

Respiration

Mark Scheme 4

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Respiration
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 4

Time Allowed: 45 minutes

Score: /37

Percentage: /100

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- 1 (a) (reserves last longer for walking / ora ;
(approx) 4 times longer / other use of figures ; [2]
- (ii) glucose **and** muscle glycogen ; [1]
- (iii) fat **and** carbohydrate ; [1]
- (iv) *award two marks if correct answer (16.6 / 17) is given
if no answer or incorrect answer award one mark for correct working*
- 1660 / 100 **OR** 5800 / 350 **OR** average of the two
16.57 / 16.58 / 16.59 / 16.6 / 17 (kJ per gram) ;; **R** rounding down to 16.5 [2]
- (b) (muscle, growth / development / repair ; **A** 'make / build up, muscle' [1]
- (ii) to build up, energy / glycogen, reserves / stores ;
muscle / liver, glycogen ;
converted to fat / stored as fat ; [2]
- (c) ($C_6H_{12}O_6 \longrightarrow 2C_3H_6O_3$ (+ energy released)
- 1 mark for glucose + lactic acid formulae correct ;
1 mark for balanced equation ; **R** if anything else given ($CO_2 + H_2O$) [2]
- (ii) 1 short, time / distance, for sprint *or* long, time / distance, for marathon ;
2 sprint needs (lots of) energy quickly / marathon needs energy over long period ;
3 sprint oxygen supply not sufficient / oxygen supplied during marathon ;
4 anaerobic does not need oxygen / aerobic needs oxygen ;
5 lactic acid, removed after sprint / would build up in marathon ;
6 ref to muscle, fatigue / cramp / pain ;
7 ref to oxygen debt ;
8 AVP ; e.g. fat has higher energy content useful for marathon [max 4]
- (iii) glycogen in liver broken down to glucose ;
correct ref to glucagon ; **R** if 'glucagon breaks down glycogen...' ;
glucose from liver enters the blood ; **R** 'excreted into blood' ;
idea that balances use of glucose ; A 'replaces glucose used up' [max 2]

[Total: 17]

- 2 (a) *balanced diet*
 provides, sufficient energy / energy for needs ;
 provides, molecules / materials, for metabolism / equivalent ; **A** substances
 provides, nutrients / named nutrients ; CPFVM H₂O fibre
A minimum of any three named nutrients
A contains (all the) food, groups / types / classes **R** 'substances'
 in correct / right, quantities / proportions / amounts ;
A adequate / sufficient **R** 'equal'

R 'balanced' as it is in the question

[max 2]

(b) (i) liver ; [1]

(ii) glucose ; **R** if two compounds are given [1]

(iii) aerobic ;
 carbon dioxide / water / no lactic acid, produced ;
 anaerobic = 0 for the whole of (iii) [2]

(c) dissolved / in solution / soluble ;
 in plasma ; [2]

(d) *mark name and function independently*

*read the functions of **A** and **B** together before awarding marks*

part	name of part	function
A	glomerulus ; A knot of capillaries R capillaries	filtration / filtering (blood) ; A increase in (blood) pressure / ref to high pressure A 'substances forced out' R diffusion
B	capsule ; R cup	collects filtrate / allows filtration ;
C	tubule ; <i>distal is neutral</i> R nephron / tube	(selective) <u>reabsorption</u> ; reabsorbs, water / glucose / salts / minerals / ions / amino acids ; <i>ignore</i> nutrients A description of reabsorption, e.g. active uptake of glucose absorption back into blood
D	collecting duct ;	(re)absorbs water / passes urine to pelvis <i>or</i> ureter ; R urea unless with water A waste substances

[8]

- 2 (e) (i) *award two marks if correct answer (1699 / 1699.2 / 1700) is given*
award one mark if no answer or incorrect answer but correct working is shown

$$1.18 \times 60 \times 24 / 1.18 \times 1440$$

$$1699 / 1699.2 / 1700 \text{ (dm}^3\text{) ;;}$$

[2]

- (ii) *award two marks if*

- *correct answer (0.1) is given*
- *allow ecf from (e)(i) – so check calculation*

if no answer or incorrect answer award one mark for dividing 1.7 by something and multiplied by 100

$$1.7 / 1700 \times 100$$

$$0.1 \text{ (\%) ;;}$$

[2]

[Total: 20]

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