

Placement Self-Assessment Test

Grade 8 Test — for students applying to enter Grade 9

Mathematics (Q1–45) • Physics (Q46–60) • Chemistry (Q61–75) • Biology (Q76–90) • 90 questions

Student name:	Date:	Programme code: 12
Grade applying for: 9	Total score: / 90	Signature:

Subject	Mathematics	Physics	Chemistry	Biology	Total
Score (optional)	/ 45	/ 15	/ 15	/ 15	/ 90

Placement Self-Assessment Test

This test is for self-assessment only. It is not included in your official transcript and does not affect your academic record.

- There is no time limit.
- You may use any learning resources, including books, notes, and a calculator, provided that you solve each question yourself and use the resources to improve your own understanding.
- Do not ask another person for answers and do not use artificial intelligence to answer the questions. The purpose of this test is to discover your real level of understanding, not simply to obtain a high score.
- Each correct answer receives **1 point**.
- Each incorrect answer receives a penalty of **–1/3 point**.
- An unanswered question receives **0 points**.
- The suggested passing score is **50 points**.
- You may decide for yourself whether you are ready to move to the next grade or whether it would be better to continue strengthening the current grade first.
- There is no required minimum score in each individual subject. Your subject-by-subject results should help you identify your strengths and the subjects that need more work.
- For example, if you are strong in Mathematics but weak in Chemistry, this test helps us identify the learning materials and support needed to balance your studies.
- Other school subjects are also important. They are not included in this test because Mathematics and Science usually require more teacher guidance and additional practice.

Instructions for Using the Question Booklet and Answer Sheet

Do not write your answers in the question booklet. Each student has an individual answer sheet and must mark all answers only on that answer sheet.

At the top of the answer sheet, enter or mark **12** as the programme code. This code is for the educational programme for Grades 7 to 12.

For placement purposes, each student must take the test for one grade below the grade they wish to enter:

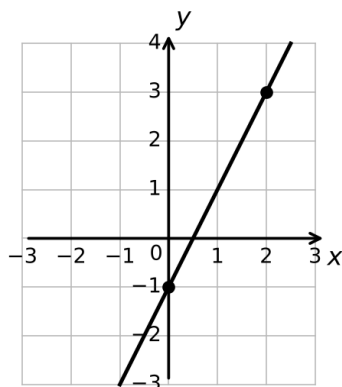
- Students applying for Grade 7 take the Grade 6 test.
- Students applying for Grade 8 take the Grade 7 test.
- Students applying for Grade 9 take the Grade 8 test.
- Students applying for Grade 10 take the Grade 9 test.
- Students applying for Grade 11 take the Grade 10 test.
- Students applying for Grade 12 take the Grade 11 test.

Before starting the test, make sure that your name, personal information, and programme code **12** are correctly entered on your individual answer sheet.

Each question has four options (A, B, C, D) and exactly one correct answer. Use $g = 10 \text{ m/s}^2$ unless a question states otherwise.

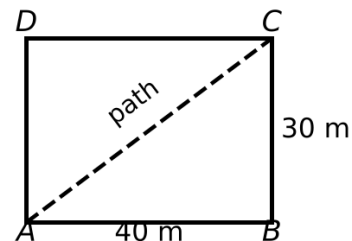
Mathematics (Questions 1–45)	
1. Which of these numbers is irrational? A) 22/7 B) $\sqrt{49}$ C) 0.25 D) $\sqrt{12}$	6. What is the value of $(\sqrt{5} - 2)(\sqrt{5} + 2)$? A) –1 B) 1 C) 9 D) 3
2. Which of these is NOT a real number? A) $-\sqrt{9}$ B) 0 C) $\sqrt[3]{-8}$ D) $\sqrt{-9}$	7. A father divides 3,600 AFN among his children Ali, Bashir and Jamil in the ratio 2 : 3 : 4. How much does Jamil receive? A) 1,600 AFN B) 800 AFN C) 1,200 AFN D) 400 AFN
3. Simplify $\sqrt{72}$. A) $8\sqrt{3}$ B) $12\sqrt{6}$ C) $6\sqrt{2}$ D) $4\sqrt{2}$	8. On a map with scale 1 : 200,000, the distance between two villages is 3.5 cm. What is the real distance? A) 70 km B) 0.7 km C) 7 km D) 700 km
4. What is $3\sqrt{5} + \sqrt{20}$? A) $\sqrt{45}$ B) $5\sqrt{5}$ C) $4\sqrt{5}$ D) $3\sqrt{25}$	
5. Rationalise the denominator: $6/\sqrt{3} = ?$ A) $6\sqrt{3}$ B) 18 C) $2\sqrt{3}$ D) $\sqrt{2}$	

9. 6 workers can build a wall in 30 days. Working at the same rate, how many workers are needed to build it in 12 days?
A) 15 B) 12 C) 24 D) 2.4
10. The speeds of two motorcycles are in the ratio 4 : 5. The first travels at 60 km/h. What is the speed of the second?
A) 75 km/h B) 61 km/h C) 80 km/h D) 48 km/h
11. 35% of a number is 280. What is the number?
A) 98 B) 800 C) 1,000 D) 980
12. A shopkeeper buys a carpet for 2,500 AFN and sells it for 3,000 AFN. What is his profit as a percentage of the cost price?
A) 16.7% B) 500% C) 30% D) 20%
13. Hamid saves 20,000 AFN at a simple interest rate of 6% per year. How much interest does he earn in 3 years?
A) 6,000 AFN B) 3,600 AFN
C) 23,600 AFN D) 1,200 AFN
14. 10,000 AFN is invested at 10% per year compound interest. How much interest is earned in 2 years?
A) 1,100 AFN B) 2,100 AFN
C) 12,100 AFN D) 2,000 AFN
15. The price of a bicycle is increased by 20% and later the new price is decreased by 20%. Compared with the original price, the final price is:
A) 4% higher B) the same
C) 4% lower D) 40% lower
16. Expand $(2x - 3)^2$.
A) $4x^2 - 6x + 9$ B) $4x^2 - 12x + 9$
C) $4x^2 + 9$ D) $4x^2 - 9$
17. Factorise $x^2 - 49$.
A) $x(x - 49)$ B) $(x + 7)^2$
C) $(x - 7)^2$ D) $(x - 7)(x + 7)$
18. Factorise $x^2 + 5x + 6$.
A) $(x + 5)(x + 1)$ B) $(x + 1)(x + 6)$
C) $(x - 2)(x - 3)$ D) $(x + 2)(x + 3)$
19. Solve: $x/3 + x/4 = 14$
A) $x = 2$ B) $x = 24$ C) $x = 12$ D) $x = 98$
20. Solve the inequality $3x - 5 < 10$.
A) $x < 5$ B) $x < 15$ C) $x > 5$ D) $x < 5/3$
21. What is the slope (gradient) of the line through the points (1, 2) and (4, 11)?
A) $1/3$ B) $13/5$ C) 3 D) 9
22. Which equation describes the line drawn on the grid?

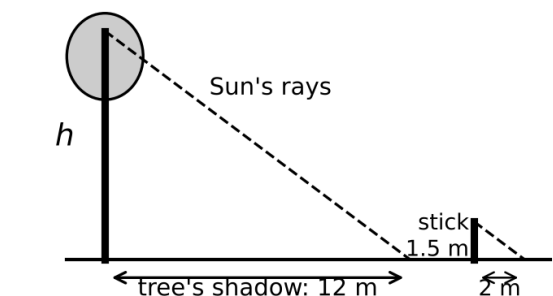


- A) $y = 2x - 1$ B) $y = 2x + 1$
C) $y = x/2 - 1$ D) $y = -2x - 1$

23. Which expression gives the n -th term of the sequence 5, 9, 13, 17, ...?
A) $4n + 5$ B) $5n$ C) $4n + 1$ D) $n + 4$
24. A bag contains 3 red, 5 blue and 2 green marbles. One marble is taken at random. What is the probability that it is NOT blue?
A) $3/10$ B) $1/5$ C) $1/3$ D) $1/2$
25. Arezo spends $1/4$ of her pocket money on lunch and $2/5$ on books. She has 210 AFN left. How much pocket money did she have?
A) 840 AFN B) 350 AFN C) 420 AFN D) 600 AFN
26. In a Kabul market, 3 kg of apples and 2 kg of oranges cost 410 AFN, while 1 kg of apples and 2 kg of oranges cost 230 AFN. What is the price of 1 kg of apples?
A) 110 AFN B) 70 AFN C) 90 AFN D) 60 AFN
27. A school sold 120 tickets for a sports event. Student tickets cost 50 AFN and adult tickets cost 100 AFN. The total income was 8,000 AFN. How many adult tickets were sold?
A) 20 B) 40 C) 60 D) 80
28. The product of two consecutive even numbers is 168. What are the numbers?
A) 12 and 14 B) 6 and 28
C) 10 and 12 D) 14 and 16
29. A 13 m ladder leans against a wall. Its foot is 5 m from the wall. How high up the wall does the ladder reach?
A) 12 m B) $\sqrt{194}$ m C) 8 m D) 18 m
30. Students walk from A to C across the rectangular field along the diagonal path instead of along the sides AB and BC. How many metres shorter is the path?

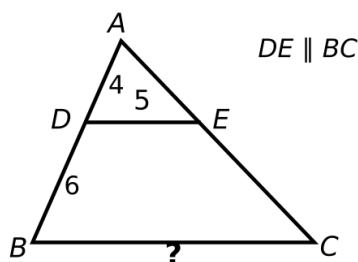


- A) 50 m B) 70 m C) 20 m D) 10 m
31. Which set of side lengths forms a right-angled triangle?
A) 7, 9, 12 B) 5, 11, 12
C) 8, 15, 17 D) 6, 8, 12
32. At the same time of day, a 1.5 m stick casts a 2 m shadow and a tree casts a 12 m shadow. What is the height h of the tree?

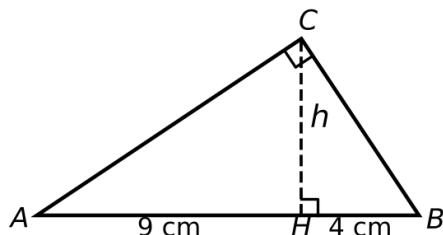


- A) 9 m B) 10.5 m C) 13.5 m D) 16 m

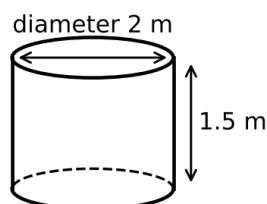
33. In triangle ABC, DE is parallel to BC, AD = 4, DB = 6 and DE = 5. What is the length of BC?



- A) 11 B) 15 C) 7.5 D) 12.5
34. Triangle ABC has a right angle at C, and CH is perpendicular to AB. AH = 9 cm and HB = 4 cm. What is the height $h = CH$?

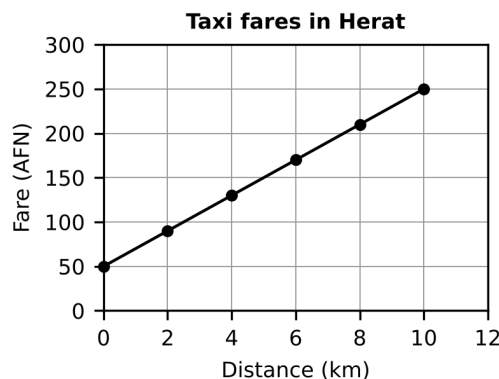


- A) 6 cm B) 6.5 cm C) 5 cm D) 36 cm
35. G is the centroid of triangle ABC and AD is a median of length 18 cm. What is the length of AG?
- A) 12 cm B) 6 cm C) 9 cm D) 13.5 cm
36. What is the volume of a cylinder with radius 3 cm and height 5 cm?
- A) $30\pi \text{ cm}^3$ B) $15\pi \text{ cm}^3$ C) $90\pi \text{ cm}^3$ D) $45\pi \text{ cm}^3$
37. A cylindrical water tank has the dimensions shown. How many litres of water can it hold? (Use $\pi = 3.14$ and $1 \text{ m}^3 = 1,000 \text{ L}$.)



- A) 9,420 L B) 18,840 L C) 4,710 L D) 471 L
38. What is the volume of a ball with radius 3 cm? ($V = \frac{4}{3}\pi r^3$)
- A) $108\pi \text{ cm}^3$ B) $27\pi \text{ cm}^3$ C) $12\pi \text{ cm}^3$ D) $36\pi \text{ cm}^3$
39. A cone and a cylinder have the same base and the same height. The volume of the cylinder is 300 cm^3 . What is the volume of the cone?
- A) 100 cm^3 B) 300 cm^3 C) 900 cm^3 D) 150 cm^3
40. Two similar triangles have corresponding sides in the ratio 3 : 5. The area of the smaller triangle is 27 cm^2 . What is the area of the larger triangle?
- A) 125 cm^2 B) 75 cm^2 C) 81 cm^2 D) 45 cm^2
41. Which shape always has point symmetry (a centre of symmetry)?
- A) isosceles trapezium B) parallelogram
C) kite D) isosceles triangle
42. How many lines of symmetry does a regular hexagon have?
- A) 3 B) 4 C) 6 D) 12

43. The graph shows how taxi fares in Herat depend on distance. If the pattern continues, what is the fare for a 12 km journey?



- A) 250 AFN B) 290 AFN C) 300 AFN D) 240 AFN
44. The diagonals of a rhombus are 12 cm and 16 cm long. What is the perimeter of the rhombus?
- A) 40 cm B) 28 cm C) 96 cm D) 56 cm
45. The length of a rectangle is 3 cm more than its width, and its area is 40 cm^2 . What is its width?
- A) 4 cm B) 8 cm C) 10 cm D) 5 cm

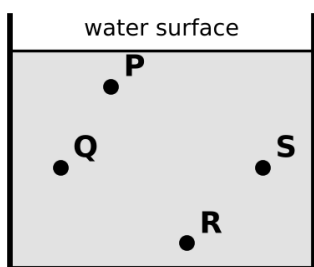
Physics (Questions 46–60)

46. What is 25°C on the Kelvin scale?
- A) 298 K B) -248 K C) 248 K D) 77 K
47. A stone has a mass of 600 g and a volume of 240 cm^3 . What is its density?
- A) 0.4 g/cm^3 B) 2.5 g/cm^3
C) $144,000 \text{ g/cm}^3$ D) 360 g/cm^3
48. The table gives the mass and volume of four objects. The density of water is 1 g/cm^3 . Which object will FLOAT in water?

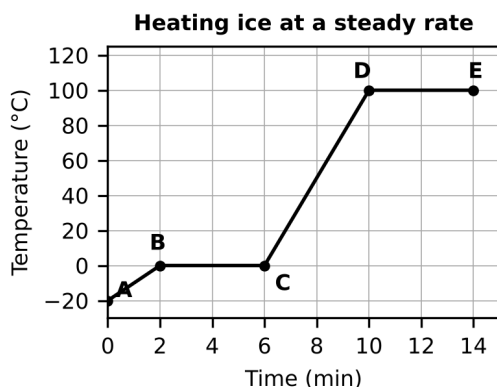
Object	Mass (g)	Volume (cm^3)
A	50	40
B	30	40
C	90	60
D	120	100

- A) A B) B C) C D) D
49. Why does a sharp knife cut bread more easily than a blunt knife?
- A) The same force acts on a larger area, so the pressure is greater.
B) A sharp knife has less friction with the air.
C) A sharp knife is heavier.
D) The same force acts on a smaller area, so the pressure is greater.
50. A box with a weight of 600 N rests on the floor. Its base has an area of 0.2 m^2 . What pressure does it exert on the floor?
- A) 600 Pa B) 3,000 Pa C) 120 Pa D) 30 Pa

51. The diagram shows a tank of water. At which point is the water pressure the greatest?

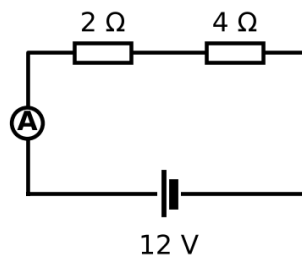


- A) P B) Q C) R D) S
52. What is the pressure caused by water at a depth of 5 m in a well? (density of water = $1,000 \text{ kg/m}^3$, $g = 10 \text{ m/s}^2$)
 A) 50,000 Pa B) 500 Pa
 C) 5,000 Pa D) 2,000 Pa
53. Why are the handles of cooking pots often made of wood or plastic?
 A) Wood and plastic are heavier than metal.
 B) Wood and plastic are good conductors of heat.
 C) Wood and plastic are poor conductors of heat.
 D) Wood and plastic reflect heat radiation.
54. In winter, a bukhari (room heater) is placed near the floor. Why does this warm the whole room?
 A) Heat travels through air mainly by conduction.
 B) Heat moves only downward.
 C) Cold air rises and warm air sinks.
 D) Warm air rises and cooler air sinks, forming convection currents.
55. How does heat from the Sun reach the Earth?
 A) by conduction B) by evaporation
 C) by convection D) by radiation
56. How much heat energy is needed to raise the temperature of 2 kg of water from 20°C to 70°C ? (specific heat capacity of water = $4,200 \text{ J/(kg}\cdot^\circ\text{C)}$)
 A) 420,000 J B) 588,000 J
 C) 8,400 J D) 210,000 J
57. The graph shows the temperature of ice heated at a steady rate. Why does the temperature stay constant between B and C?



- A) The water is boiling.
 B) The ice is losing energy to the air.
 C) The energy is being used to melt the ice.
 D) The heater is switched off.

58. Look at the circuit. What is the reading on the ammeter?

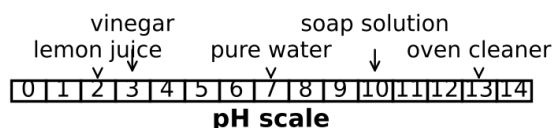


- A) 2 A B) 72 A C) 3 A D) 6 A
59. A lamp connected to 6 V carries a current of 0.5 A. What is its resistance?
 A) 6.5Ω B) 0.08Ω C) 12Ω D) 3Ω
60. Why are the lamps and sockets in a house connected in parallel and not in series?
 A) In parallel, the current is the same in every appliance.
 B) Parallel circuits use no electrical energy.
 C) In parallel, all appliances must be on at the same time.
 D) Each appliance gets the full voltage and can be switched on or off separately.

Chemistry (Questions 61–75)

61. When a magnesium atom (2, 8, 2) forms an ion, what happens?
 A) It loses 2 electrons and forms Mg^{2+} .
 B) It gains 6 electrons and forms Mg^{6-} .
 C) It loses 2 protons and forms Mg^{2-} .
 D) It gains 2 electrons and forms Mg^{2-} .
62. An oxide ion, O^{2-} , is formed from an oxygen atom (8 protons). How many electrons does the oxide ion have?
 A) 6 B) 8 C) 10 D) 16
63. Which compound is held together by ionic bonds?
 A) H_2O B) CH_4 C) CO_2 D) NaCl
64. In a molecule of water, the hydrogen and oxygen atoms are joined by:
 A) transfer of electrons (ionic bonds)
 B) shared pairs of electrons (covalent bonds)
 C) shared protons
 D) magnetic forces
65. Aluminium has a valency of 3 and oxygen has a valency of 2. What is the formula of aluminium oxide?
 A) Al_3O_2 B) AlO_3 C) AlO D) Al_2O_3
66. What is the formula of calcium chloride? (Ca^{2+} and Cl^-)
 A) CaCl_2 B) Ca_2Cl_3 C) Ca_2Cl D) CaCl
67. What is the relative formula mass of CO_2 ? ($\text{C} = 12$, $\text{O} = 16$)
 A) 28 B) 40 C) 44 D) 56
68. Which numbers correctly balance the equation $__\text{H}_2 + __\text{O}_2 \rightarrow __\text{H}_2\text{O}$?
 A) 1, 1, 1 B) 2, 2, 1 C) 1, 2, 2 D) 2, 1, 2
69. When 10 g of calcium carbonate is heated, it breaks down into 5.6 g of calcium oxide and carbon dioxide gas. What mass of carbon dioxide is produced?
 A) 5.6 g B) 4.4 g C) 10 g D) 15.6 g
70. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$. What type of reaction is this?
 A) combustion B) neutralisation
 C) decomposition D) displacement

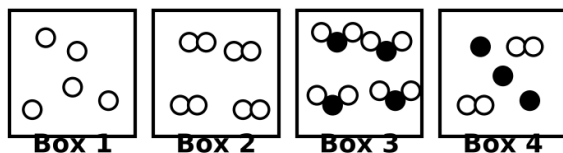
71. The diagram shows the pH of five substances. Which substance is the most acidic?



- A) lemon juice B) vinegar
C) soap solution D) oven cleaner
72. What are the products when an acid reacts with a base (alkali)?
A) an acid and oxygen B) a salt and water
C) a base and water D) a salt and hydrogen
73. A few drops of a solution turn blue litmus paper red. What can you conclude?
A) The solution is basic (alkaline).
B) The solution is acidic.
C) The solution is neutral.
D) The solution is pure water.
74. Four metals were placed in dilute acid. Using the results in the table, which list shows the metals from MOST reactive to LEAST reactive?

Metal	Observation in dilute acid
Copper	no bubbles
Iron	a few bubbles, slowly
Magnesium	many bubbles, very fast
Zinc	bubbles at a steady rate

- A) magnesium, zinc, iron, copper
B) zinc, magnesium, iron, copper
C) copper, iron, zinc, magnesium
D) magnesium, iron, zinc, copper
75. Which box represents a pure compound?
○ and ● are atoms of two different elements



- A) Box 1 B) Box 2 C) Box 3 D) Box 4

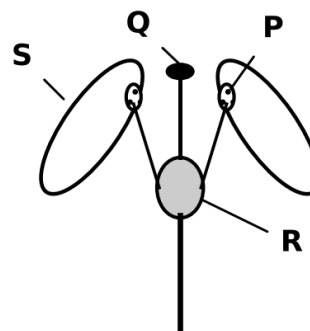
Biology (Questions 76–90)

76. Which tissue carries water and minerals from the roots to the leaves?
A) xylem B) cambium
C) phloem D) epidermis
77. What is the main function of stomata in leaves?
A) to absorb water from the soil
B) to allow gases to enter and leave the leaf
C) to make the leaf green
D) to carry sugar to the roots
78. On which kind of day will a plant lose water by transpiration the fastest?
A) warm, humid and still
B) cold, humid and still
C) hot, dry and windy
D) cold, dry and still

79. Why do roots have many root hairs?
A) They increase the surface area for absorbing water and minerals.
B) They protect the root from insects.
C) They make food for the plant.
D) They carry out photosynthesis underground.

80. Pollination is the transfer of pollen from:
A) the ovary to the petal
B) the anther to the stigma
C) the stigma to the ovary
D) the root to the flower

81. The diagram shows a section through a flower. In which labelled part do the seeds develop after fertilisation?



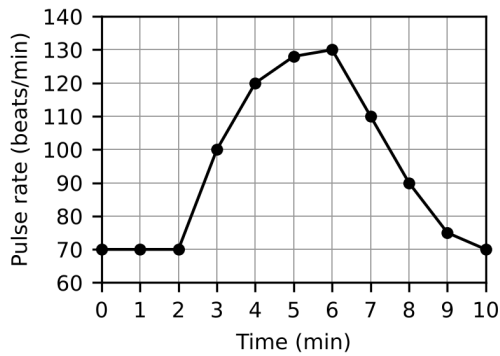
- A) P B) Q C) R D) S

82. Seeds were placed in four tubes, as shown in the table. Which conclusion is best supported by the results?

Tube	Conditions	Germinated?
A	dry cotton wool, 25 °C	No
B	wet cotton wool, 25 °C	Yes
C	wet cotton wool, 4 °C (fridge)	No
D	boiled water, oil on top, 25 °C	No

- A) Seeds germinate best in the cold.
B) Seeds need water, oxygen and warmth to germinate.
C) Seeds need only water to germinate.
D) Seeds need light to germinate.
83. In which order does air pass into the lungs?
A) nose → trachea → bronchi → bronchioles → alveoli
B) nose → bronchi → trachea → alveoli → bronchioles
C) nose → trachea → alveoli → bronchi → bronchioles
D) mouth → alveoli → trachea → bronchi → bronchioles
84. Which feature of the alveoli helps gas exchange to happen quickly?
A) thick, muscular walls
B) very thin walls and a large surface area
C) a small surface area
D) no blood supply
85. When the diaphragm contracts and moves down, what happens?
A) The lungs push the diaphragm down.
B) The heart stops pumping blood.
C) The volume of the chest increases and air flows into the lungs.
D) The volume of the chest decreases and air flows out.
86. Which blood vessel has thick, muscular walls and carries blood away from the heart under high pressure?
A) vein B) capillary
C) lymph vessel D) artery

87. Rahima cuts her finger. Which part of the blood helps to form a clot to stop the bleeding?
A) plasma water only **B)** white blood cells
C) red blood cells **D)** platelets
88. Which blood vessel carries deoxygenated blood from the heart to the lungs?
A) pulmonary artery **B)** aorta
C) pulmonary vein **D)** vena cava
89. A student exercised from minute 2 to minute 6 and her pulse rate was recorded. How many minutes after she STOPPED exercising did her pulse return to its resting rate?



- A)** 6 minutes **B)** 10 minutes
C) 2 minutes **D)** 4 minutes
90. Why do people who smoke often cough a lot?
A) Smoke adds extra oxygen to the lungs.
B) Smoke makes the lungs larger.
C) Smoke makes the blood carry more oxygen.
D) Smoke damages the cilia that clean the airways, so mucus builds up.

End of test. Check that every answer is marked on your answer sheet.