BAHS 237 – CARDIOVASCULAR & RESPIRATORY SYSTEMS I (IA 2)

1. In the formation of the primitive heart tube, all the following occur except:

   A. Cardiac precursor cells migrate in the cranial and lateral directions
   B. There is initiation of vasculogenesis to form lateral endocardial tubes
   C. Cranial body folding leads to ventral and caudal location of the cardiac crescent
   D. Lateral body folding leads to apposition of the two limbs of the cardiac crescent
   E. The cardiac precursor cells come from the caudal third of the primitive streak.

2. The myocardium of the heart embryologically developed from

C. Coelomic endoderm

D. Ectoderm

E. Paraxial mesoderm

3. Which part of the primitive heart tube give rise to most of the Right Ventricle?

★ Bulbus Cordis

B. Right horn of the sinus venosus

C. Left horn of the sinus venosus

D. Truncus Arteriosus

E. Conus Arteriosus

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C. Left horn of the sinus venosus

D. Truncus Arteriosus

E. Conus Arteriosus

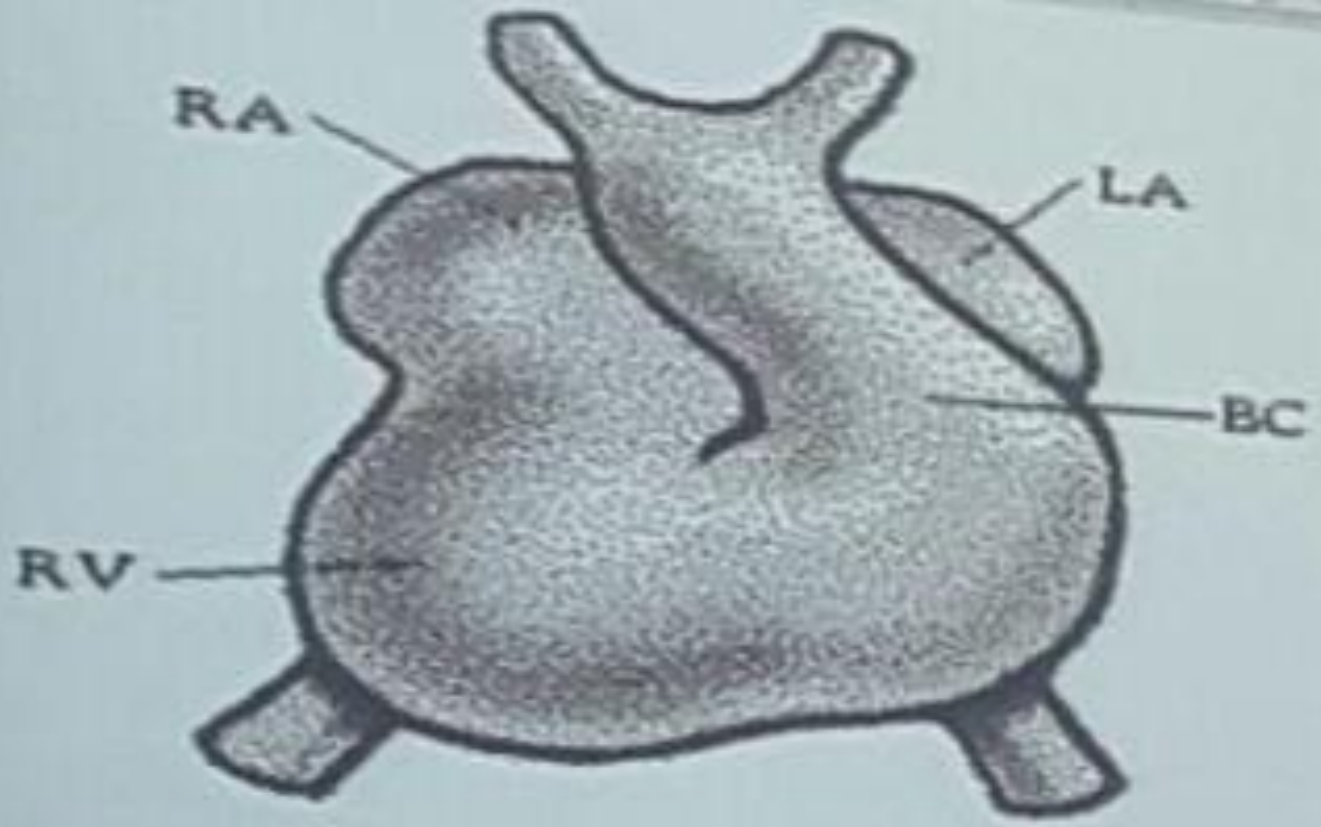
4. Cordae Tendinae and papillary muscles are formed from which of the following structures?

A. Endocardiac cushions

B. Remodelling of the walls of the ventricular walls

C. Excavation and remodelling of endocardial tissue

D. Spiral extension of conotractal segment



5. The above diagram shows a developing heart in which the bulboventricular loop bends towards the right instead of the left. What anomaly would this give rise to?

A. Acardia
B. Transposition of great arteries
C. Persistent truncus arteriosus
D. Dextrocardia
E. Patent ductus arteriosus

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6. At birth, the opening between the two atria of the heart closes on account of which of the following?

A. Increased pressure in the right atrium above that in the left.
B. Increased pressure in the left atrium above that in the right.
C. Pressed septum primum against septum secundum
D. A and C
E. B and C

7. In the anomaly of heart development known as Fallot's tetralogy the following are features EXCEPT:

A. Pulmonary Stenosis

B. Ventricular Septal Defect

C. Overriding Aorta

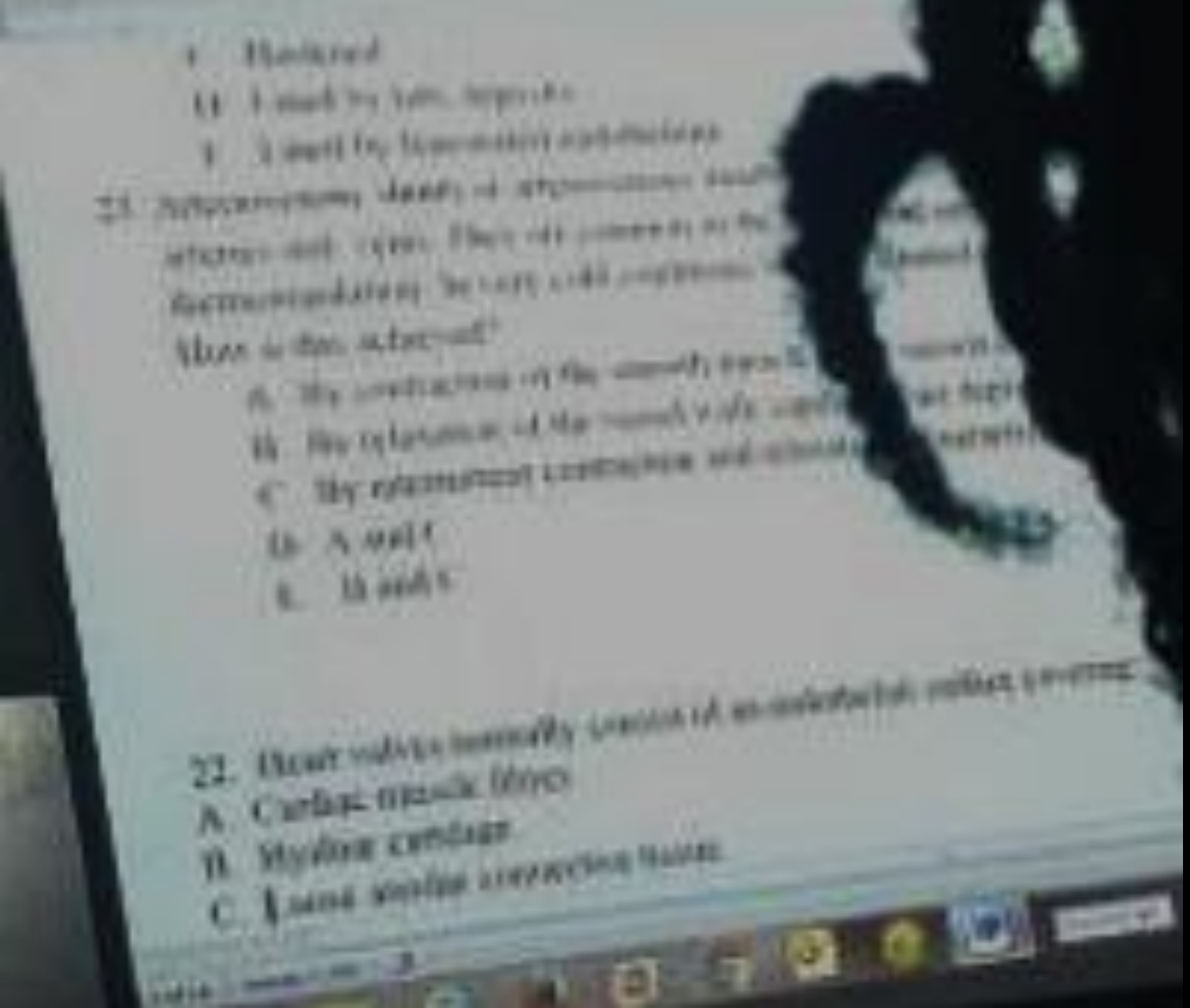
D. Rt Ventricular Hypertrophy

E. Patent ductus arteriosus

8. The smooth portion of the right atrium develops from which of the following structures?

A. Right horn of Sinus venosus

B. Left horn of Sinus venosus



22. Heart valves normally consist of an endothelial surface covering
A. Cardiac muscle fibres
B. Hyaline cartilage
C. Loose areolar connective tissue
D. Fibrocollagenous and fibroelastic connective tissue
E. Adipose connective tissue

23. Which of the following features is a normal component of epicardium but NOT of endocardium?
A. Adipocytes
B. Collagen
C. Elastin
D. Fibroblasts
E. Simple squamous epithelial tissue

24. Which cell junction, located at intercalated disks, is responsible for electrical communication between cardiac muscle cells?
A. Macula adherens
B. Zonula adherens

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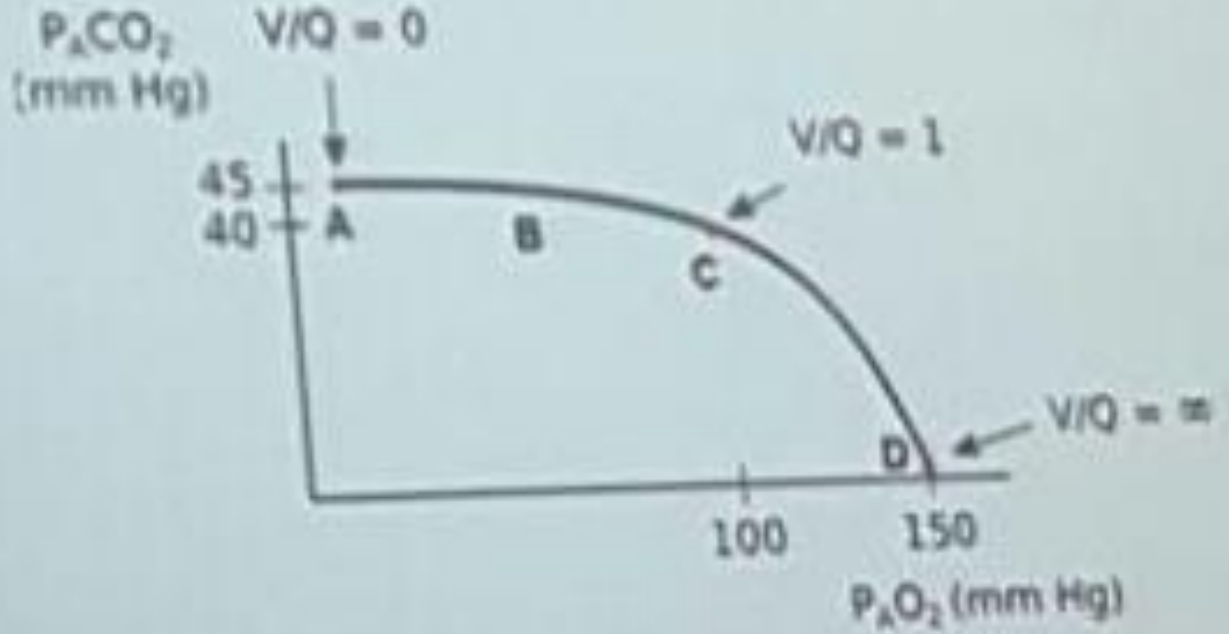
A. Macula adherens.
B. Zonula adherens.
C. Zonula occludens.
D. Desmosome.
E. Gap junction.

25. Which of the following is not true regarding the endocardium?

A. The endocardium contains adipose tissue.
B. The endocardium has sublayers.
C. The endocardium contains blood vessels.
D. The endocardium contains smooth muscles.
E. The endocardium is lined by an endothelium.

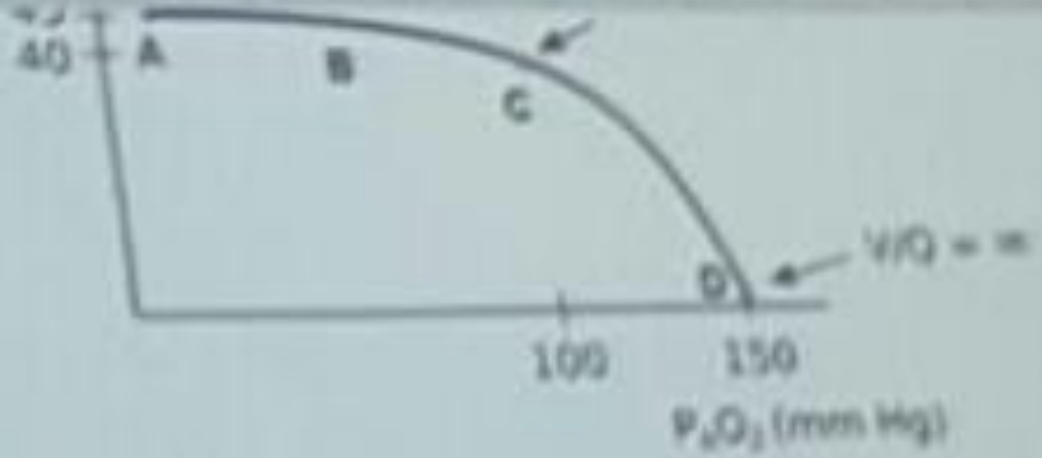
Use the preamble below to answer the next three questions

The oxygen-carbon dioxide diagram below shows the effect of changing the V/Q Ratio on alveolar and blood gas composition. Regions A, B, C and D are different points on the curve.



26. Which point indicates dead space?

a. A



26. Which point indicates dead space?

a. A
b. B
c. C
d. D
e. None of the above

27. The region with the best gas exchange is region

a. A
b. B
c. C
d. D

28. Which of the following is/are possible combination(s) of arterial blood composition
    a. $pO_2 = 100$ and $pCO_2 = 40$
    b. $pO_2 = 40$ and $pCO_2 = 46$
    c. $pO_2 = 150$ and $pCO_2 = 0$
    d. all the above
    e. none of the above

29. Which of the following statements is not true?
    a. Physiological dead space is a sum of anatomical and alveolar dead space
    b. Anatomical dead space may be measured by Fowler's method
    c. It is more advantageous to increase tidal volume than to increase respiratory rate when increasing alveolar minute ventilation
    d. Increasing alveolar minute ventilation results in hypercapnia (increased arterial carbon dioxide tensions) and acidosis

30. If the right main bronchus is obstructed, then the blood leaving the area of the lung it serves will have

a. $pO_2 = 150$, $pCO_2 = 0$ mmHg
b. $pO_2 = 40$, $pCO_2 = 46$ mmHg
c. $pO_2 = 100$, $pCO_2 = 40$ mmHg
d. a similar composition as inspired humidified air
e. an unknown gas composition because the ventilation-perfusion ratio is not known

31. Concerning clinical application of the V/Q mismatch, the following is not true

a. In humans, pulmonary tuberculosis is much more common at apex of lung
b. In Bats, pulmonary tuberculosis is distributed more at the base
c. In humans, *Mycobacterium tuberculosis* thrives better in pO_2 of about 130mmHg
d. Metastatic calcification of the lungs is more common in the lung apex
e. All the above are true

32. The most common cause of hypoxemia is

a. hypoventilation
b. impaired diffusion
c. ventilation perfusion mismatch/abnormalities
d. Physiological shunt

33. The pO2 in pulmonary capillary blood is less than pO2 in alveolar gas because of
    a. physiological shunts
    b. pathological shunts
    c. physiological dead space
    d. pathological dead space
    e. diffusion impairment

34. The pulmonary circulation:
    a. is a low pressure, high flow, high resistance circulation
    b. receives exactly half the cardiac output
    c. responds to localized hypoxia in the lung by vasoconstriction
    d. freely anastomoses with the bronchial circulation at the capillary level
    e. is in parallel with the systemic circulation

35. Pulmonary blood flow is greatest at the lung base because of
    a. uneven degree of neural constriction or dilation of pulmonary blood vessels in different regions
    b. uneven regional difference between arterial and venous pressures
    c. the hydrostatic effect of the earth's gravitational field
    d. [illegible]

36. The SA node is the normal pace maker because :

a. is the most rapidly discharging part

b. is the most richly supplied by nerve endings
c. located in the atrium
d. is not affected by the autonomic nervous system
e. none of the above

38. 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
★ it has no plateau
e. all of the above

39. The atrio-ventricular valves :

a. have three cusps for each valve
★ their closure is initiated when the ventricular pressure exceeds atrial pressure
c. open by contraction of papillary muscles .
d. is also called the semilunar valve
e. have three cusps for each valve

40. It is impossible to tetanize the cadiac muscle because :

a. there is a long mechanical refractory period
★ 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

d. the mechanical contractile event is usually shorter than the duration of the electrical depolarization .
e. the cardiac muscle is involuntary

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

42. Ventricular pressure is higher than the atrial pressure in all phases of the cardiac cycle except in:
a. isovolumetric contraction phase.
b. atrial systole phase.
c. rapid ejection phase.
d. slow ejection phase.
e. all the above

43. All are involved in ventricular filling except:

a. atrial systole phase.
b. rapid ejection phase.
c. rapid filling phase.
d. slow filling phase.
e. all the above

44. AV valves are opened in:

a. isovolumetric contraction phase
b. isovolumetric relaxation phase
c. atrial systole phase.
d. slow ejection phase.
e. rapid ejection phase.

45. All cardiac valves are opened in:

a. isometric relaxation phase.
b. isometric contraction phase.
c. rapid filling phase.
d. all of the above.
e. none of the above.

46. First heart sound occurs in:
   a. isovolumetric contraction phase.
   b. atrial systole phase.
   c. isometric relaxation phase.
   d. rapid filling phase.
   e. slow filling phase

47. Second heart sound is due to:
   a. closure of AV valves.
   b. closure of semilunar valves.
   c. closure of all the cardiac valves.
   d. opening of AV valves.
   e. None of the above

48. 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. non of the above.

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49. 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. the potential difference between the left leg and the right leg
e. none of the above.

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a. fourth intercostal space at left sternal border.
b. fourth intercostal space at right sternal border.
c. fifth intercostal space at the midclavicular line.
d. fifth intercostal space at anterior axillary line.
e. fifth intercostal space at mid axillary line.

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a. lead I equals the sum of voltage in lead II and lead III.
b. lead I, lead II and lead III equals the sum up to zero
c. lead II equals the sum of LI and LIII.
d. lead I should equal lead III.
e. lead II should equal lead III.

52. ***Which of the following is determined by ECG:***

a. mechanical performance of the heart:
b. cardiac output.
c. systolic and diastolic information.
d. electrical activities off the heart.
e. venous return to heart.

53. ***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. ischem[illegible]ges of the myocardium.
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d. ischemic changes of the myocardium.
e. the influence of same drugs on the heart.

54. *P wave of ECG is absent in:*
a. atrial hypertrophy.
b. ventricular extrasystole.
c. heart failure.
d. supraventricular tachycardia.
e. none of the above.

55. *Chronotropism refers to:*
a. Rhythmicity.

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a. Rhythmicity.
b. Conductivity.
c. Excitability.
d. Contractility.
e. all the above

56. ***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.
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57. ***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.
e. all the above

58. The amount of blood pumped by one ventricle in one minute, is called the

a. stroke volume.
b. end-diastolic volume.
c. ejection fraction.
d. cardiac output.
e. end diastolic volume

59. Any mechanism that increases heart rate is said to have a positive

a. feedback effect
b. chronotropic effect
c. inotropic effect
d. cholinergic effect
e. [illegible] effect

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    e. speedotropic effect

60. Stroke volume is regulated by all of the following except
    a. end-diastolic volume.
    b. cardiac output.
    c. contractility.
    d. peripheral resistance.
    e. venous returns

61. The preload acting on a ventricle is equivalent to that chamber's
   a. contractility.
   b. stroke volume.
   ★ end-diastolic volume.
   d. ejection fraction.
   e. Cardiac output

62. The afterload imposed on a ventricle refers to
   a. its end-systolic volume, the blood left after contraction is complete.
   b. the amount of blood added to a ventricle by atrial systole.
   ★ the total peripheral resistance opposing the ejection of blood.
   d. the ejection fraction, or percentage of EDV ejected by ventricular systole.
   e. none of the above

63. The Frank-Starling law of the heart describes the proportional relationship between
   a. stroke volume and cardiac output.
   b. stroke volume and end-diastolic volume

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b. stroke volume and end-diastolic volume
c. stroke volume is and total peripheral resistance.

64. A positive inotropic agent is something that
   a. reduces the heart rate in positive feedback loop.
   b. increases the heart rate in positive feedback loop.
   ★ increases the contractility of myocardial fibers.
   d. increases the contractility of myocardial fibers.
   e. decreases the contractility of myocardial fibers.

65. The colloid osmotic pressure of blood plasma is due to its high concentration of
   ★ albumin
   b. hemoglobin
   c. sodium
   d. glucose
   e. sugar

66. Damage to the left ventricular myocardium can cause
   a. systemic edema
   ★ pulmonary edema
   c. elevated cardiac output from the left ventricle
   d. an increase in right ventricle stroke volume

c. elevated cardiac output from the left ventricle
d. an increase in right ventricle stroke volume
e. All the above

67. If a person's blood pressure is 110/70, then the
b. pulse pressure is 40 mm/Hg
b. diastolic pressure is 40 mm/Hg
c. systolic pressure is 70 mm/Hg
d. mean arterial pressure is 120 mm/Hg
e. All the above

68. Pulse pressure is calculated by
a. adding diastolic pressure to systolic pressure
b. subtracting diastolic pressure from systolic pressure
c. adding the diastolic and systolic pressure, then dividing by 2
d. adding one-third of the difference between the diastolic and the systolic pressure to the diastolic pressure.
e. None of the above

69. Friction between the blood and vessel walls
a. increases blood pressure

e. None of the above

69. Friction between the blood and vessel walls

a. decreases blood pressure
b. increases blood flow
c. increases as blood viscosity decreases
d. causes peripheral resistance
e. does not affect the blood flow

70. Venous return would be increased by

a. dilation of the veins
b. loss of the venous valves
c. increased skeletal muscle activity

1 A 2

6 A 1 E 7 E 13 B 19 E 25 A 31 E 37 E 43 B 49 C 55 A 61 C

68 B 7 A 8 A 14 D 20 B 26 D 32 C 38 D 44 C 50 A 56 B 62 C

69 D 3 A 9 E 15 A 21 B 27 C 33 E 39 B 45 E 51 B 57 C 63 B

70 C 4 B 10 D 16 E 22 D 28 D 34 C 46 D 46 A 52 D 58 A 64 C

5 D 11 B 17 C 23 A 29 D 35 C 41 E 47 B 53 B 59 B 65 A

6 E 12 C 18 A 24 E 30 B 36 A 42 B 48 A 54 E 60 B 66 B