P530/2
BIOLOGY
Paper 2
Nov./Dec. 2008
2½ hours

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY

(THEORY)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer question **one** *in section* **A** *plus* **three** *others from section* **B.**

Candidates are advised to read the questions carefully, organise their answers and present them precisely and logically, illustrating with well-labelled diagrams wherever necessary.

1. Table 1 shows percentages by volume of some gases in inspired air, expired air and alveolar air, in a resting human being.

Table 1

Gas	Percentage Volume (%)		
	Inspired air	Expired air	Alveolar air
Oxygen	20.90	15.30	13.90
Nitrogen	78.60	74.90	No data
Carbondioxide	0.03	3.60	4.90
Water vapour	0.47	6.20	No data

Figure 1 **a** and **b** show effects of increased carbondioxide concentrations in inspired air, on the volume of air breathed in and out per minute and on the breathing rate respectively.

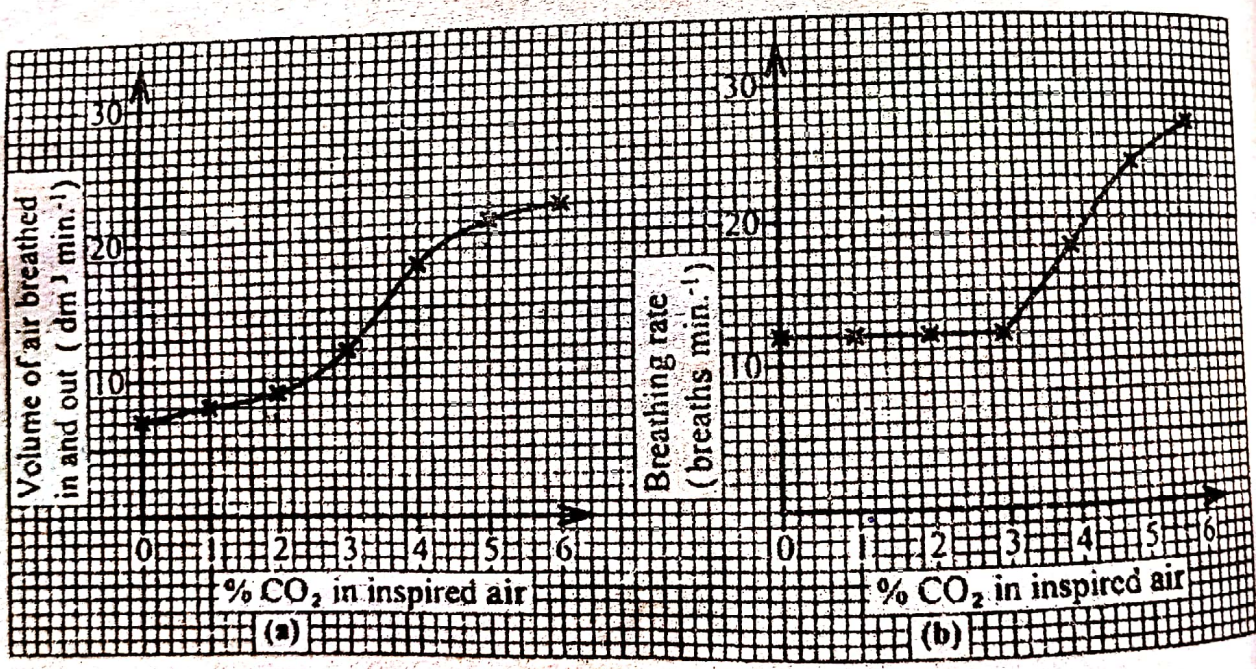

Fig. 1

(a) Explain why

(i) the percentage volume of oxygen in expired air is intermediate between the inspired and alveolar values. *04 mark*

(ii) there is a difference in the percentage volume of nitrogen between inspired and expired air. *(04 marks)*

(b) (i) using the information in figure 1, calculate the mean volumes of a single breath in and out, at different carbondioxide concentrations in inspired air, indicated in Table 2. *(3½ marks)*

Table 2

Percentage concentration of CO_2 in inspired air	0	1	2	3	4	5	6

(ii) Plot a graph showing the mean volume of a single breath against percentage concentration of carbondioxide in inspired air. *(5½ marks)*

(c) Describe the effect of the increase in carbondioxide concentration in inspired air on the

(i) volume of air breathed in and out per minute. *(03 marks)*

(ii) breathing rate. *(03 marks)*

(iii) mean volume of a single breath in and out. *(03 marks)*

(d) Explain the effect of the increase in carbondioxide concentration in inspired air on the

(i) volume of air breathed in and out per minute. *(02 marks)*

(ii) breathing rate. *(02 marks)*

(iii) mean volume of a single breath in and out. *(02 marks)*

(e) Outline the physiological effects in the body, of breathing in excess

(i) carbondioxide. *(04 marks)*

(ii) oxygen. *(04 marks)*