TOPIC: ANIMAL TRANSPORT
Time: 2 ½ hours
Attempt all questions in this paper

SECTION	MARKS
A	
B	
TOTAL	

SECTION A (40 MARKS)

1 Which of the following is leukemia?
   A. Uncontrolled production of red blood cells
   B. Uncontrolled production of white blood cells
   C. Uncontrolled production of platelets
   D. All the above

2 The mountain gorilla lives at high altitudes and has its oxygen dissociation curve located at the left of many animals. This suggests that
   A. There is low carbon dioxide tension at high altitudes.
   B. Its hemoglobin has a higher affinity for oxygen than many animals.
   C. Temperatures are lower at high altitudes.
   D. It has a high concentration of myoglobin in its muscles.

3 Which of the following is the role of capillary network around alveoli in mammals?
   A. Make alveoli more permeable
   B. Increases surface area for alveoli
   C. Maintains steep diffusion gradient
   D. Makes alveoli thinner

4 The ventricle of the crocodile is completely portioned but in reptiles there is mixing of oxygenated and deoxygenated blood that takes place in it, because
   A. The membrane between the ventricles is very thin
   B. The ventral aorta is undivided
   C. The dorsal aorta is undivided
   D. Ventricles have pore.

5 Which of the following substances is not transported by blood circulatory system in arthropod?
   A. Nutrients
   B. Respiratory gases
   C. Hormones
   D. Nitrogenous wastes

6 Which of the following features does not contribute to the efficiency of a red blood cell?
   A. Biconcave shape
   B. Being filled with hemoglobin
   C. Being numerous
   D. Absence of nucleus

7 Which one of the following conditions reduces the affinity of hemoglobin for oxygen?
   A. High oxygen concentration
   B. High carbon dioxide concentration
   C. Low body temperature
   D. High pH of blood

8 Which one of the following is responsible for increasing the pressure of blood flowing in veins, back to the heart?
   A. The pumping of the heart
   B. Contraction of skeletal muscles
   C. Closing of valves
   D. Inspiratory movement of muscles

9 The biochemical property of blood essential for its protective function of the body is the
   A. Ability to clot
   B. Possession of antibodies
   C. Presence of hemoglobin
   D. Possession of white blood cells.

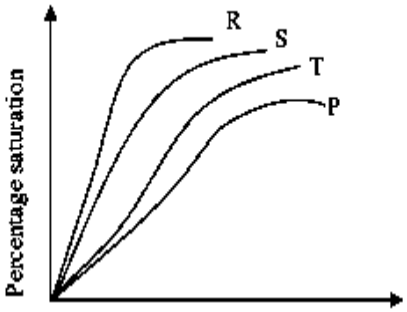
10 The oxygen dissociation curves for aquatic animals are usually to the left of those of terrestrial animals because
   A. There is less oxygen in water
   B. Air is less dense than water
   C. Aquatic animals are less active
   D. Aquatic animals use less oxygen

11 Which of the following is the correct order of events in the heart after the contraction of the atria?
   A. Atrio-ventricular valves open, ventricle contract, semilunar valve close
   B. Ventricles contract, atrio-ventricular valves close, semilunar valve open
   C. Ventricles contract, atrio-ventricular valves open, semilunar values open
   D. Atrio-ventricular valve open, semilunar valves open, ventricles contract

12 High concentration of carbon dioxide in the tissues lead to
   A. Increase in affinity for oxygen by hemoglobin
   B. Increased in the loading tension of hemoglobin
   C. Shifting of the dissociation curve to the left
   D. Lowering of the affinity for oxygen by hemoglobin

13 The figure shows the oxygen dissociation curve for mudfish,

human fetus, and adult human and active flying bird.



Partial pressure of oxygen

A. R
B. S
C. T
D. P

14 Which one of the following describes the chloride shift during transportation of carbon dioxide in mammals?
   A. Hydrogen carbonate ions leave the erythrocytes as chloride ions from the tissue, enter
   B. Chloride ions leave the erythrocytes as hydrogen carbonate ions from the tissue, enter
   C. Chloride ions enter the lungs as hydrogen carbonate ions enter the erythrocytes
   D. Hydrogen carbonate ions enter the lungs as the chloride ions leave the erythrocytes.

15 Oxygen from myoglobin is released after oxyhemoglobin supplies are exhausted because myoglobin
   A. Acts as a store of oxygen in resting muscles
   B. Works better when the partial pressure of oxygen is high
   C. Is produced in skeletal muscles when the oxygen demand is low
   D. Has a lower affinity for oxygen than hemoglobin

16 The correct order of transmission of electrical impulses to initiate the heart beat is
   A. Sino-atrial node ➞atria ➞ atrio-ventricular node ➞ purkinje tissue ➞ ventricles
   B. Sino-atrial node ➞ ventricle ➞ atrio-ventricular node ➞ purkinje tissue ➞ ventricles ➞ atria
   C. Atrio-ventricular node ➞ atria ➞ Sino-atrial-node ➞ purkinje tissue ➞ ventricles
   D. Atrio-ventricular node ➞ purkinje tissue ➞ ventricles ➞ Atria ➞ Sino-atrial node

17 Blood flows in the heart of an insect as a result of
   A. Raising the perivisceral membrane
   B. Contraction of the alary muscles
   C. Relaxation of the heart ligaments
   D. Increase in the pericardial pressure

18 The lungfish living in mud has its oxygen dissociation curve to the left of that of human because
   A. There is high level of carbon dioxide concentration in the mud
   B. The lung fish's hemoglobin has a higher affinity for oxygen than that of humans
   C. Of the lower temperature of the lung fish
   D. Of lower level of oxygen concentration in the mud

19 Which one of the following when at high levels in the blood, increase the rate of heart beat?
   A. Carbon dioxide
   B. Thyroxine
   C. Oxygen
   D. Adrenaline

20 Which of the following ions move from plasma into red blood cells to maintain electroneutrality during the uptake of carbon dioxide by the blood in the tissue?
   A. Cl^-
   B. CO_3^{2-}
   C. K^+
   D. HCO_3^-

21 High carbon dioxide concentration in the respiring tissues is important because it causes
   A. Local vasodilation, allowing more blood into the tissues
   B. Low pH in the tissue leading to unloading of oxygen.
   C. Local vasodilatation creating high blood pressure
   D. Increase heart bean

22 Mixing of oxygenated and deoxygenated blood in amphibians is minimized by
   A. Rapid contraction of the ventricles
   B. Spongy nature of the heart muscles
   C. Spiral valve in truncus arteriosus
   D. Columnae carnae in the ventricular walls

23 The lack of a nucleus in the red blood cell enables it to
   A. Have high affinity for oxygen
   B. Have more permeable to oxygen
   C. Give up oxygen more readily
   D. Contain more hemoglobin

24 Myoglobin is more abundant in active muscles because it
   A. Easily gives up its oxygen to the muscles
   B. Gives the color of the muscle

C. Slowly releases oxygen to the muscles
D. Has low affinity for oxygen

25 Which of the following is true about the blood circulatory system in amphibian?
A. Double with partially divided heart
B. Single with undivided heart
C. Double with completely divided heart
D. Partially double with completely divided heart

26 Which of the following substances are not transported in the mammalian blood?
A. Urea and glucose
B. Insulin and pepsin
C. ATP and pepsin
D. Carbon dioxide and sodium chloride

27 The main problem of a single circulation is the
A. Slow speed of blood to the tissues
B. Mixing of oxygenated and deoxygenated blood
C. Low rate of oxygenation of blood
D. Slow speed of blood to the heart

28 Which one of the following features of red blood cells does not contribute to their high absorptive nature of oxygen? They
A. Possess thin flexible membrane
B. Possess a biconcave disc shape
C. Are filled with hemoglobin
D. Are manufactured at a high rate

29 Which one of the following structures is responsible for initiating the contraction of the heart?
A. Purkinje tissue
B. Atrio-ventricular node
C. Sino atrial node
D. Heart muscles

30 Which one of the following is the correct route taken by blood on leaving the heart, in a single circulatory system?
A. Gills ➞ body ➞ heart
B. Body ➞ gills ➞ heart
C. Gills ➞ heart ➞ body
D. Body ➞ heart ➞ gills

31 Which one of the following animals has a double circulatory system?
A. Fish
B. Octopus
C. Frog
D. Squid

32 Which of the following pigments contain copper?
A. Haemocyanin
B. Myoglobin
C. Haemerythrin
D. Haemoglobin

33 The ability of the heart to contract without fatigue is owed to the
A. Sino-ventricular node
B. Cardiac muscle
C. Sinoatrial node
D. Purkinje tissue

34 Which blood vessel are able to change their resistance to blood flow regulating distribution of blood flow to organs?
A. Veins
B. Arteries
C. Arterioles
D. Capillaries

35 Which organ in the body contains cardiac muscle?
A. Gizzard
B. Diaphragm
C. Esophagus
D. Heart

36 The artery is adapted to withstand high pressure resulting from the pumping of the heart by having a
A. Superficial location on the body to allow distension
B. Thin elastic wall that extends with increased pressure
C. Thick tough wall to withstand the pressure
D. System of valves that prevent back flow of blood.

37 Loss of water from the blood in human body can result into is the
A. Lowering of body temperature.
B. Slowing down the rate of breathing.
C. Lowering of the blood pressure
D. Slowing down of the heartbeat.

38 Which one of the following is the correct order of vents in the heart after the contraction of the atria?
A. Atrio -ventricular valves open, ventricles contract, semi lunar valves close.
B. Ventricles contract, atrio-ventricular valves close, semi lunar valves open.
C. Ventricles contract, atrio-ventricular valves semi lunar valves open.
D. Atrio- ventricular valves open, semilunar valves open, ventricles contract

39 Which of the following animal groups body segments and closed circulatory tern?
A. Crustacea.
B. Platyhelminthes.
C. Annelida.
D. Insecta.

40. The voice of lubb is produced during the contraction of heart when
A. Tricuspid valve is closed
B. Bicuspid valve is closed
C. Both tricuspid and bicuspid are closed
D. Semilunar valve is closed.

SECTION B (60MARKS)

41. (a) What is the difference between cardiac output and stroke volume. (1mark)

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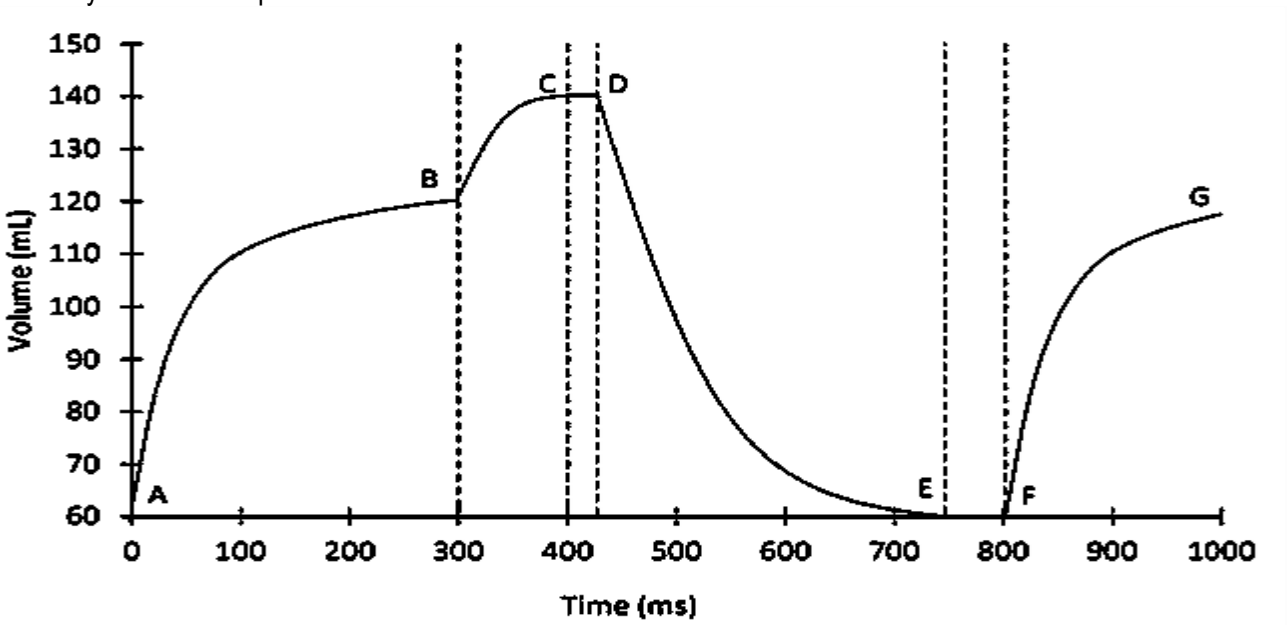
(b) The diagram below ilustrates blood volume changes in the left ventricle of the heart during the cardiac cycle. Study it carefully and answer qeustions that follow.



(i) Using the variables and / or data from the graph, indicate the region that represents. (1mark)

Late atrial systole.....Late ventricular systole.....

(ii) Identify the state of:

Seemilunar valves at point D and at point E. (1mark)

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Atrioventricular valves at point C and point F. (1mark)

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Explain the changes in blood volume of the left vetricle between

AB (3marks)

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DE (3marks)

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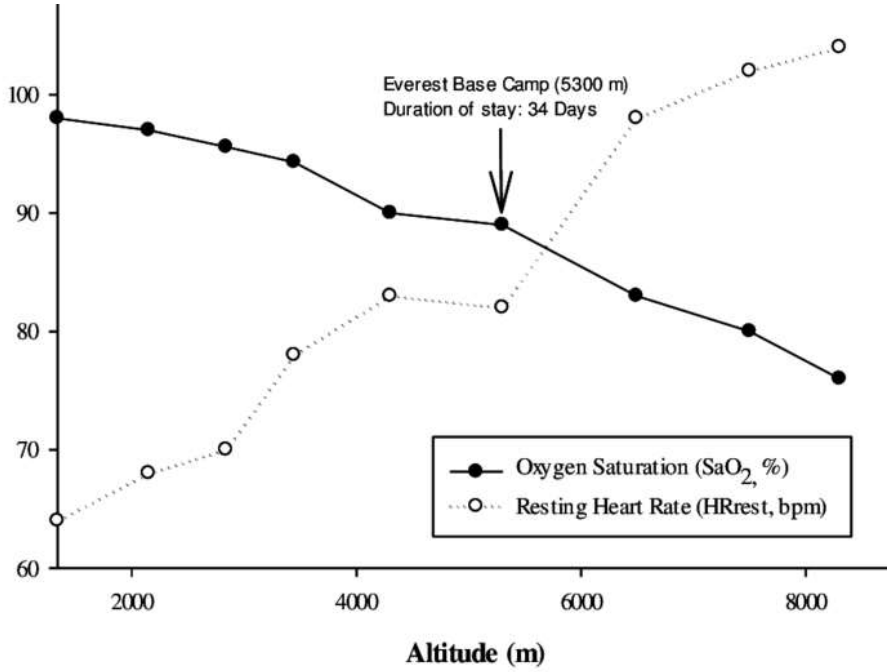
42. Mountain Everest is the Eaarth's highest mountain above sea level with an elevation of 8849 metre. Many adventurers have died trying to reach its summit for related reasons such as exhaustion on descent, cardiac arrest and altitude sickness. During the climbing processs, adventurers have resting camps at different heights of the mountain at which they stay for some days. Muhammad Nasuha is one of the successful mountain climbers who managed to surve his adventure. The graph below shows the changes which were recorded on Nasuha's mean oxygen saturation and resting heart rate at different altitudes before and after resting at the base camp. Study it carefully and answer questions that follow.



(a) Explain the changes in oxygen saturation and resting herat rate.

(i) Before the camp. (3marks)

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(ii) After the camp. (4marks)

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(b) Apart from the ones stated in (a) above, state other physiological changes that occur to mountain climbers. (3marks)

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43. (a) State three differences between innate immunity and adaptive immunity. (3marks)

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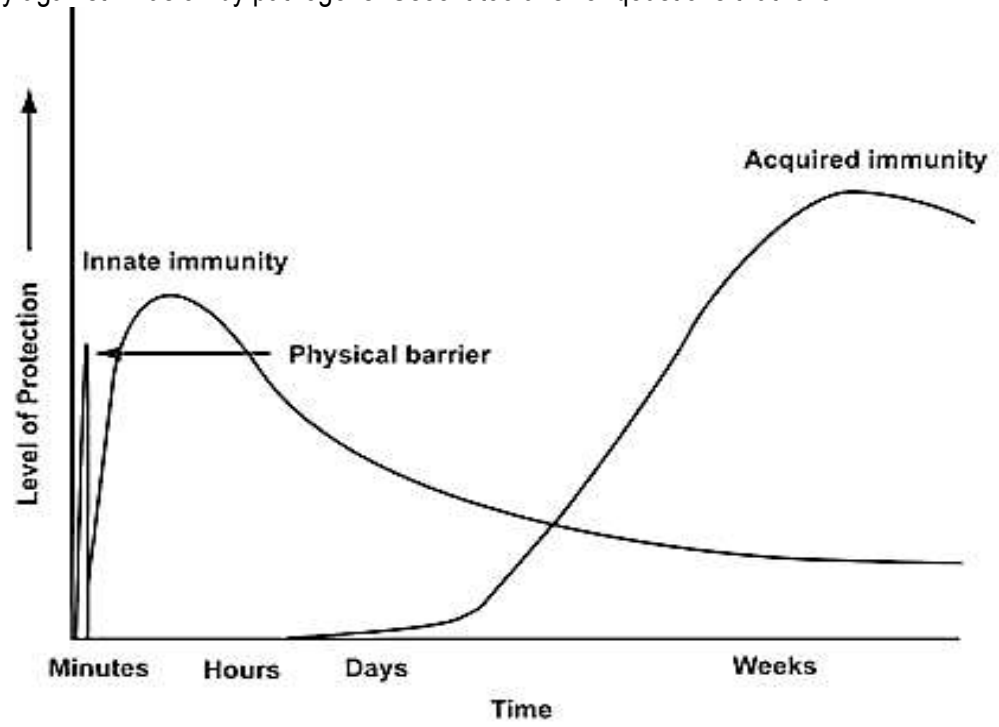
(b) The graph below shows the relative abundancy of variuos immune mechanisms that occur in the body and their role in protecting the body against invasion by pathogens. Usee it too answer qeustions that follow.



(i) Outline four physical barriers against pathogens that occur in man. (2marks)

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(ii) Explain the levels of protection of the folliwng immunt mechanisms.
Innate immunity. (2marks)

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Acquired immunity. (3marks)

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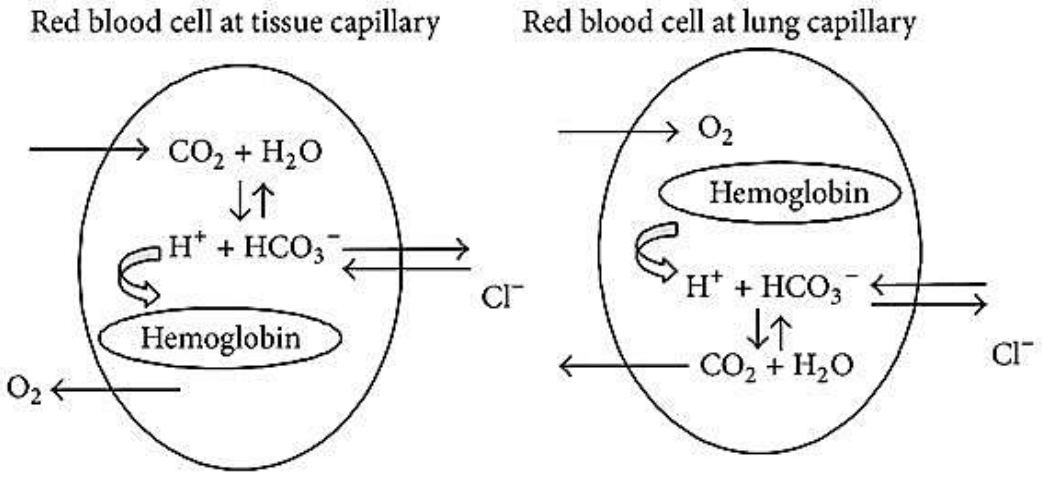
44. The diagram below shows two red blood cells at different regions of the mammalian body namely: at tissue capillary and at lung capillary, and their respective net exchange withi these regions of the body. Use it to answer qeustions that follow.



(a) (i) Outline three differences that take place in the red blood cells at these two regions of the body. (3marks)

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(ii) Name the central enzyme that catalyzes these physiological pocesses. State its precise functio. (2marks)

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(b) (i) On the diagrsm, indicate the region of the chloride shist. (1mark)

(ii) What happens at the chloride losired shift? (1mark)

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(iii) State the signicance of the chloride shiide shift. (2marks)

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(c) Besides the above method, outline other two methods through which carbon dioxde is transported in the body. (1mark)

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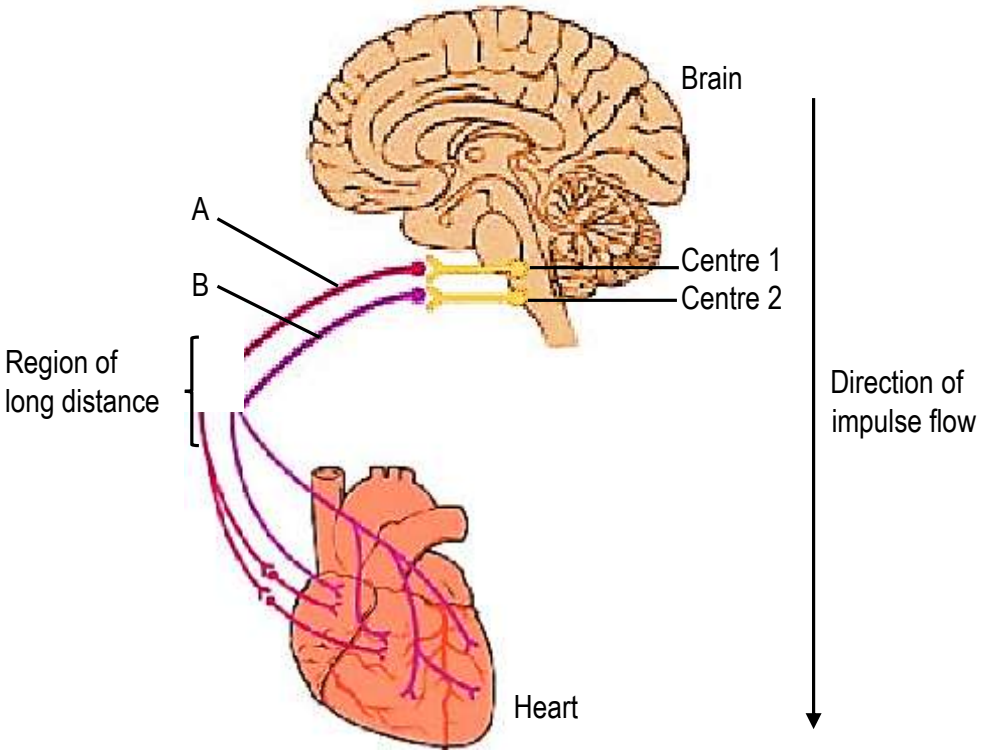
45. The diagram below shows a physical nerve link between the heart and aprt of the brain. Carefully study the diagram and answer qeuustions that follow.



(a) (i) With clear reasons from the heart, name the nerves represents as. (4marks)

A

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B……

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(ii) Name the part of the brain at which these nerves are connected. (½marks)

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(iii) Identify the control centre in the part stated (ii) that regulates heart rate. (½marks)

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(b) Explain the effect of the following centers on the rate of heart beat.

(i) Centre 1 (2marks)

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(ii) Centre 2 (3marks)

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(c) State two other factors that affect heart rate. (1mark)

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46. (a) Explain the difference between systolic pressure and diastolic pressure in a normal person. (2marks)

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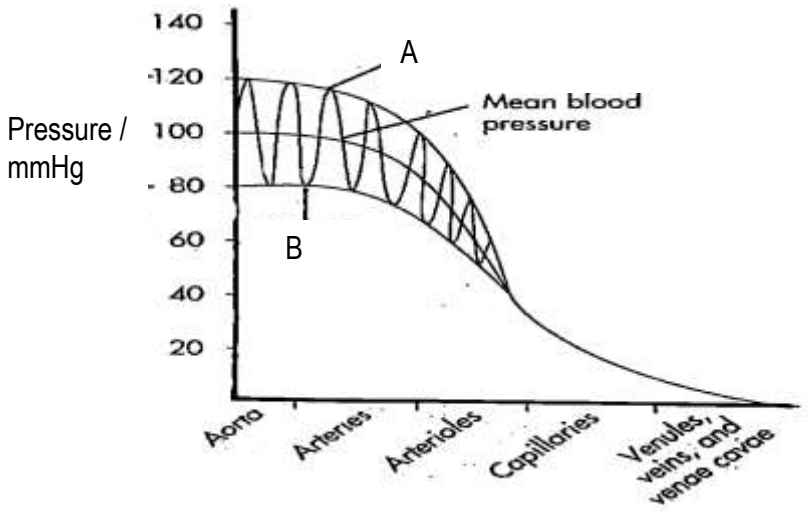
(b) The figure below shows pulsatile changes in blood pressure that occur in the systemic circulation of a mammal in which systolic and diastolic pressures have been indicated by letters on the diagram.



(i) State how the mean blood pressure is obtained. (1mark)

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(ii) Which of the above stated blood pressures is represented by: (1mark)

A.....B.....

(iii) Explain the variations in the mean blood pressure at

Aorta. (2½marks)

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Capillaries (2marks)

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Venae cavae. (1½marks)

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END