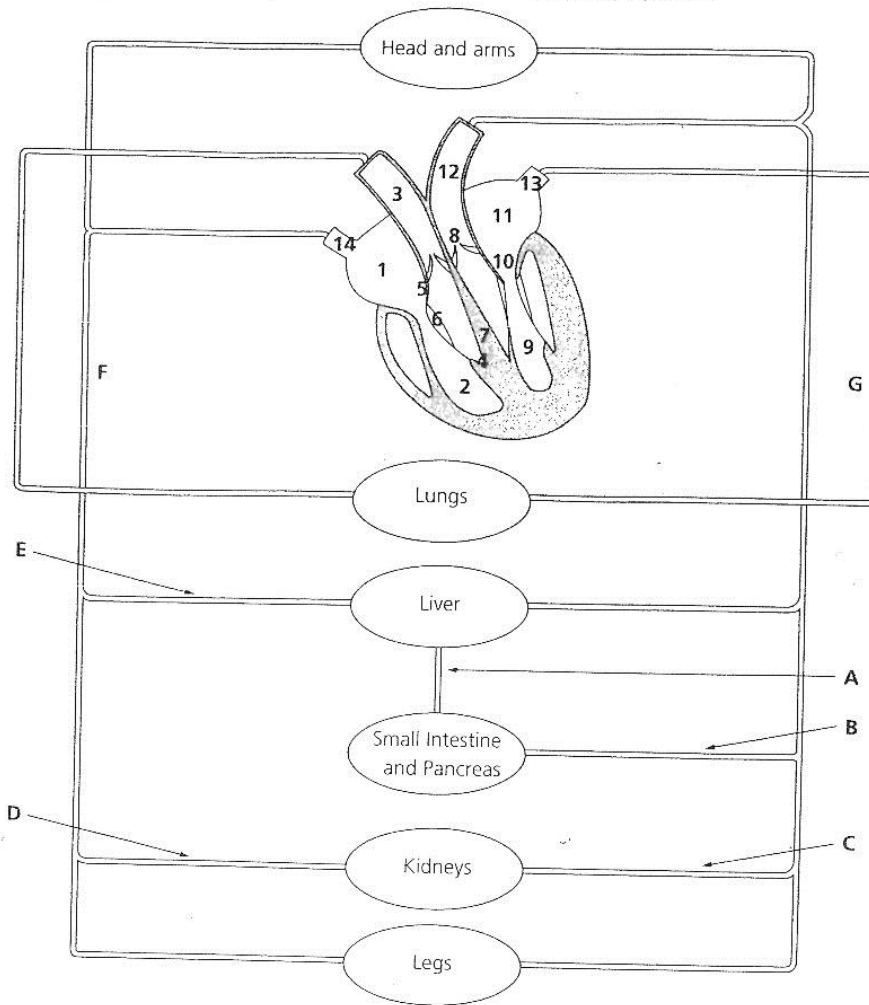


10 The diagram below represents the human circulatory system.



1. R. Atrium
2. R. Ventricle
3. P. Artery
4. papillary muscle
5. tricuspid valve
6. tendon | chordae tendinae
7. interventricular septum
8. semilunar valve ^{Aortic}
9. L. Ventricle
10. bicuspid valve
11. L. Atrium
12. Aorta
13. P. Vein
14. Vena cava

- (a) Identify the structures labelled 1 to 14 in the area of the heart.
 (b) Give the differences in the composition of the blood in
 A and B after a meal **B low glucose & A high | amino acids ...**
 C and D **C high urea B low**
 A and E **A high glucose E lower | amino acids ...**
 F and G **F high CO₂ G low CO₂ | F low O₂ G high O₂**
 Try to give reasons for these differences.

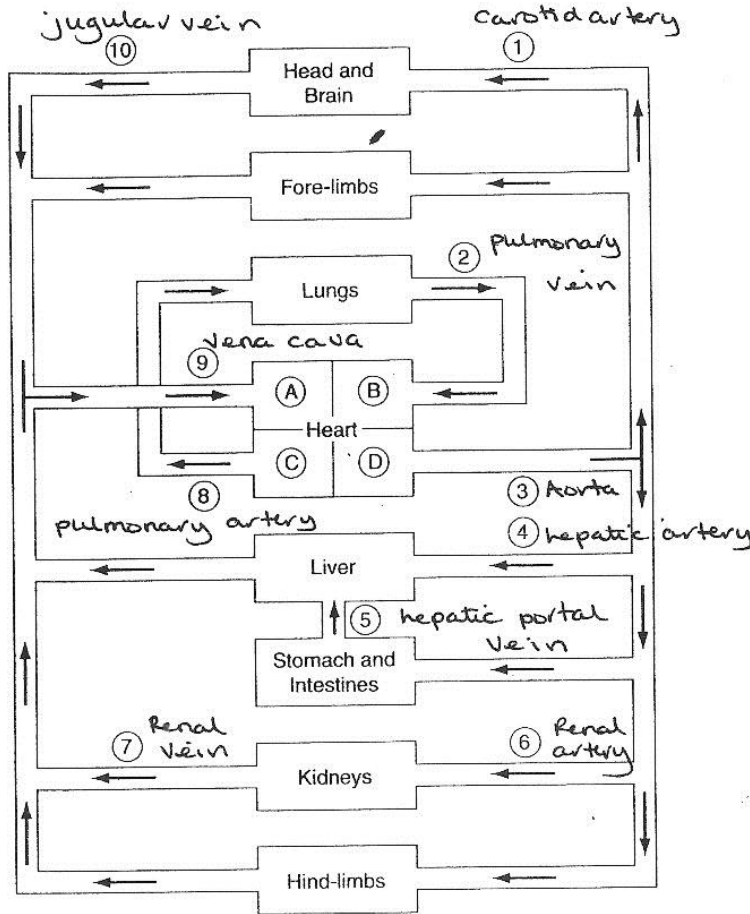
Q2

The table below shows the diameter of the lumen and the rate of blood flow in a number of human blood vessels.

Vessel	Diameter of lumen	Rate of blood flow/cm s ⁻¹
Artery	0.4 cm	40-10
Arteriole	30.0 μm	10-0.1
Capillary	8.0 μm	less than 0.1
Venule	20.0 μm	less than 0.3
Vein	0.5 cm	0.3-5

- (a) (i) Describe the general relation between the rate of blood flow and the diameter of the lumen of the blood vessel. **> diameter > rate of flow** (1)
 (ii) Explain how the diameter of a blood vessel affects the resistance to blood flowing through it. **< diameter, more blood in contact with walls, greater friction** (2)
 (b) (i) Which of the blood vessels mentioned has most elastic tissue in its walls? **artery** (1)
 (ii) How does the possession of elastic tissue affect flow through blood vessels? (1)
AEB 1994 smooths out blood flow (as stretches & recoils) (Total 5 marks)

3. The diagram below is a plan of the mammalian circulatory system. The arrows indicate the direction of flow of the blood.



- (a) Give the names of the vessels numbered 1-10.
- (b) List **four** differences between the composition of blood in vessel 6 RA and its composition in vessel 7. RV
- (c) (i) Name the chambers of the heart labelled A and D. R Atrium & L Ventricle
(ii) Which letter depicts the chamber with the thickest wall? D
(iii) Name the valves found between chambers B and D. atrio-ventricular valves - bicuspid
(iv) Name the valves found in vessel 3. semi-lunar valve at exit of heart
- (d) List **two** differences between the circulatory system shown and that of a fish.

RA	RV
↑ O ₂	↓ O ₂
↓ CO ₂	↑ CO ₂
↑ urea	↓ urea
↑ H ₂ O	↓ H ₂ O
↑ glucose	↓ glucose (used in respiration)

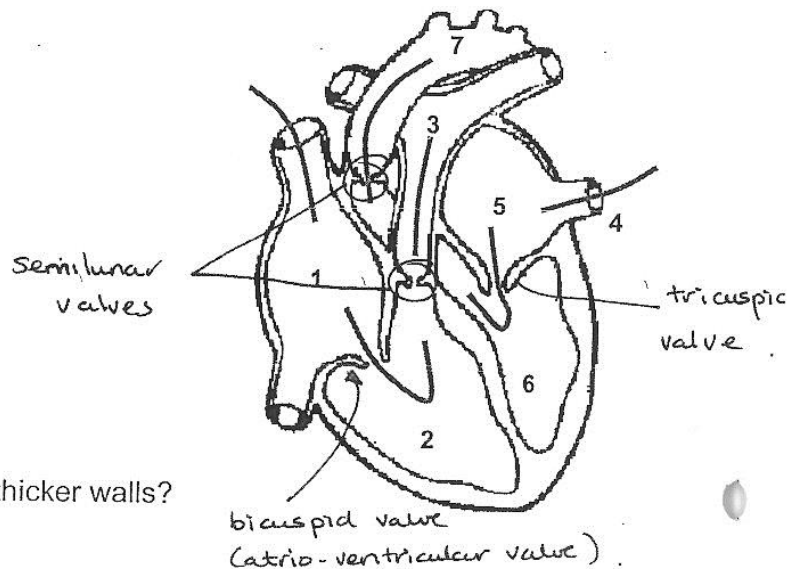
Use this as a starter to introduce the heart (differentiation)

YEAR 12 BIOLOGY: HEART STRUCTURE

Name _____

1. On the diagram below: i) put heads on the arrows to show the direction of blood flow ii) name the numbered parts of the heart iii) colour the right side of the heart blue and the left side red. [4marks]

1. R. Atrium
2. R. Ventricle
3. Pulmonary Artery
4. Pulmonary Vein
5. L. Atrium
6. L. Ventricle
7. Aorta



2. Which chambers of the heart have the thicker walls?
[1mark] ventricles

3. Relate the thickness of the chambers to their functions. [2marks]

- atria thinner than ventricles as receive blood & push v small distance to ventricle
ventricle thicker than atria as push blood out of heart
- LV thicker than RV as needs to create/generate/produce higher pressure to push blood around body & lungs close by R. Ventricle

4. What is the function of the valves? Label the valves on the diagram above [2 marks]
prevent back flow of blood

- from ventricles to atria ⇒ atrio-ventricular valves
- from arteries to ventricles ⇒ semi-lunar valves

5. What is the type of muscle that makes up the walls of the heart? Why is it so special, and how does it maintain a constant blood supply? [3 marks]

- cardiac muscle
- beats without nervous stimulation | generates own rhythm
- cardiac cycle

6. Trace the pathway a drop of blood would take from the time it leaves the aorta, to the time it returns to the left ventricle ready to leave the aorta again, describing the chambers and vessels [4marks]

aorta → body → vena cava → RA → tricuspid valve → RV → semi-lunar valve → PA Artery
→ lungs → Pul vein → LA → bicuspid valve → LV → semi-lunar valve → aorta

