Life Processes

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The job of mucus in the stomach is to:
(a) protect the inner lining of the stomach from the acid
(b) carry digested fats and drain extra fluid back into the blood
(c) exchange gases between the air and the blood
(d) stop blood from flowing backwards

2. The enzymes of the intestinal juice act on:
(a) starch **(b)** emulsified fats
(c) proteins **(d)** proteins, carbohydrates and fats

3. The energy currency of the cell is:
(a) DNA **(b)** glucose **(c)** ATP **(d)** haemoglobin

4. The mode of nutrition of ticks is:
(a) saprophytic **(b)** autotrophic **(c)** parasitic **(d)** holozoic

5. Which of these carries deoxygenated blood from the heart to the lungs?
(a) The vena cava **(b)** The aorta
(c) The renal artery **(d)** The pulmonary artery

6. In yeast, without oxygen, pyruvate is broken down into:
(a) ethanol, carbon dioxide and energy **(b)** lactic acid, carbon dioxide and water
(c) carbon dioxide, water and energy **(d)** glucose and oxygen

7. A student counts 16 pulse beats in 10 seconds. The heart rate is:
(a) 96 beats per minute **(b)** 106 beats per minute
(c) 16 beats per minute **(d)** 160 beats per minute

8. Assertion (A): If the kidneys filter 185 litres of fluid in a day and 1 litre leave as urine, about 0.54% of the filtrate is reabsorbed.
Reason (R): Most of the filtrate, including water, glucose and salts, is reabsorbed in the kidney tubules.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. Name the structure whose job is to stop the air passage from collapsing.

10. What are proteins finally broken down into in the small intestine, and how are these products absorbed?

11. A person's pulse beats 13 times in 10 seconds, and each beat pumps 80 mL of blood. Find the heart rate per minute and the litres of blood pumped per minute.

12. Why is diffusion not enough to meet the oxygen needs of multicellular organisms like humans?

13. The kidneys filter 190 litres of fluid from the blood each day, but only 1.8 litres is passed out as urine. What percentage of the filtrate is reabsorbed? Where does this happen?

14. What is the mode of nutrition of bread mould? Describe it in one line.

15. Name the chamber of the heart or blood vessel described: exchange materials between the blood and the body cells.

16. A person takes 9 breaths in 30 seconds, breathing in 600 mL of air each time. Find the breathing rate per minute and the litres of air breathed in per minute.

Section C — Word problems — 4 × 4 = 16 marks

17. Explain the process of nutrition in Amoeba.

18. Photosynthesis: $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ (in sunlight, with chlorophyll). A plant takes in 211.2 g of carbon dioxide. Find the mass of glucose made and the mass of oxygen given out. (Atomic masses: H = 1 u, C = 12 u, O = 16 u)

19. A person's heart beats 76 times a minute and pumps 80 mL of blood with each beat. (a) How many litres are pumped in a minute? (b) In a day? (c) If the body has 4.5 litres of blood, about how many times does all of it pass through the heart in a minute?

20. Give two differences between the small intestine and the large intestine.

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Answer key

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Q	Answer	Working
1	**(a) protect the inner lining of the stomach from the acid**	—
2	**(d) proteins, carbohydrates and fats**	the product is amino acids, glucose, and fatty acids with glycerol
3	**(c) ATP**	—
4	**(c) parasitic**	they feed on the blood of a host animal
5	**(d) The pulmonary artery**	—
6	**(a) ethanol, carbon dioxide and energy**	glucose → pyruvate happens first, in the cytoplasm
7	**(a) 96 beats per minute**	16 × 60 ÷ 10
8	**(d) A is false, but R is true.**	A is false: (185 − 1) ÷ 185 × 100 = 99.46%. R is true.
9	**The rings of cartilage in the throat**	—
10	**Amino acids; they are absorbed through the walls of the villi into the blood.**	—
11	**78 beats per minute; 6.24 litres per minute**	13 × 60 ÷ 10; 78 × 80 mL
12	**Their body is large and most cells are far from the surface, so oxygen cannot diffuse to every cell fast enough; they need special organs to take in and carry oxygen.**	—
13	**99.05%; in the tubules of the nephrons**	(190 − 1.8) ÷ 190 × 100
14	**Saprophytic: it breaks down food outside its body and absorbs it.**	—
15	**The capillaries**	—
16	**18 breaths per minute; 10.8 litres per minute**	9 × 60 ÷ 30; 18 × 600 mL
17	**Amoeba takes in food by making temporary finger-like projections (pseudopodia) that surround the food particle and form a food vacuole. Inside it, complex substances are broken down into simpler ones, which diffuse into the cytoplasm. Undigested material is moved to the surface and thrown out.**	—
18	**Glucose 144 g; oxygen 153.6 g**	$C_6H_{12}O_6$ = 180 u; 6 × CO_2 = 264 u give 180 u of glucose and 192 u of oxygen

Q	Answer	Working
19	**(a) 6.08 L; (b) 8,755.2 L; (c) about 1.35 times**	76 × 80 mL; × 1,440 minutes; ÷ 4.5
20	**The small intestine completes digestion and absorbs digested food through villi; the large intestine absorbs water from the undigested food.**	—