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 H_2O 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 **;** *distal is neutal* **R** nephron / tube	(selective) reabsorption **;** reabsorbs, water / glucose / salts / minerals / ions / amino acids **;** *ignore* 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 *or* 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 × 60 × 24 / 1.18 × 1440

1699 / 1699.2 / 1700 (dm^3) **;;** [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 × 100

0.1 (%) **;;** [2]

[Total: 20]