



K17 Health, Lifestyle and Drugs

AQA AQA KS3 Science - Biology · Calculator allowed · about 75 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Name two nutrients that are important for growth and repair in the body.

(1)

- 2** Which nutrient is the main source of energy for cells? Choose one: A) Protein B) Carbohydrate C) Fibre D) Vitamin C

- ☐ A) Protein
☐ B) Carbohydrate
☐ C) Fibre
☐ D) Vitamin C

- 3** Describe one way a balanced diet helps keep the body healthy.

(2)

- 4** Priya measures the mass of food she eats each day for a week. Her average daily food mass is 900 g and she burns about 9 000 kJ of energy each day. Explain why mass of food eaten is not the same as energy intake.

(4)

5 Complete the sentence. Regular aerobic exercise mainly improves the health of the: A) digestive system B) circulatory system C) skeletal system D) excretory system

- ☐ A) digestive system
- ☐ B) circulatory system
- ☐ C) skeletal system
- ☐ D) excretory system

6 A student times how long it takes Kwame to run 400 m. Kwame runs it in 1 minute 40 seconds. Calculate Kwame's average speed in metres per second (m/s).

(3)

7 Smoking is known to harm the lungs and heart. Give one health risk linked to smoking and name the body system affected.

(1)

8 Explain one way long-term heavy drinking of alcohol can damage the body.

(3)

9 A food label shows: Carbohydrate 60 g per 100 g, of which sugars 20 g per 100 g, Fat 10 g per 100 g, Protein 8 g per 100 g, Fibre 5 g per 100 g. Calculate the percentage of the food that is made of sugar by mass.

(4)

- 10** A teenager follows a diet that contains 70 g of protein per day. Explain why protein is important in the diet for repairing muscles after exercise. Give one example of a protein-rich food.

(2)

- 11** A class investigates the effect of regular exercise on resting heart rate. The class records resting heart rates of 10 pupils before and after a 6-week exercise programme. Suggest one variable they should control to make the test fair and explain why. Also give one practical improvement to reduce random variation in measurements.

(3)

- 12** Which of these is NOT a nutrient required in the diet: A) Vitamins B) Minerals C) Alcohol D) Protein

- ☐ A) Vitamins
- ☐ B) Minerals
- ☐ C) Alcohol
- ☐ D) Protein

- 13** Explain how smoking during pregnancy can affect the developing baby. Mention at least one specific effect and the mechanism by which smoking causes it.

(4)

- 14** Evaluate the statement: 'A balanced diet and regular exercise are enough to ensure good long-term health.' In your answer discuss at least two other lifestyle or environmental factors that affect health, give evidence or reasons, and reach a supported conclusion.

(6)

-
- 15** A nutritionist recommends an athlete increases carbohydrate intake before a long race. Explain why increasing carbohydrates before endurance exercise helps performance and give one practical example of a carbohydrate-rich meal.

(3)

-
- 16** A pack of cigarettes contains about 20 cigarettes. If a smoker smokes 15 cigarettes per day, estimate how many packs they buy in a 30-day month, and calculate the annual number of cigarettes smoked. Show your working.

(4)

-
- 17** Name two short-term effects of taking stimulant drugs (for example, caffeine or some illegal stimulants) on the body.

(2)

18 A survey records that pupils who sleep less than 6 hours per night report more tiredness and lower concentration in class. Explain two ways poor sleep could lead to poorer school performance, linking biological effects to the outcomes.

(4)

Mark scheme · K17 Health, Lifestyle and Drugs

Question 1

- **B1** any one of: protein, vitamins, minerals (eg calcium), oe
- Answer: **Protein and vitamins (for example).**

Question 2

- **B1** B cao
- Answer: **B) Carbohydrate**

Question 3

- **M1** statement of a benefit (eg provides energy, supplies vitamins/minerals, supports growth and repair, maintains a healthy weight)
- **A1** brief explanation linking the nutrient to health (eg carbohydrates give energy for activity; vitamins help immune system) cao
- Answer: **A balanced diet provides energy from carbohydrates so we can be active and provides vitamins that help the immune system.**

Question 4

- **M1** statement that different foods have different energy per gram (eg fats have more energy per g than carbohydrates or fibre)
- **M1** statement that energy intake depends on the types of nutrients and their energy content, not only mass
- **A1** conclusion linking to Priya: eating 900 g of low-energy foods could give less energy than a smaller mass of high-energy food, so mass $\neq$ energy intake cao
- **A1** additional valid point: water content changes mass but not energy, or different portion composition affects energy
- Answer: **Different foods contain different energy per gram (eg fats give more kJ per g than carbohydrates; water adds mass but no energy), so 900 g of food does not uniquely determine energy intake.**

Question 5

- **B1** B cao
- Answer: **B) circulatory system**

Question 6

- **M1** convert time and substitute speed = distance / time: 400 / 100
- **A1** 4.0 m/s cao
- **B1** speed stated with correct unit m/s
- Answer: **4.0 m/s**

Question 7

- **B1** any one of: lung cancer (respiratory system), chronic bronchitis or emphysema (respiratory system), increased risk of heart disease or stroke (circulatory system), oe
- Answer: **Increased risk of lung cancer; respiratory system.**

Question 8

- **M1** identification of a damage effect (eg liver disease, liver cirrhosis, reduced brain function, increased blood pressure)
- **M1** reason describing how alcohol causes the damage (eg alcohol is toxic to liver cells causing scarring; it affects brain cells altering behaviour)
- **A1** link to long-term heavy drinking as cause and a clear consequence (eg reduced liver function, memory problems, increased risk of accidents) cao
- Answer: **Alcohol can damage the liver because it is toxic to liver cells, causing scarring (cirrhosis) and reduced liver function after long-term heavy drinking.**

Question 9

- **M1** identify that sugars are 20 g per 100 g and set up calculation percentage = $(20 / 100) \times 100$
- **M1** perform calculation $20 / 100 = 0.20$
- **A1** 20% cao
- **B1** answer given as a percentage with correct symbol or word
- **Answer: 20%**

Question 10

- **M1** state that protein provides amino acids used to repair and build muscle tissue
- **A1** give an example of a protein-rich food (eg chicken, beans, eggs, tofu) cao
- **Answer: Protein supplies amino acids needed to repair and build muscle after exercise; example: chicken.**

Question 11

- **M1** identify a control variable (eg measure resting heart rate at the same time of day, control caffeine or recent exercise, ensure pupils are rested)
- **M1** explain why controlling that variable is important (eg time of day affects heart rate; recent activity or caffeine raises heart rate)
- **A1** suggest a practical improvement to reduce random variation (eg take the average of three readings, use the same person to measure pulse, ensure quiet rest period before measuring) cao
- **Answer: Control time of day for measurements so circadian variation does not affect results; take the average of three readings to reduce random variation.**

Question 12

- **B1** C cao
- **B1** brief reason (eg alcohol provides energy but is not an essential nutrient) oe
- **Answer: C) Alcohol**

Question 13

- **M1** identify a specific effect on the baby (eg low birth weight, increased risk of premature birth, breathing problems)
- **M1** state a mechanism (eg carbon monoxide reduces oxygen in mothers blood; nicotine reduces blood flow to placenta)
- **A1** link mechanism to effect (eg reduced oxygen supply causes slower growth and lower birth weight)
- **A1** explicitly state that these risks are increased if the mother smokes during pregnancy cao
- **Answer: Smoking can cause low birth weight and increase premature birth risk because carbon monoxide reduces oxygen carried in the mother's blood and nicotine reduces blood flow to the placenta, so the baby gets less oxygen and nutrients.**

Question 14

- **Level 3** (5-6): Detailed evaluation: discusses at least two other factors (eg smoking, alcohol, genetics, mental health, socioeconomic factors, pollution), gives clear reasoning or evidence for how each affects health, considers limitations of diet and exercise alone, and reaches a well supported conclusion.
- **Level 2** (3-4): Some evaluation: discusses one or two other factors with some reasoning, recognises that diet and exercise help but may not be sufficient, and gives a simple conclusion.
- **Level 1** (1-2): Basic points: limited mention of another factor or a simple statement that diet and exercise help, with little or no reasoning and no clear conclusion.
- **Indicative content:**
 - Other factors could include smoking, alcohol, drug use, genetics, mental health, access to healthcare, sleep, and pollution.
 - Explain how smoking increases risk of respiratory and circulatory diseases; how alcohol can damage liver and brain and increase accident risk.
 - Discuss socioeconomic factors and stress affecting diet choices and access to exercise.
 - Mention that diet and exercise reduce risk of obesity, type 2 diabetes and heart disease but cannot remove genetic risks or exposure to pollutants.
 - Make a reasoned conclusion that diet and exercise are important but not always sufficient for good long-term health; other factors must be managed too.

Question 15

- **M1** state that carbohydrates are stored as glycogen in muscles and liver
- **M1** explain that higher glycogen stores delay fatigue and provide energy during endurance exercise
- **A1** give a practical example of a carbohydrate-rich meal (eg pasta with tomato sauce, rice and beans, porridge) cao
- **Answer: Carbohydrates are stored as glycogen in muscles and liver; increasing them before a long race increases glycogen stores which delays fatigue and supplies energy during the race. Example meal: pasta with tomato sauce.**

Question 16

- **M1** calculate packs per month: $15 \times 30 = 450$ cigarettes, $450 / 20 = 22.5$ packs
- **M1** state an appropriate rounded packs value or show decimal packs (eg 22.5 packs)
- **M1** calculate annual cigarettes: $15 \times 365 = 5475$
- **A1** correct final annual cigarettes 5475 cao
- **Answer: Packs per 30-day month = $450 / 20 = 22.5$ packs; Annual cigarettes = $15 \times 365 = 5475$**

Question 17

- **B1** any one short-term effect: increased heart rate, increased blood pressure, increased alertness, reduced appetite, restlessness, oe
- **B1** a second short-term effect different from the first, oe
- **Answer: Increased heart rate; increased alertness.**

Question 18

- **M1** identify one biological effect of poor sleep (eg reduced concentration, impaired memory consolidation, slower reaction times)
- **M1** explain how that biological effect causes poorer school performance (eg impaired memory makes learning and recall harder)
- **M1** identify a second biological effect (eg increased tiredness, mood changes affecting motivation)
- **A1** explain link from second effect to performance (eg tiredness lowers attention in lessons, mood lowers participation) cao
- **Answer: Poor sleep reduces memory consolidation and concentration, so pupils find it harder to learn and recall information; it also causes tiredness and mood changes that lower attention and motivation in class.**