PHOTON THAILAND 2026

Photon Science Competition (Thailand)

Science Primary G.5–6

Sunday, August 9, 2026

3:00 – 4:30 p.m. (90 minutes)

B

Instructions

1. This exam includes 40 questions, with 4 and 5 choices given (100 marks).
2. Use a 2B black pencil or darker one to fill in the circle.
3. Fill out your name, grade, school, test center, room, seat number, and identification number either in pen or in pencil.
4. If you want to change an answer that you have already marked, use a clean eraser to erase the incorrect answer and mark the new one.
5. It should be noted that figures in the exam are not drawn to scale.
6. Dictionaries, calculators, and electronic devices are not permitted in the test room.
7. Note taking can be done on the test paper only, with no extra sheet provided.
8. Do not write anything or make any symbols in the black barcode area along the edge of the paper except the answers on the answer sheet. Make sure the answersheet is not crumpled.
9. Submit the answer sheet to the proctor when the time is up.
10. Cheating in the exam may cause serious consequences including disqualification from receiving any award or joining the second round of the test held by PHOTON THAILAND.

Problems and Scoring

Part I : Number 1–30 are multiple-choice questions.
Each correct answer is worth 2 marks.

Part II : Number 31–40 are multiple-choice questions.
Each correct answer is worth 4 marks.

Should any disagreement arise, the judgment of the panel is deemed final.

Announcement of the results via
https://prod.miraah-education.com/student on September 16, 2026

: PhotonScienceCompetition.Thailand / Miraah.education

LINE
@miraah.edu

Part I : This is a multiple-choice test with 4 options. Students must choose only one best answer.

1. A swimmer who opens their eyes underwater without wearing goggles cannot see clearly, even in clean, transparent water. What is the main reason?

    1. The water absorbs nearly all the light entering the eyes.
    2. Light is strongly scattered by clean water.
    3. Light travels more slowly in water and therefore cannot form an image.
    4. The refractive power of the cornea decreases, so the image is not focused on the retina.

2. Four balls, M, N, O, and P, interact as follows:

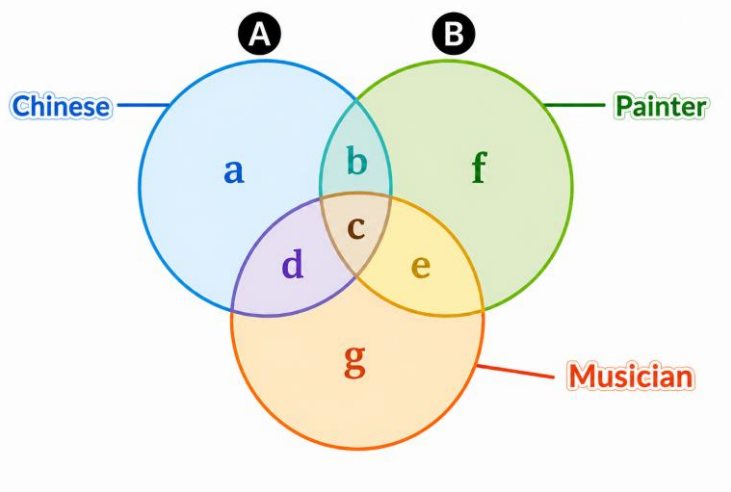
    1. Ball M repels ball N.
    2. Ball M attracts ball O.
    3. Ball O repels ball P.

If ball P is positively charged, what charge must ball N have?

    1. Positive
    2. Negative
    3. Electrically neutral
    4. Either negative or electrically neutral

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3. Study the Venn diagram carefully.



Which letter represents people who are Chinese musicians but not painters?

1. d
2. c
3. b
4. a

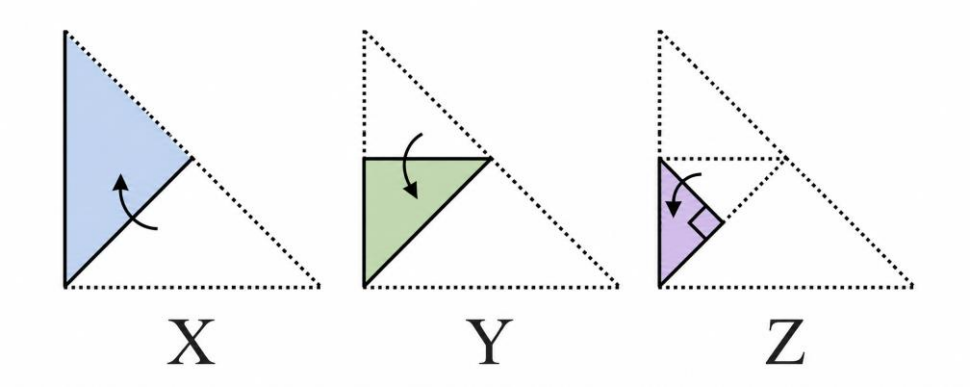
4. In a certain code language, **BRAIN** is written as ***%-#x** and **TIER** is written as **$#+%**.

How is **RENT** written in the same code?

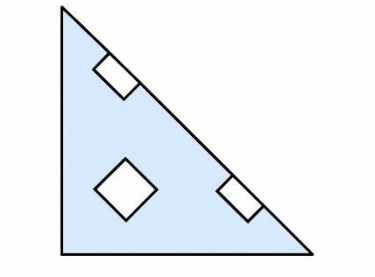
1. %x#$
2. %#x$
3. %+x$
4. +x%$

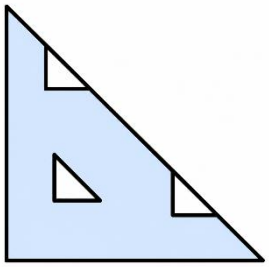
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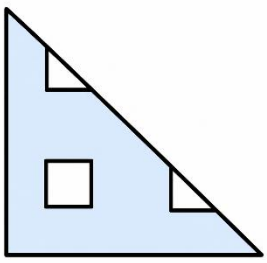
5. The diagrams X, Y, and Z show the sequence of folding a sheet of paper. Diagram Z shows the cut made in the folded paper.

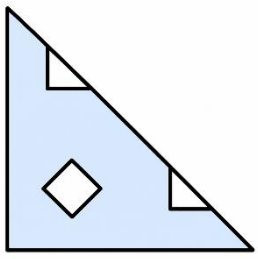


Which option best represents the paper after it is completely unfolded?

1. 

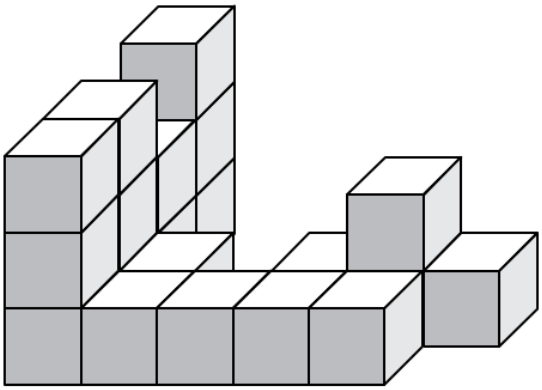
2. 

3. 

4. 

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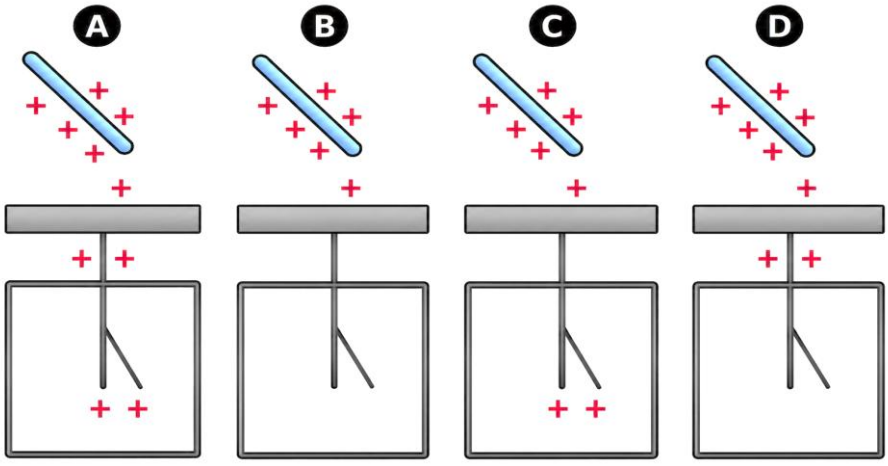
6. Consider the figure below.



The number of cubes in the given figure is _____.

1. 20
2. 21
3. 19
4. 22

7. Which diagram correctly shows what happens when a positively charged rod is brought close to, but does not touch, an electroscope?



1. A
2. B
3. C
4. D

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8. A car travels on a level road and is brought to rest by friction between its tyres and the road. Assume that the coefficient of friction remains constant.

Consider the following statements:

Statement 1 : The stopping distance **X** depends on the car's initial speed.

Statement 2 : Under the same road conditions and at the same initial speed, changing the mass of the car does not affect its stopping distance.

Which option is correct?

1. Both statements are correct, and Statement 2 correctly explains Statement 1.
2. Both statements are correct, but Statement 2 does not explain Statement 1.
3. Statement 1 is correct, but Statement 2 is incorrect.
4. Both statements are incorrect.

9. A warm-blooded vertebrate lives near the coast and has a streamlined body covered with short, dense hair that helps protect it from water. Its limbs are modified into paddle-like flippers for swimming, and it breathes using lungs. How should this animal be classified?

1. A cartilaginous marine fish adapted to living in a cold climate
2. A marine mammal, such as a seal or a sea lion
3. A marine reptile with limbs adapted mainly for swimming
4. A flightless seabird with dense feathers and paddle-like wings

10. If the kidneys' filtering efficiency decreases to only 10% of its normal level, which change would most likely be observed in their blood chemistry?

1. Increased glucose levels
2. High levels of urea
3. High carbon dioxide
4. Decreased salt levels

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11. During heavy exercise, your muscles produce more carbon dioxide (CO_2). How does the body primarily sense that it needs to breathe faster?

1. Sensing low energy levels
2. Monitoring lung expansion
3. Detection of blood acidity
4. Feeling muscle temperature

12. In a protected grassland ecosystem, a team of ecologists has been monitoring a simple food chain consisting of three main organisms:

Green grass (Producer) ⟶ **Field mice** (Primary consumer) ⟶ **Wild hawks** (Secondary consumer)

Due to a sudden outbreak of a viral disease that specifically attacks rodents, the population of field mice dropped by 80% within a few weeks. If no other organisms enter or leave this ecosystem, which of the following predictions best describes the immediate and long-term consequences on this environment?

1. The green grass population will drastically decrease in the short term due to the loss of nutrients from dead mice, causing the wild hawks to switch immediately to eating grass.
2. The wild hawks will initially face severe food shortages, leading to a decline in their population, while the green grass will overgrow in the short term due to reduced grazing pressure.
3. The ecosystem will remain perfectly balanced because the wild hawks will start preying on each other to maintain their population size until the mice recover.
4. The field mice population will completely disappear forever, causing the wild hawks to immediately mutate into herbivores to survive.

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13. Two identical metal blocks, A and B, slide across the same flat surface. Block A rests on its largest face, while Block B rests on its smallest face. Both blocks move at the same speed. How does the kinetic friction acting on Block A compare with that acting on Block B?

1. The friction on Block A is greater than that on Block B.
2. The friction on Block B is greater than that on Block A.
3. The friction depends mainly on the volume of each block.
4. The friction is the same for Block A and Block B.

14. A wooden block is placed on a horizontal table. A student pulls the block with a constant force of 12 N to the right, but the block remains stationary. If the maximum static friction between the block and the table is 15 N, what is the magnitude and direction of the friction force acting on the block at this moment?

1. 12 N to the right
2. 3 N to the left
3. 15 N to the left
4. 12 N to the left

15. Consider a hydroelectric dam. Water stored at the top of the dam flows down through pipes to turn a turbine. What is the correct sequence of energy transformations occurring in this system?

1. Kinetic energy ⟶ Elastic Potential energy ⟶ Electrical.
2. Potential energy ⟶ Kinetic energy ⟶ Electrical.
3. Electrical ⟶ Potential energy ⟶ Kinetic energy
4. Thermal ⟶ Kinetic energy ⟶ Electrical.

16. When a person gets a skin injury such as a deep cut, a wound etc., an injection is usually recommended to prevent a deadly disease which affects the nervous system.
Which is this disease?

1. Pneumonia
2. Tetanus
3. Tuberculosis
4. Hepatitis

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17. During sunrise, an observer on Earth sees the Sun slightly before it actually crosses the horizon. Which analytical statement best explains this phenomenon in the context of the Earth's atmosphere?

1. Total internal reflection occurs at the vacuum-atmosphere interface, reflecting light downward.
2. The atmosphere acts as a convex lens, magnifying the solar disk above the horizon line.
3. Atmospheric density increases toward the surface, causing light to bend toward the normal.
4. Rayleigh scattering shifts the light's path, making the Sun appear higher than its true position.

18. A marine biologist uses a sonar system aboard a research vessel to measure the depth of the ocean floor in an area where a pod of dolphins is swimming. The sonar emits a 50,000 hertz ultrasonic wave vertically downward. Sound travels through seawater at 1,500 m/s, and the reflected wave returns to the receiver 4 seconds after transmission.

The scientist also knows that humans cannot hear this sonar signal. Which conclusion is most accurate?

1. The ocean is 6,000 metres deep, and humans cannot hear the signal because its amplitude is too low.
2. The ocean is 3,000 metres deep, and humans cannot hear the signal because its frequency is above their hearing range.
3. The ocean is 3,000 metres deep, and humans cannot hear the signal because its wavelength is excessively long.
4. The ocean is 1,500 metres deep, and dolphins hear the signal because their hearing range is identical to that of humans.

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19. In a series circuit containing a battery and three identical resistors, if the middle resistor is replaced by a copper wire of negligible resistance, what would happen to the total current in the circuit?

1. The current becomes zero.
2. The current increases.
3. The current decreases.
4. The current remains the same.

20. A negatively charged object is brought near the cap of a neutral gold-leaf electroscope. While the object is near, a person momentarily touches the cap with their finger.
After removing the finger and then the object, what happens to the gold leaves?

1. The gold leaves diverge with positive charge.
2. The gold leaves remain completely flat.
3. Leaves diverge then immediately collapse.
4. Leaves diverge with negative charge.

21. A student stands in front of two large plane mirrors joined at a 90° angle. The student holds a sign displaying the word **"REFLECT"** in the right hand. When looking into the corner where the mirrors meet, the student sees a middle image formed by reflections from both mirrors. Which statement best describes this middle image?

1. The image is upside down, but the text appears normal.
2. The sign appears in the left hand, and the text appears normal.
3. The sign appears in the right hand, and the text appears normal.
4. The sign appears in the right hand, but the text is laterally inverted.

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22. A person wants to see their full height in a plane mirror hanging on a wall. What is the minimum vertical length the mirror must have for the person to see their entire body from head to toe?

1. Double their actual height.
2. It depends on how far they stand.
3. Exactly half of their height.
4. Exactly the same as their height.

23. In a science laboratory, a student observes three unknown objects (X, Y, and Z) and records the following data:

Object X repels the North pole of a compass needle.

Object Y is attracted to both the North and South poles of a bar magnet and blocks all incident light.

Object Z does not deflect a compass needle and allows light to pass through it without changing its direction.

Based on these observations, which of the following statements is a scientifically correct conclusion?

1. Object Y is a translucent material that is non-magnetic.
2. Object X is a magnetic metal but not a magnet.
3. Object Z is a transparent and non-magnetic material.
4. Object Y is a permanent magnet with two fixed poles.

24. A researcher observes that on a cold morning, a distant mountain appears slightly taller and shifted upward from its usual position. Which atmospheric condition best explains this 'superior mirage'?

1. A layer of warm air exists directly beneath a layer of much colder air.
2. A layer of cold air exists directly beneath a layer of much warmer air.
3. Increased water vapor in the air causes light to scatter toward the observer.
4. The air density is perfectly uniform from the surface to the mountain peak.

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25. A scientist places two identical sealed glass boxes in direct sunlight. Box A contains dry air, while Box B contains air with a high concentration of water vapour. After one hour, Box B is found to have a higher temperature than Box A. According to the model described, which statement best explains this observation?

1. Humid air is denser and therefore absorbs more incoming sunlight than dry air.
2. Water vapour absorbs outgoing infrared radiation and reduces heat loss from the box.
3. Dry air has a higher heat capacity and therefore changes temperature more slowly.
4. Water vapour continuously condenses and releases cooling energy inside the box.

26. A deep lake in a cold climate undergoes autumn overturn. As the surface water cools toward 4°C, it becomes denser and sinks, causing water from deeper layers to rise and mix with it. Why is this process important for fish living near the bottom of the lake?

1. It removes carbon dioxide from the bottom water and releases it directly into the atmosphere.
2. It transports surface ice downward and keeps the deep-water fish at a lower temperature.
3. It produces strong currents that allow the fish to swim while using less energy.
4. It transports dissolved oxygen from the surface water into the deeper parts of the lake.

27. A student has two identical metal bars made of the same material. Bar A is short and thin, while Bar B is long and thick. When the student strikes each bar with the same amount of force, they produce different sounds. What is the most accurate prediction about the sounds produced, and why?

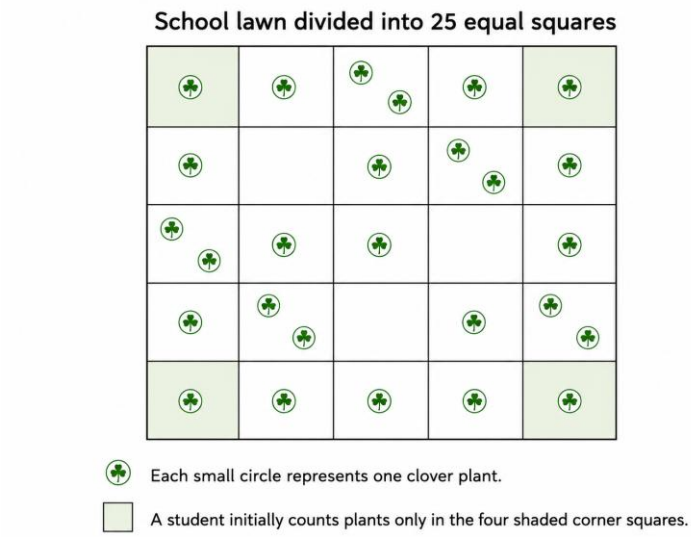
1. Bar A will produce a lower pitch than Bar B because it is shorter.
2. Bar B will produce a higher pitch than Bar A because it is larger.
3. Bar B will produce a lower pitch than Bar A because of its greater mass and length.
4. Both bars will produce the same pitch because they are made of the same material.

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28. A researcher measures the speed of sound in a desert at noon (45 °C) and at midnight (10 °C). Which statement correctly analyzes the results?

1. Sound cannot travel at midnight.
2. Sound travels faster at noon.
3. Sound travels faster at midnight.
4. Humidity changes the speed more.

29. A school lawn is divided into 25 equal squares. Each small circle represents one clover plant. A student initially counts plants only in the four shaded corner squares. After counting the four corner squares, the student concludes that the entire lawn contains very few clover plants.



Which analysis of the student's method is most appropriate?

1. The conclusion may underestimate the population because the sampled corner squares do not represent the plant-rich central area; squares should be selected randomly from across the lawn.
2. The conclusion is reliable because corner squares are easier to reach, and convenient locations always provide the most accurate estimate of a population.
3. The conclusion may overestimate the population because plants in the central squares should not be included when estimating the number in the entire lawn.
4. The conclusion is invalid only because four squares were counted; counting any five neighbouring squares would automatically produce an unbiased estimate.

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30. A nature reserve worker is comparing a crocodile and a salamander. Both animals are ectothermic vertebrates that can spend time on land and in water.
Which characteristic can the worker use to safely classify the crocodile as a reptile and the salamander as an amphibian?

1. The crocodile breathes only with lungs; the salamander breathes only with gills as an adult.
2. The crocodile has dry skin covered in hard scales; the salamander has moist, smooth skin without scales.
3. The crocodile lays soft jelly-like eggs in water; the salamander lays hard-shelled eggs on land.
4. The crocodile is an invertebrate, while the salamander is a vertebrate.

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Part II : This is a multiple-choice test with 5 options. Students must choose only one best answer.

31. A student performed an experiment to test how different conditions affect the digestion of starch using human saliva, which contains the enzyme amylase. The results were recorded in the table below:

Test Tube	Contents	Temperature (°C)	Iodine Test Result (Tests for Starch)
Tube 1	Starch solution + Saliva	37	Yellow/Brown
Tube 2	Starch solution + Saliva	0	Dark Blue/Black
Tube 3	Starch solution + Boiled Saliva	37	Dark Blue/Black
Tube 4	Starch solution + Water	37	Dark Blue/Black

Based on the experimental data, which of the following is the most accurate scientific conclusion regarding human enzymes and health?

1. Enzymes in our body can function perfectly at any temperature, including freezing points.

2. Boiling the saliva destroyed the structure of the enzyme, making it unable to break down starch even at body temperature (37°C).

3. Water is a better digestive agent than saliva when the body temperature is exactly at 37°C.

4. The experiment proves that starch digestion in humans begins only when food reaches the environment of the stomach.

5. Low temperatures (0°C) permanently chemically change the starch molecules so they can never be digested.

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32. An athlete is training at a high-altitude mountain station where the air is less dense. To adapt to this environment, the athlete's body undergoes several physiological changes. Which of the following graphs or descriptions correctly analyzes the long-term adaptation of the athlete's blood components to ensure enough oxygen reaches the muscles?

1. The number of white blood cells increases to protect the body from cold mountain viruses, which indirectly helps oxygen transport.
2. The volume of blood plasma decreases significantly to concentrate the existing oxygen molecules in the heart.
3. The production of red blood cells increases because they contain hemoglobin, the protein responsible for binding and transporting oxygen.
4. Blood platelets multiply rapidly to prevent internal bleeding caused by changes in atmospheric pressure.
5. The heart rate permanently decreases to half its normal speed to conserve the limited oxygen available in the lungs.

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33. Patient Z has a medical condition where their pancreas fails to secrete a sufficient amount of two crucial substances: Pancreatic Juice and the hormone Insulin.

If Patient Z consumes a meal consisting of white rice, grilled chicken, and olive oil, what will be the most likely immediate consequences regarding their digestion and blood chemistry?

1. Carbohydrates and proteins will be digested normally in the stomach, but blood glucose levels will drop dangerously close to zero because insulin cannot be released.

2. Lipids will be perfectly broken down by bile alone, but the lack of insulin will cause the patient's cells to absorb too much glucose from the blood.

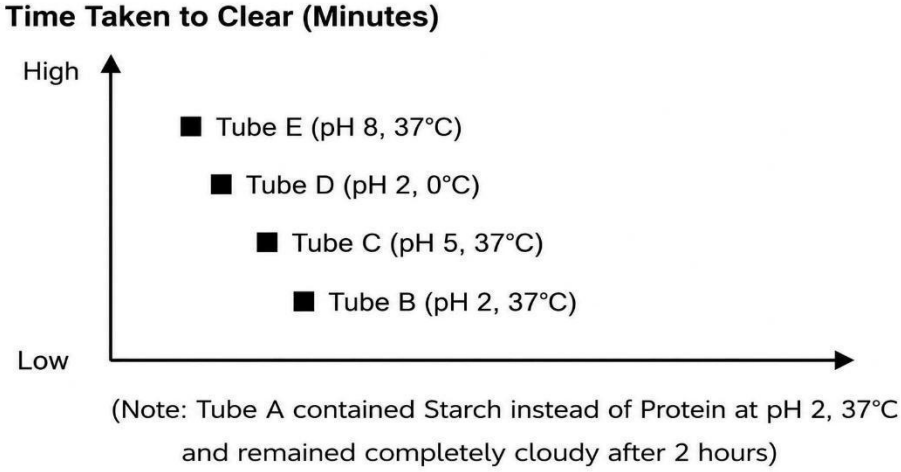
3. Only protein digestion will fail due to the lack of pancreatic enzymes, while insulin deficiency will cause the liver to destroy all existing blood sugars.

4. The stomach will take over the role of the pancreas by producing insulin, ensuring that blood glucose remains perfectly balanced despite the disease.

5. The digestion of carbohydrates, proteins, and lipids will all be severely impaired, and their blood glucose levels will remain abnormally high after the meal because cells cannot absorb the glucose without insulin.

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34. A student set up an experiment to investigate the digestion of egg white (albumin protein) using the digestive enzyme pepsin, which is naturally found in the human stomach. Five test tubes were prepared with different pH levels and temperatures. The time taken for the cloudy protein solution to become completely clear was recorded and plotted in the graph below.



(Note: Tube A contained Starch instead of Protein at pH 2, 37°C and remained completely cloudy after 2 hours)

Based on the graph and experimental parameters, which of the following statements provides the most accurate scientific deduction regarding the chemical digestion in the human stomach?

1. Pepsin is a non-specific enzyme that can digest any organic molecule as long as the environment is kept at a high pH.

2. The chemical digestion of proteins is completely independent of temperature, but strictly dependent on a highly alkaline environment.

3. Tube A failed to clear because starch molecules are chemically smaller than protein molecules, allowing them to escape enzyme binding.

4. If the student increases the temperature of Tube B to 80°C, the reaction rate will double, and the time taken to clear will be cut in half.

5. Tube B shows the optimum condition because pepsin requires both a low pH and temperature 37°C to maintain its functional structure and maximize its reaction rate.

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35. An 11-year-old child living in an indoor orphanage with very limited access to natural sunlight has developed Rickets, a disease characterized by soft, weak, and bowed legs. A blood test reveals a severe deficiency in Calcium, which is vital for bone calcification. The child's daily meals actually contained the recommended dietary intake of Calcium. Which of the following is the cause of this child's condition?

1. The lack of sunlight caused a deficiency in Vitamin A, which directly prevents blood cells from delivering calcium to the bones.
2. Sunlight is required to synthesize Vitamin D in the skin. Without Vitamin D, the small intestine cannot efficiently absorb Calcium from food.
3. The continuous lack of sunlight causes the skeletal muscles to freeze, converting existing bone calcium into body fat.
4. Vitamin C levels dropped due to the indoor environment, destroying the hemoglobin required to lock calcium inside the joints.
5. The child's body is experiencing a mutation where the stomach mistakes calcium for dietary fiber and expels it all as waste.

36. During a period of high solar activity, scientists observe a massive ejection of plasma and magnetic fields from the Sun's corona traveling toward Earth at millions of miles per hour. This phenomenon is known as a Coronal Mass Ejection (CME). Which of the following describes the most direct effect this event will have on Earth?

1. It will instantly raise the global atmospheric temperature of Earth by several degrees Celsius.
2. It will interact with Earth's magnetosphere, creating beautiful auroras near the poles but potentially disrupting satellite communications and power grids.
3. It will cause immediate and widespread volcanic eruptions due to the sudden increase in gravitational pull from the Sun.
4. It will dissolve the ozone layer completely, allowing harmful ultraviolet (UV) radiation to destroy all plant life within 24 hours.
5. It will alter the Earth's orbit, pushing the planet slightly further away from the Sun.

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37. A 10-year-old child living in a severe drought-stricken region is brought to a medical clinic. The child exhibits symptoms of kwashiorkor (severe swelling of the abdomen/edema, thinning hair, and stunted growth) due to a diet consisting almost exclusively of pure cassava root. Why does this specific diet lead to the child's physical symptoms?

1. Starch contains too much nitrogen, which causes toxicity in the liver and blocks the absorption of water.
2. The lack of dietary lipids prevents the stomach from producing gastric acid, leading to food accumulation in the abdomen.
3. A critical deficiency in essential amino acids impairs the body’s ability to build plasma proteins, swelling and halting cellular growth.
4. Starch molecules destroy Vitamin C in the bloodstream, leading to weak blood vessels and internal bleeding in the stomach.
5. The child's body is converting excess carbohydrates into muscle tissue at a dangerously fast rate, causing the body to warp.

38. A student observes a beautiful rainbow after a rain shower. They learn that a rainbow is formed when sunlight interacts with tiny water droplets in the air. The process involves sunlight entering a raindrop, bending as it enters, bouncing off the back of the droplet, and then bending again as it exits. What are the key light phenomena that must occur in this sequence to form a rainbow?

1. Dispersion, refraction, and internal reflection
2. Refraction and reflection
3. Reflection and absorption
4. Total internal reflection and absorption
5. Refraction and diffusion

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39. A student covers the top half of a convex lens with a piece of opaque black paper. How will this change the image of a distant tree formed on a screen?

1. The image disappears completely from the screen
2. Only the bottom half of the tree is visible
3. The entire tree is visible but is inverted
4. Only the top half of the tree is visible
5. The entire tree is visible but appears dimmer

40. If the Earth's atmosphere were significantly thicker and composed of much larger dust particles rather than small gas molecules, how would the appearance of the daytime sky likely change?

1. The sky would appear bright green
2. The sky would appear mostly white or grey
3. The sky would appear a deeper, darker blue
4. The sky would appear completely black
5. The sky would appear violet throughout the day

---------- End of Questions ----------

Please check your answers before submitting the answer sheet.

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Answers Keys : Science Primary - Grade 5 - 6

No.	Answers	No.	Answers
1.	4	21.	3
2.	2	22.	3
3.	1	23.	3
4.	3	24.	2
5.	1	25.	2
6.	1	26.	4
7.	3	27.	3
8.	2	28.	2
9.	2	29.	1
10.	2	30.	2
11.	3	31.	2
12.	2	32.	3
13.	4	33.	5
14.	4	34.	5
15.	2	35.	2
16.	2	36.	2
17.	3	37.	3
18.	2	38.	1
19.	2	39.	5
20.	1	40.	2

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