. 40-60 beats per minute
C. 60-100 beats per minute
D. none of the above

40. According to Einthoven's Triangle, lead two is characterized by

A. left arm positive, right leg negative
B. left leg positive, right arm negative
C. right leg positive, left arm negative
D. right arm positive, left leg negative

41. Which of the following information can be obtained from a single lead ECG reading?

A. the presence of an infarct
B. Cardiac output
C. Chamber enlargement
D. Heart rate

42. On the vertical axis of a standard ECG graph paper, a deflection of two large boxes signifies

A. 1 mV of amplitude
B. 10 mV of amplitude
C. 0.4 seconds duration
D. 2.0 seconds duration

43. On the horizontal axis of a standard ECG graph paper, a deflection of one large box signifies

A. 1 m V of amplitude
B. 10 m V of amplitude
C. 0.2 seconds duration
D. 0.04 seconds duration

44. The P wave represents

A. atrial depolarization
B. ventricular depolarization
C. delay at the AV node
D. ventricular repolarization

45. The T wave represents
A. atrial depolarization
B. ventricular depolarization
C. delay at the AV node
D. ventricular repolarization

46. The QRS complex represents

A. atrial depolarization
B. ventricular depolarization
C. delay at the AV node
D. ventricular repolarization

47. The P-R interval represents
A. atrial depolarization
B. ventricular depolarization
C. delay at the AV node
D. ventricular repolarization

48. Which of the following is **TRUE** regarding the absolute refractory period?
A. The heart may depolarize
B. The heart cannot depolarize

49. Which of the following statements regarding myocardial muscle is false?
A. Myocardial muscle is composed of specialized muscle cells found only in the heart.
B. Myocardial muscle is striated like skeletal muscle.
C. Myocardial muscle has electrical properties similar to smooth muscle.
D. All of the above are false.
E. None of the above is false.

50. Beginning with the return of blood to the heart from the peripheral circulation, place the following in order, describing the normal flow of blood.

1. right atrium
2. left atrium
3. right ventricle
4. left ventricle
5. pulmonary arteries
6. aorta
7. inferior and superior vena cava
8. bicuspid (mitral) valve
9. tricuspid valve
10. pulmonic valve
11. aortic valve
12. pulmonary veins
13. pulmonary capillaries

A. 7,1,8,3,10,5,13,12,2,9,4,11,6
B. 7,1,8,3,10,12,13,5,2,9,4,11,6
C. 12,2,9,4,11,6,7,1,8,3,10,5,13
D. 7,1,9,3,10,5,13,12,2,8,4,11,6
E. 7,1,9,3,10,12,13,5,2,8,4,11,6

51. The coronary arteries are the exclusive arterial blood supply to the heart muscle and its electrical conduction system. The coronary arteries originate in the

A. coronary sinus of the right atrium.
B. pulmonary artery just above the leaflets of the pulmonic valve.
C. pulmonary vein just above the leaflets of the aortic valve.
D. aorta just above the leaflets of the aortic valve.
E. aorta just above the leaflets of the pulmonic valve.

52. The cavity within a blood vessel, the diameter of which varies greatly, is called

A. the container.
B. the vascular hollow.
C. the lumen.
D. the os.
E. a sinus.

53. The smooth, single-cell layer that is the innermost lining of a blood vessel wall is called the

A. tunica adventitia.
B. tunica intima.
C. tunica terres.
D. tunica arteriosum.
E. tunica media.

54. The middle layer of a blood vessel wall is composed of elastic fibers and muscle. This layer gives strength and recoil to vessels, is thicker in arteries than in veins and is called the

A. tunica adventitia.
B. tunica intima.
C. tunica teres.
D. tunica arteriosum.
E. tunica media.

55. A protective fibrous tissue covers the exterior of a blood vessel, providing strength to withstand high pressures within. The outer layer is called the

A. tunica adventitia.
B. tunica intima.
C. tunica teres.
D. tunica arteriosum.
E. tunica media.

56. Blood is carried away from the heart by

A. capillaries.
B. veins.
C. arteries.
D. All of the above.
E. None of the above.

57. All fluid, gas and nutrient exchange occurs in

A. capillaries.
B. veins.
C. arteries.
D. All of the above.
E. None of the above.

58. One-way valves aid the direction of blood flow within

A. capillaries.
B. veins.
C. arteries.
D. All of the above.
E. None of the above.

59. The right and left atria contract together during the cardiac cycle called

A. systole.
B. diastole.
C. asystole.
D. Either answer A or B.
E. Answer A, B or C

60. The ventricular contraction phase of a cardiac cycle is called
A. systole.
B. diastole.
C. asystole.
D. Either answer A or B.
E. Answer A, B or C

61. The bicuspid (mitral) and tricuspid valves are open during
A. systole.
B. diastole.
C. asystole.
D. Either answer A or B.
E. Answer A, B or C

62. The pulmonic and aortic valves are open during
A. systole.
B. diastole.
C. asystole.
D. Either answer A or B.
E. Answer A, B or C

63. The phase during which most coronary artery filling occurs (about 70 percent) is
A. systole.
B. diastole.
C. asystole.
D. Either answer A or B.
E. Answer A, B or C

64. Stroke volume is the amount of blood ejected from a ventricle with one contraction. The average adult stroke volume is

A. 120 milliliters.
B. 15 milliliters.
C. 7.45 milliliters
D. 40 milliliters
E. 70 milliliters.

65. Preload influences stroke volume and is defined as

A. the volume and pressure available to the atrium for cardiac pumping
B. the pressure under which the ventricle fills, influenced by venous return.
C. the resistance against which the ventricle contracts, determined by arterial resistance
D. Both answers A and B.
E. Both answers A and C.

66. Afterload influences stroke volume and is defined as

A. the volume and pressure available to the atrium for cardiac pumping
B. the pressure under which the ventricle fills, influenced by venous return.
C. the resistance against which the ventricle contracts, determined by arterial resistance
D. Both answers A and B.
E. Both answers A and C.

67. Starling's law of the heart states that up to a limit,
A. the stronger the force of cardiac contraction, the greater will be the rebound chamber filling.
B. the more a myocardial muscle is stretched, the greater will be its force of contraction.
C. the greater the volume of chamber filling, the greater will be its stroke volume.
D. Both answers A and C
E. Both answers B and C

68. An increase in peripheral vascular resistance will
A. increase preload and increase stroke volume.
B. increase afterload and increase stroke volume.
C. decrease preload and increase stroke volume.
D. increase afterload and decrease stroke volume.
E. have no effect on stroke volume.

69. Cardiac output is the volume of blood pumped through the circulatory system during

A. one cardiac cycle.
B. ten cardiac cycles.
C. one minute.
D. Any of the above
E. None of the above.

70. Which of the following statements regarding the nervous system's control of the heart is false?

A. The autonomic nervous system influences rate, conductivity, and contractility of the heart.
B. Parasympathetic stimulation of the heart occurs via the vagus nerve and its chemical neurotransmitter, acetylcholine.
C. Acetylcholine release increases heart rate and AV conduction.
D. Carotid sinus massage produces vagus nerve stimulation.
E. Valsalva maneuvers decrease heart rate and AV conduction.

71. Sympathetic stimulation of the heart is produced by the chemical neurotransmitter norepinephrine, which has both alpha and beta effects. Alpha effects on the heart produce

A. an increased heart rate.
B. and increased myocardial contractility.
C. and increased conductivity.
D. All of the above.
E. None of the above.

72. Beta effects on the heart produce

A. an increased heart rate.
B. and increased myocardial contractility.
C. and increased conductivity.
D. All of the above.
E. None of the above.

73. The most important role of the electrolyte sodium is its action relating to

A. the depolarization phase of myocardial cells.
B. the force of myocardial contraction.
C. the repolarization phase of myocardial cells.
D. Both answers A and B.
E. Both answers B and C.

74. The most important role of the electrolyte potassium is its action relating to

A. the depolarization phase of myocardial cells.
B. the force of myocardial contraction.
C. the repolarization phase of myocardial cells.
D. Both answers A and B.
E. Both answers B and C.

75. Calcium plays a major role in
    A. the depolarization phase of myocardial cells.
    B. the force of myocardial contraction.
    C. the repolarization phase of myocardial cells.
    D. Both answers A and B.
    E. Both answers B and C.

76. A property of the heart's pacemaker cells is the ability to generate an electrical impulse without stimulation from another source. This ability is called
    A. excitability.
    B. reciprocity.
    C. automaticity.
    D. conjunctivity.
    E. conductivity.

77. A property of all myocardial cells is the ability to respond to an electrical stimulus. This ability is called
    A. excitability.
    B. reciprocity.
    C. automaticity.
    D. conjunctivity.
    E. conductivity.

78. The ability to propagate an impulse from cell to cell is called
    A. excitability.
    B. reciprocity.
    C. automaticity.
    D. conjunctivity.
    E. conductivity.

79. Place the following in the correct sequence, showing the normal electrical conduction of the heart.
    1. AV node
    2. SA node
    3. Purkinje fibers
    4. internodal and interatrial tracts
    5. bundle branches
    6. bundle of His

    A. 2,1,6,5,3,4
    B. 2,4,1,6,5,3
    C. 1,5,2,6,3,4
    D. 1,4,2,5,6,3
    E. 2,4,1,5,6,3

80. Which of the following statements regarding ECG monitoring is false?

A. The ECG is a record of the electrical activity of the heart as sensed by electrodes on the body surface.
B. In the absence of radial pulses, the ECG provides information as to whether or not the heart is still pumping.
C. The isoelectric line on the ECG indicates an absence of net electrical activity.
D. All of the above are false.
E. None of the above is false.

81. On standard ECG paper, one small box horizontally represents

A. 0.02 seconds of time.
B. 0.04 seconds of time.
C. 0.08 seconds of time.
D. 0.12 seconds of time.
E. 0.20 seconds of time.

82. On Stand ECG paper, one large box horizontally represents

A. 0.02 seconds of time.
B. 0.04 seconds of time.
C. 0.08 seconds of time.
D. 0.12 seconds of time.
E. 0.20 seconds of time.

83. The amount of time required for an atrial impulse to reach the ventricles is _____ of a normal ECG tracing.
A. indicated by the P wave
B. indicated by the T wave
C. indicated by the QRS complex
D. indicated by the P-R interval
E. indicated by the S-T segment

84. The period of time when cells have been depolarized and have not yet returned to a polarized state is called the

A. resting state.
B. unpolarized state.
C. polarizing period.
D. depolarized state.
E. refractory period.

85. During repolarization of depolarized cells, the period of time when no amount of stimulation can produce early depolarization is called the

A. absolute repolarizing state.
B. absolute unpolarized state.
C. primary repolarizing period.
D. secondary repolarizing period.
E. absolute refractory period.

86. The period of time mentioned in question 85 is observed on the ECG during the
A. QRS complex.
B. first half of the T wave.
C. second half of the T wave.
D. Both answers A and B.
E. Both answers A and C.

87. During repolarization of depolarized cells, the period when cells are close enough to repolarization that a sufficiently strong stimulus may produce premature depolarization is called the
A. relative repolarizing state.
B. partially unpolarized state.
C. partially polarized period.
D. susceptibility period.
E. relative refractory period.

88. The period of time mentioned in question 87 is observed on the ECG during the
A. QRS complex.
B. first half of the T wave.
C. second half of the T wave.
D. Both answers A and B.
E. Both answers A and C.

89. The normal duration of a P-R interval is
A. 0.04-0.08 seconds.
B. 0.04-0.12 seconds.
C. 0.08-0.20 seconds.
D. 0.12-0.20 seconds.
E. 0.14-0.22 seconds.

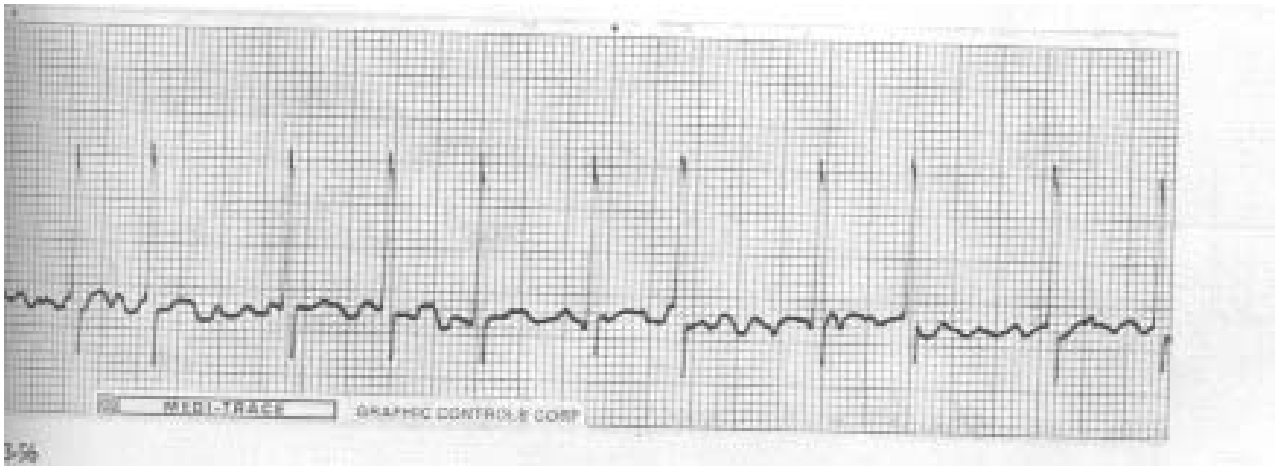
90. The normal duration of a QRS complex is
A. 0.04-0.08 seconds.
B. 0.04-0.12 seconds.
C. 0.08-0.20 seconds.
D. 0.12-0.20 seconds.
E. 0.14-0.22 seconds.

91. Your patient has an irregular pulse. On the ECG monitor you note regularly irregular groups of QRS complexes without any ectopy present. There are more P waves present than QRSs and the R-R intervals progressively decrease until a P wave without a QRS occurs. Your patient has a

A. first-degree AV block.
B. second-degree AV block, type I.
C. second-degree AV block, type II.
D. third-degree AV block.
E. None of the above.

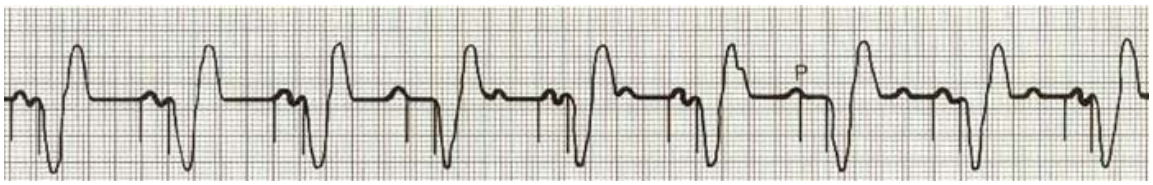
92. Your patient has a bradycardic pulse. On the ECG monitor you note regular R-R intervals, PRIs of 0.14 seconds, and QRSs of 0.14 seconds. There are twice as many P waves as QRSs and there is no ectopy present. Your patient has a

A. first-degree AV block.
B. second-degree AV block, type I.
C. second-degree AV block, type II.
D. third-degree AV block.
E. None of the above.




93. Which of the following descriptions best identifies the ECG strip above?

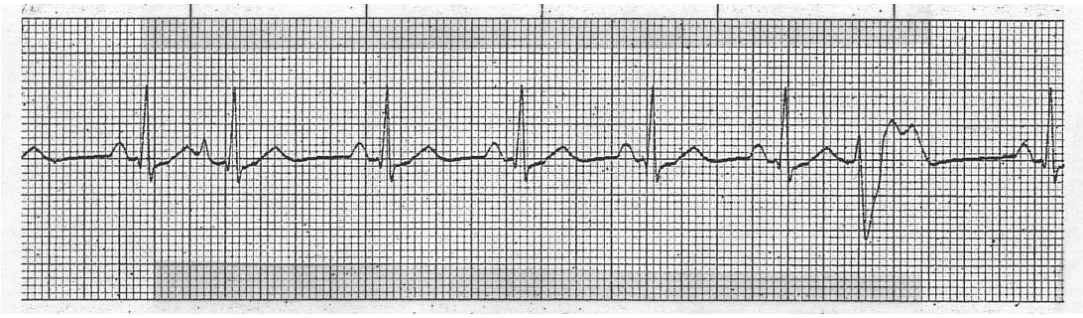
A. Sinus rhythm with aberrantly conducted PACs.
B. Sinus rhythm with frequent unifocal PVCs.
C. Atrial flutter with variable ventricular response.
D. Atrial fibrillation with a bundle branch block.
E. Atrial fibrillation with aberrantly conducted PACs.



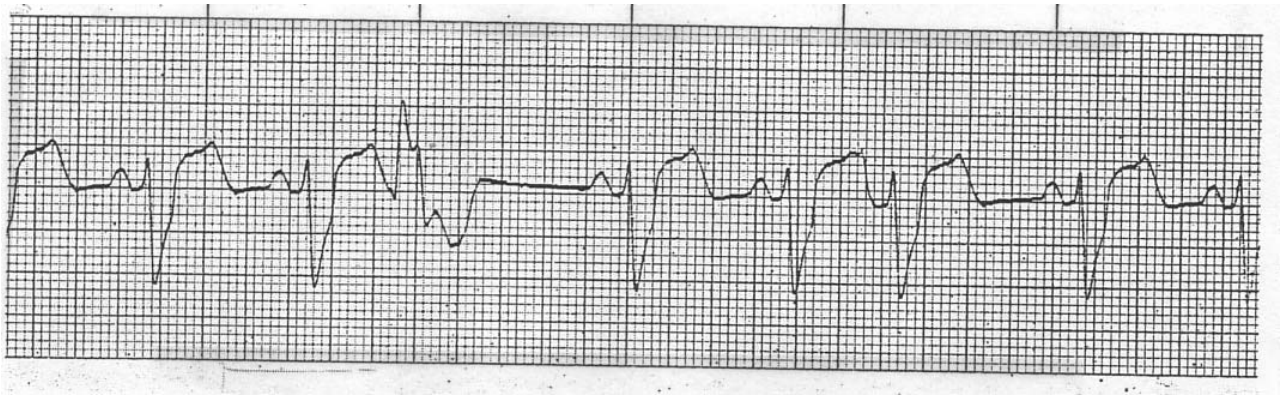
94. Which of the following descriptions best identifies the ECG strip above?

A. Sinus rhythm with bigeminal, unifocal PVCs.
B. Sinus rhythm with bigeminal, multifocal PVCs.
C. AV sequential pacemaker rhythm.
D. Pacemaker rhythm with underlying sinus tachycardia.
E. Junctional rhythm with bigeminal, unifocal PVCs.

95. Which of the following descriptions best identifies the ECG strip above?
A. Junctional rhythm.
B. Sinus bradycardia.
C. Accelerated idioventricular rhythm.
D. Wandering atrial pacemaker.
E. Atrial bradycardia.

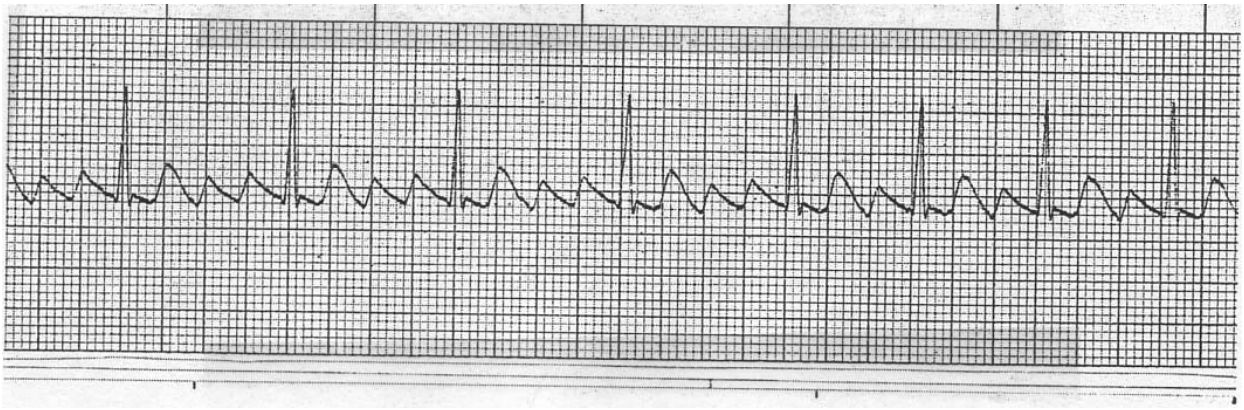


96. Which of the following descriptions best identifies the ECG strip above?
A. Sinus rhythm with one PVC.
B. Sinus rhythm with multifocal PVCs.
C. Sinus rhythm with one PAC.
D. Sinus rhythm with multifocal PACs.
E Sinus rhythm with one PAC and one PVC.



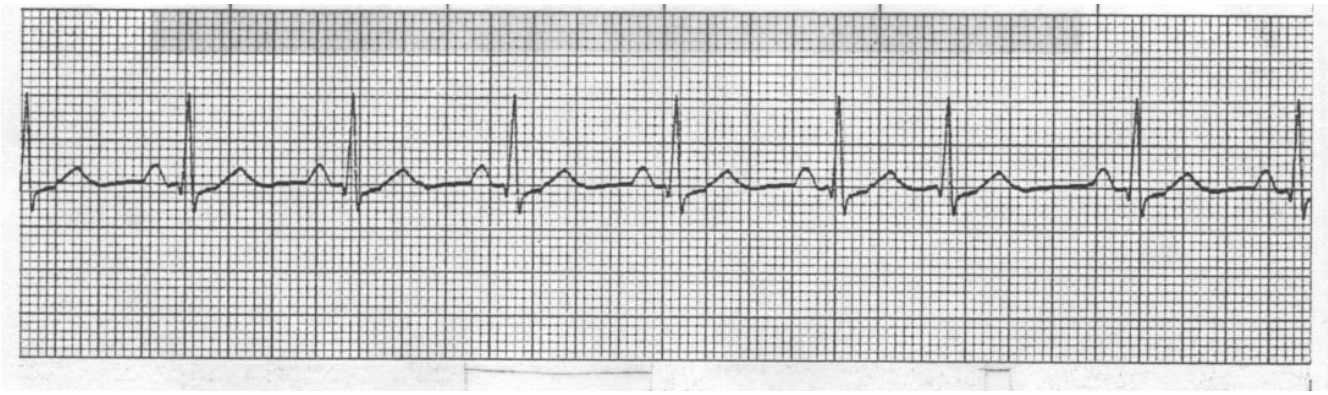
97. Which of the following descriptions best identifies the ECG strip above?

A. Sinus dysrhythmia with one PVC.
B. Sinus dysrhythmia with multifocal PVCs.
C. Sinus dysrhythmia with one PAC.
D. Wenkebach, second-degree AV block with one PVC.
E. Sinus rhythm with one PAC and one PVC.



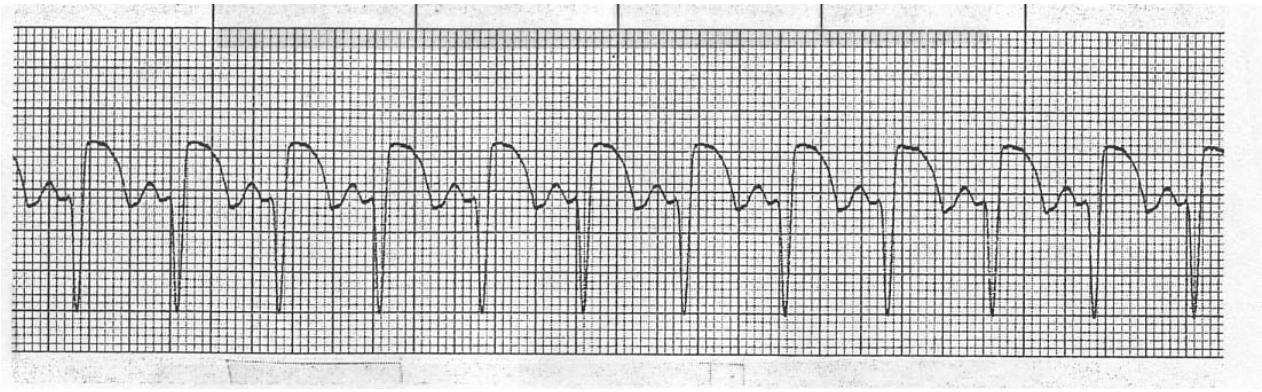
98. Which of the following descriptions best identifies the ECG strip above?

A. Atrial flutter with variable ventricular response.
B. Atrial fibrillation.
C. Atrial fibrillation with 3:1 and 2:1 ventricular response.
D. Classic second-degree AV block with variable ventricular response.
E. Atrial fibrillation with uncontrolled ventricular response.



99. Which of the following descriptions best identifies the ECG strip above?

A. Normal sinus rhythm.
B. Sinus rhythm with one PAC.
C. Sinus rhythm with one PJC.
D. Sinus rhythm with one PVC.
E. Sinus dysrhythmia.



100. Which of the following descriptions best identifies the ECG strip above?

A. Sinus tachycardia with an elevated S-T segment.
B. Atrial tachycardia with an elevated S-T segment.
C. Junctional tachycardia with and elevated S-T Segment.
D. Ventricular tachycardia.
E. Runaway pacemaker rhythm.