Core 1

Two characteristics of living organisms are nutrition and respiration.

(a) (i) List **three** other characteristics of living organisms.

1. .....

2. .....

3. .....[3]

(ii) Name the process by which green plants produce carbohydrates.

.....[1]

(b) Living organisms release gases into the atmosphere as a result of their various activities. Complete the table, using a tick (✓) or a cross (✗), to show which gases are released.

	carbon dioxide released into the atmosphere	oxygen released into the atmosphere
animals in bright light		
green plants in bright light		
animals in the dark		
green plants in the dark		

[4]

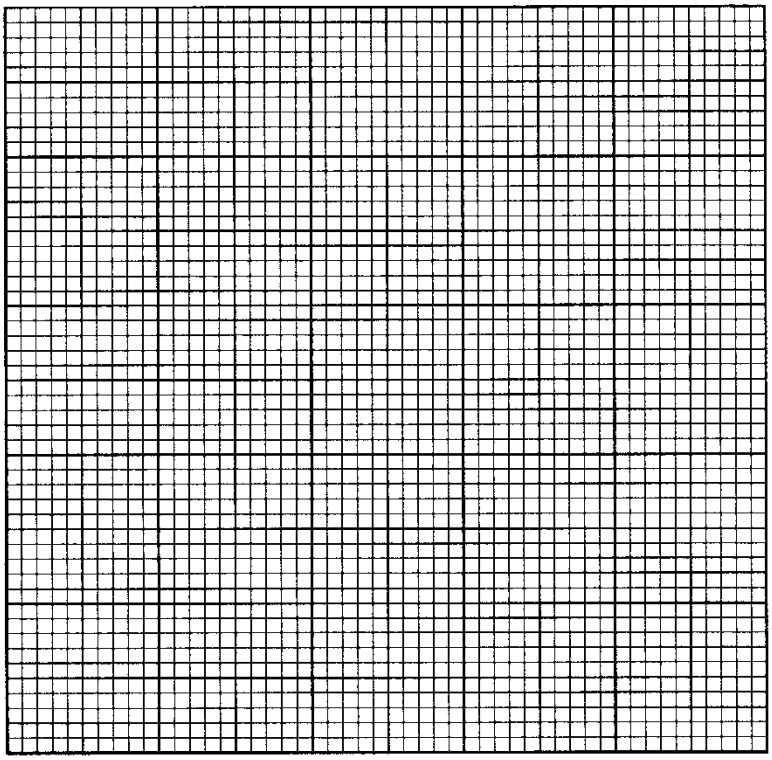
[Total : 8]

(a) Table 1 shows the frequency of human blood groups in a population.

Table 1

human blood group	% frequency in the population
A	46
B	9
AB	3
O	42

(i) Plot the data in the table as a bar chart on the grid below.



[3]

(ii) What type of variation is illustrated by these data? State a reason for your answer.

Type of variation .....

Reason .....

.....[2]

Core 3

Fig. 1 shows a section through the heart.

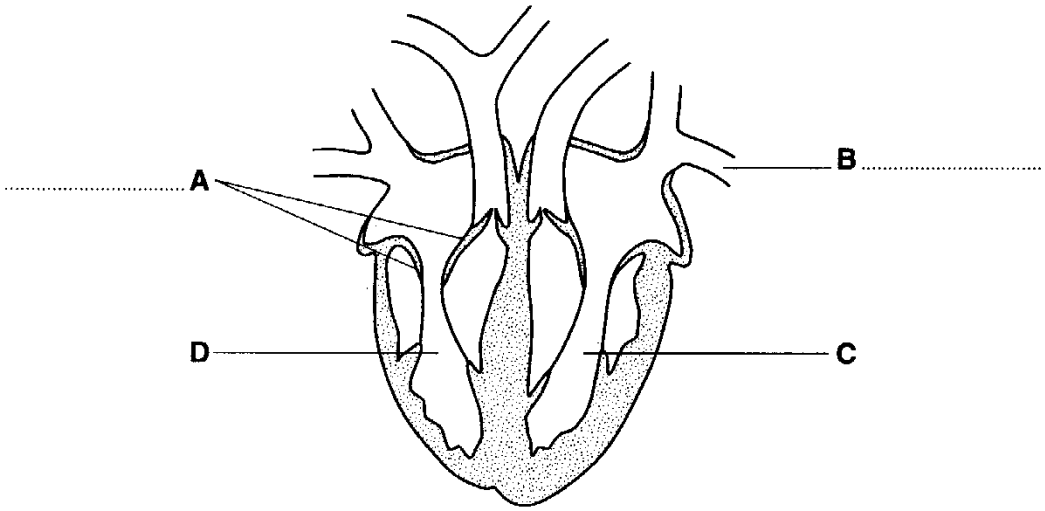


Fig. 1

(a) On Fig. 1

(i) name the parts labelled **A** and **B**; [2]

(ii) shade the cavity of the ventricle which contains oxygenated blood; [1]

(iii) suggest why the wall around chamber **C** is much thicker than that around chamber **D**.

.....

.....

.....[2]

(b) The coronary arteries supply blood to the heart muscle.

(i) Suggest **two** activities of humans which might cause a clot in a coronary artery.

1. .....

2. .....[2]

(ii) Explain what might be the result of such a blockage.

.....

.....

.....[2]

(c) Fig. 2 shows a plan of the circulatory system.

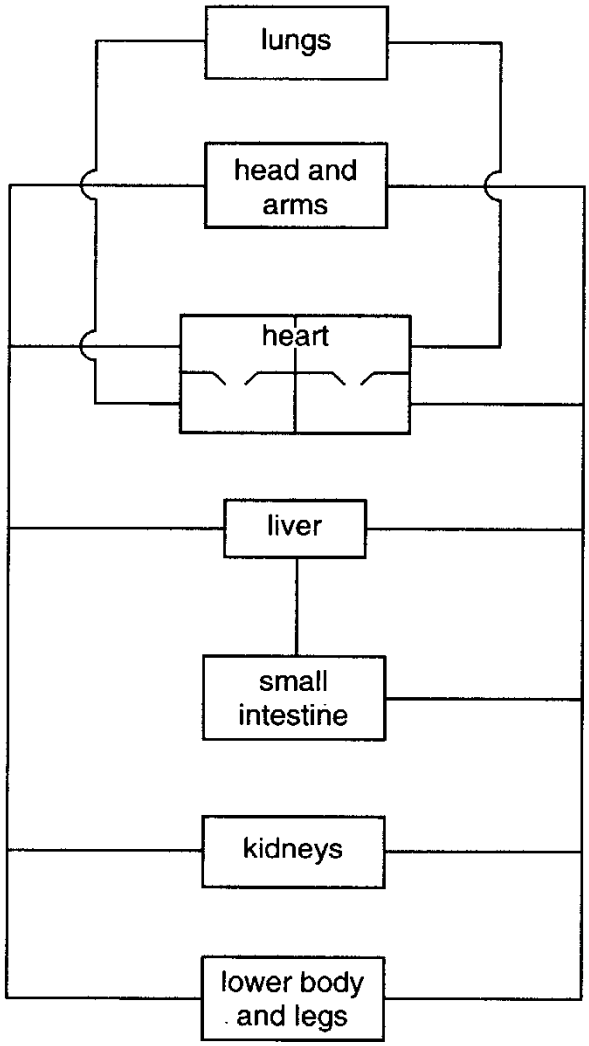


Fig. 2

On Fig. 2

(i) label where urea is formed; [1]

(ii) label where urea is excreted; [1]

(iii) show, using a series of arrows, the route taken by urea between these two organs. [2]

[Total : 13]

Alternative to Practical 1

Fig. 3 shows the apparatus that was used to investigate the activity of yeast in a glucose solution.

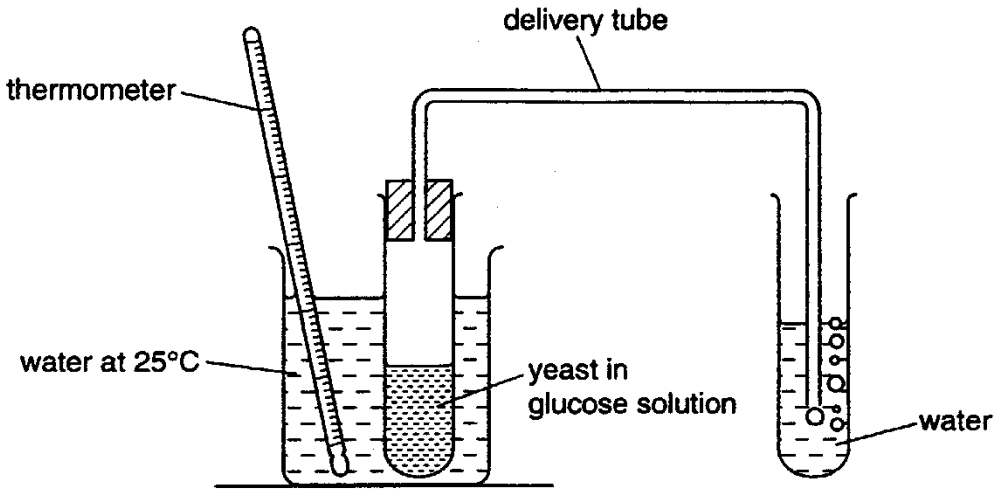


Fig. 3

The number of bubbles released in one minute was counted. This was repeated another four times.

The temperature in the water bath was then raised to 35 °C and five more counts were made.

Table 2

	number of bubbles released in one minute	
	25 °C	35 °C
1	11	17
2	12	19
3	14	20
4	13	16
5	10	18
total		
mean (average)		

Alternative to Practical 1

(a) (i) Complete Table 3.1 to show the totals and mean numbers of bubbles released at each temperature. [2]

(ii) Name the physiological process in yeast which is investigated in this experiment.

.....[1]

(iii) State the effect of raising the temperature on the activity of yeast.

Explain your answer.

Effect .....

Explanation .....

.....[3]

(b) (i) Name the gas present in the bubbles.

.....

(ii) Describe a test you could use to identify this gas.

.....

.....[2]

(c) Explain why it is better to leave the apparatus for a few minutes at each temperature before beginning to count the bubbles.

.....

.....

.....[2]

[Total : 10]

Extension 1

(a) Describe the functions of each of the following parts of the heart:

(i) right atrium;

(ii) right ventricle;

(iii) tricuspid valve.

[9]

(b) Outline the likely causes of a heart attack and suggest what preventive measures can be taken to maintain a healthy heart. [6]

[Total: 15]

Extension 2

An athlete takes part in a race.

(a) Describe and explain what happens to her breathing rate as a result of the race. [5]

(b) The level of adrenaline increases at the start of the race. Describe the effect of this increased level of adrenaline in the athlete's body. [4]

(c) At the end of the race the athlete's body temperature has increased. Outline the body processes which cause her temperature to return to normal after the race. [6]

[Total: 15]

Core 1

a(i) any three of these
- growth
- movement
- irritability / sensitivity
- excretion
- reproduction

(ii) photosynthesis

b

	carbon dioxide released into the atmosphere	oxygen released in to the atmosphere
animals in bright light	√	X
green plants in bright light	X	√
animals in the dark	√	X
green plants in the dark	√	X

Core 2

a for three marks
axes oriented correctly
both axes labelled and with suitable scale on frequency axis
all four columns correctly plotted

b type discontinuous variation
reason there are no intermediate values between the four groups / there are distinctly separate sets of values

Core 3

a(i) A tricuspid / right atrio-ventricular / right cuspid valve
B pulmonary vein

(ii) all of cavity of left ventricle shaded

(iii) thicker wall can generate a greater pressurs / more powerful push / pump

(iv) to pump / push / force blood further / all round the body / not just to the lungs

b(i) any two of these
smoking
fat / cholesterol rich diet
lack of exercise
stress

(i) restrict supply of oxygen / glucose / sugar to heart / ventricle
muscle in area dies / heart ttack/ cannot respire

c(i) label to liver

(ii) label to kidney

(iii) arrows from liver to heart and heart to kidneys
arrows from heart to lungs and back to heart

Alternative to Practical 1

a(i)

	25 ^{o}C	35 ^{0}C
total	60	90
mean (average)	12	18

(ii) respiration / fermentation

(iii) Effect increase in number of bubbles released per min
reference to a numerical increment

Explanation reference to role of enzymes involved / kinetic energy / more molecular collisions of enzyme and substrate

b(i) carbon dioxide

(ii) limewater turns milky white

c agitation of tubes
equilibrium / temperature to be reached

Extension 1

a(i) any three from these
- receives blood from vena cava
- reference to blood being deoxygenated
- acts as reservoir
- reference to thin muscle wall
- contracts / reference to atrial systole to move blood to right ventricle

(ii) any three of these
- receives blood from right atrium
- reference to thick / thicker muscle wall
- reference to builds up blood pressure
- contracts / reference to ventricular systole to move blood to lungs via pulmonary artery

(iii) any three of these
- reference to position
- prevents backflow of blood / maintains blood flow in one direction
- reference to closing a ventricular systole / when pressure starts to build in right ventricle
- so blood can only leave via pulmonary artery

b any six of these
- reference to high saturated or animal fat diet / reduce saturated or animal fat content of diet
- reference to too much cholesterol / reduce cholesterol content of diet
- fat / cholesterol builds up on coronary artery
- atherosclerosis / atheroma
- high salt diet / reduce salt content of diet
- stress / stress management
- high blood pressure
- smoking / stop smoking
- lack of exercise / take regular exercise
- obesity / take control of diet to reduce obesity

Extension 2

a any five of these
- breathing rate increases
- to increase amount of oxygen / to replace used oxygen
- needed for aerobic respiration
- reference to muscles
- repaying oxygen debt
- remova of lacic acid
- reove / exhale morecarbon dioxide
- control of breathing rate by brain

b any four of these
- increased heart rate / pulse rate
- to move blood faster
- so more oxygen / glucose goes to muscles
- non-essential processes slow down
- increased air flow into lungs / breathing rate
- so aerobic respiration increases
- stimulates conversion of glycogen to glucose
- increases mental awareness

c any six of these
- increase in sweat production
- secreted from sweat glands
- onto skin
- sweat evaporated
- removing heat from skin surface / reference to cooling effect
- vasodilation
- arterioles
- more blood flows near skin
- blood carries heat
- so heat is lost from skin
- panting causes heat loss from lungs
- hairs lowered to allow more heat loss