



XPertSTEM

THE XPertSTEM COMPETITION

Theory Exams - Student Question Booklet

◆ MATHEMATICS ◆ NATURAL SCIENCE ◆ PHYSICS ◆ CHEMISTRY ◆ BIOLOGY ◆

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The XPertSTEM Competition Scientific Committee

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PREFACE

Dear Educators, Students, and Academicians,

This book has been prepared to consolidate theoretical concepts in mathematics and natural sciences across a wide spectrum, from 3rd grade up to 12th grade. The questions contained within are specifically designed to measure students' analytical thinking and problem-solving skills.

This "Two-Tier" exam format holds great significance as it measures not only students' lower-order knowledge based on rote memorization (recall), but also their conceptual understanding and higher-order cognitive skills (analysis, evaluation). In this question format, the first stage requires the candidate to select the direct and factual knowledge related to a topic; while the second stage expects them to present the scientific justification or logical explanation behind their choice. In this way, the competition minimizes chance factors or superficial memorization, clearly identifies participants' misconceptions, and successfully distinguishes those with genuine reasoning ability and in-depth knowledge from others.

We wish you the best of success.

The XPERTSTEM Competition Scientific Committee

1. MATHEMATICS

1.1 THEORY CHALLENGE MATHEMATICS

DIVISION: 1

Question 1: Sarah has 24 apples. She wants to put them into baskets so that each basket has the same number of apples and there are no apples left over. Which of the following numbers of baskets is NOT possible?

- A) 5 baskets
- B) 3 baskets
- C) 4 baskets
- D) 6 baskets

STAGE 2 - YOUR REASONING:

Explain how you determined whether each number divides 24 evenly. Use the concept of factors and remainders in your explanation.

Question 2: A rectangle has a length of 8 cm and a width of 3 cm. What is its perimeter?

- A) 24 cm
- B) 22 cm
- C) 16 cm
- D) 11 cm

STAGE 2 - YOUR REASONING:

State the geometric property or mathematical rule you used to find the total distance around the rectangle. Show each step of your calculation and clearly explain the logic behind your mathematical operations.

Question 3: Which fraction is equivalent to $\frac{2}{3}$?

- A) $\frac{4}{9}$
- B) $\frac{6}{9}$
- C) $\frac{4}{8}$
- D) $\frac{3}{6}$

STAGE 2 - YOUR REASONING:

Explain what it means for two fractions to be equivalent. Show how you can multiply or divide the numerator and denominator to check your answer.

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Question 4: A clock shows exactly 6:00. What type of angle do the hour hand and minute hand form?

- A) Acute angle
- B) Right angle
- C) Obtuse angle
- D) Straight angle

STAGE 2 - YOUR REASONING:

Describe the positions of the hour and minute hands at 6:00. Calculate the angle between them and explain why it falls into the category you chose.

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1.2 THEORY CHALLENGE MATHEMATICS

DIVISION: 2

Question 1: What is 25% of 200?

- A) 75
- B) 25
- C) 40
- D) 50

STAGE 2 - YOUR REASONING:

Explain two different methods to calculate a percentage of a number. Show your work and justify which method is more efficient.

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Question 2: The ratio of boys to girls in a class is 3:4. If there are 28 students in total, how many boys are there?

- A) 16
- B) 12
- C) 14
- D) 10

STAGE 2 - YOUR REASONING:

Set up a proportion using the given ratio. Explain how you solved for the unknown number of boys and why your answer makes sense in the context of the problem.

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Question 3: What is the least common multiple (LCM) of 6 and 8?

- A) 24
- B) 48
- C) 12
- D) 36

STAGE 2 - YOUR REASONING:

List the multiples of 6 and 8. Identify the smallest common multiple and explain why the larger common multiples are not the LCM.

Question 4: A triangle has angles measuring 50° and 60° . What is the measure of the third angle?

- A) 80°
- B) 110°
- C) 70°
- D) 90°

STAGE 2 - YOUR REASONING:

Identify the fundamental geometric theorem that relates the interior angles of any triangle. Show your mathematical steps and justify why no other angle measure could possibly be correct for the third angle.

1.3 THEORY CHALLENGE MATHEMATICS

DIVISION: 3

Question 1: Simplify: $\sqrt{72}$

- A) $6\sqrt{2}$
- B) $2\sqrt{18}$
- C) $8\sqrt{3}$
- D) $4\sqrt{3}$

STAGE 2 - YOUR REASONING:

Explain the mathematical process of simplifying a radical expression. Demonstrate your step-by-step breakdown of the number 72 and justify why your final answer represents its most simplified form.

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Question 2: Solve for x: $3x - 7 = 14$

- A) $x = 5$
- B) $x = 4$
- C) $x = 7$
- D) $x = 8$

STAGE 2 - YOUR REASONING:

Describe each step you take to isolate x. Explain why you perform each operation (addition, subtraction, multiplication, division) and how it keeps the equation balanced.

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Question 3: Two triangles are similar. The sides of the first triangle are 3 cm, 4 cm, and 5 cm. If the shortest side of the second triangle is 6 cm, what is its longest side?

- A) 8 cm
- B) 9 cm
- C) 12 cm
- D) 10 cm

STAGE 2 - YOUR REASONING:

Define what it means for two triangles to be similar. Set up a proportion using corresponding sides and solve for the unknown side.

Question 4: What is the probability of rolling a sum of 7 with two standard six – sided dice?

- A) $1/12$
- B) $1/6$
- C) $5/36$
- D) $1/36$

STAGE 2 - YOUR REASONING:

List all possible outcomes when rolling two dice. Count the number of outcomes that result in a sum of 7. Explain how probability is calculated as a fraction of favorable outcomes over total outcomes.

1.4 THEORY CHALLENGE MATHEMATICS

DIVISION: 4

Question 1: Solve the quadratic equation: $x^2 - 5x + 6 = 0$

- A) $x = 2, 3$
- B) $x = -2, -3$
- C) $x = 1, 6$
- D) $x = -1, -6$

STAGE 2 - YOUR REASONING:

Factor the quadratic expression. Explain how you find two numbers that multiply to 6 and add to -5 . Verify your solutions by substituting them back into the original equation.

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Question 2: What is the value of $\sin 30^\circ$?

- A) $\sqrt{3} / 2$
- B) $1/2$
- C) $\sqrt{2} / 2$
- D) 1

STAGE 2 - YOUR REASONING:

Use the unit circle or a $30 - 60 - 90$ triangle to derive the exact value of $\sin 30^\circ$. Explain why this value is independent of the size of the triangle.

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Question 3: Find the slope of the line passing through the points (2, 3) and (6, 11).

- A) 4
- B) $1/2$
- C) 2
- D) -2

STAGE 2 - YOUR REASONING:

Write the formula for the slope of a line. Substitute the coordinates into the formula and simplify. Explain the meaning of the slope in terms of rate of change.

Question 4: What is the distance between the points (1, 2) and (4, 6)?

- A) 4
- B) $\sqrt{13}$
- C) $\sqrt{29}$
- D) 5

STAGE 2 - YOUR REASONING:

Write the distance formula. Substitute the coordinates, simplify the expression, and explain each step of the simplification process.

1.5 THEORY CHALLENGE MATHEMATICS

DIVISION: 5

Question 1: Find the derivative of $f(x) = 3x^4 - 2x^3 + x - 7$.

- A) $12x^3 - 6x^2 + 1$
- B) $12x^3 - 6x^2$
- C) $3x^4 - 2x^3 + x - 7$
- D) $12x^3 - 6x^2 + 1 - 7$

STAGE 2 - YOUR REASONING:

Apply the power rule to each term individually. Explain why the derivative of a constant is zero and why the derivative of x is 1. Show the differentiation of each term step by step.

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Question 2: Evaluate the following integral: $\int (4x^3 - 2x + 1) dx$

- A) $4x^4 - x^2 + x + C$
- B) $x^4 - x^2 + x + C$
- C) $x^4 - x^2 + 1 + C$
- D) $4x^4 - 2x^2 + x + C$

STAGE 2 - YOUR REASONING:

Apply the power rule for integration to each term. Explain the role of the constant of integration C and why it must be included in the final answer.

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Question 3: What is the limit: $\lim_{x \rightarrow 2} (x^2 + 3x - 4)$?

- A) 4
- B) 10
- C) 6
- D) 8

STAGE 2 - YOUR REASONING:

Analyze the mathematical properties of the given function type at the specified point. Explain the theoretical basis for the method you chose to evaluate this limit and present your full algebraic calculations.

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Question 4: Find the value of i^{2026} , where $i = \sqrt{-1}$.

- A) 1
- B) i
- C) $-i$
- D) -1

STAGE 2 - YOUR REASONING:

Explain the cyclic pattern of powers of i . Divide 2026 by 4 and use the remainder to determine the value. Show why this method works.

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2. NATURAL SCIENCE

2.1 THEORY CHALLENGE NATURAL SCIENCE

DIVISION: 1

Question 1: Which of the following is a liquid at room temperature?

- A) Water
- B) Ice
- C) Steam
- D) Iron

STAGE 2 - YOUR REASONING:

Describe the three states of matter. Explain what "room temperature" means and why water fits this state while the others do not.

Question 2: What happens to a magnet when it is cut into two pieces?

- A) The magnetism is destroyed.
- B) Each piece becomes a separate magnet with a north and south pole.
- C) Both pieces become non – magnetic.
- D) Only the original north pole piece remains magnetic.

STAGE 2 - YOUR REASONING:

Explain that every magnet has north and south poles. Describe what happens to the domains inside the magnet when it is cut.

Question 3: Which of these animals is a herbivore?

- A) Lion
- B) Eagle

C) Cow

D) Frog

STAGE 2 - YOUR REASONING:

Define the terms herbivore, carnivore, and omnivore. Explain why each animal belongs to its category based on what it eats.

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Question 4: What is the main source of energy for plants to make their own food?

A) Soil

B) Water

C) Air

D) Sunlight

STAGE 2 - YOUR REASONING:

Describe the process of photosynthesis in simple terms. Explain why plants need sunlight, water, and carbon dioxide to produce food.

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2.2 THEORY CHALLENGE NATURAL SCIENCE

DIVISION: 2

Question 1: Which organelle is known as the "powerhouse" of the cell?

- A) Mitochondria
- B) Nucleus
- C) Ribosome
- D) Vacuole

STAGE 2 - YOUR REASONING:

Describe the function of mitochondria in a cell. Explain why it is called the "powerhouse" and how it helps the cell perform its activities.

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Question 2: In a food chain, which organism is the primary consumer?

- A) Grass
- B) Rabbit
- C) Fox
- D) Sun

STAGE 2 - YOUR REASONING:

Describe the trophic levels in a food chain. Explain the terms producer, primary consumer, secondary consumer, and decomposer with examples.

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Question 3: What happens to the density of a substance when it changes from a liquid to a solid (like water freezing)?

- A) Density always increases.
- B) Density always decreases.
- C) Density usually increases, but water's density decreases.
- D) Density remains the same.

STAGE 2 - YOUR REASONING:

Explain the general rule about density changes during phase transitions. Describe the unique behavior of water and why ice floats.

Question 4: Which of the following is a simple machine?

- A) Bicycle
- B) Car engine
- C) Computer
- D) Lever

STAGE 2 - YOUR REASONING:

Define what a simple machine is and list examples. Explain why a lever is a simple machine while the others are more complex systems.

2.3 THEORY CHALLENGE NATURAL SCIENCE

DIVISION: 3

Question 1: What type of cell division produces gametes (sperm and egg cells)?

- A) Meiosis
- B) Mitosis
- C) Binary fission
- D) Budding

STAGE 2 - YOUR REASONING:

Compare mitosis and meiosis. Explain why meiosis is necessary for sexual reproduction and how it results in genetic diversity.

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Question 2: Newton's second law of motion is summarized by which equation?

- A) $F = m/a$
- B) $F = ma$
- C) $F = mg$
- D) $F = mv$

STAGE 2 - YOUR REASONING:

Define Newton's second law in words. Explain what each symbol in the equation represents and how force, mass, and acceleration are related.

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Question 3: Which of the following is an example of a chemical change?

- A) Melting of ice cream
- B) Boiling water
- C) Rusting of iron
- D) Dissolving sugar in water

STAGE 2 - YOUR REASONING:

Distinguish between physical and chemical changes. Explain why rusting is a chemical change while the other options are physical changes.

Question 4: What is the pH value of pure water at 25°C?

- A) 0
- B) 14
- C) 1
- D) 7

STAGE 2 - YOUR REASONING:

Explain the pH scale and what it measures. Describe why pure water is considered neutral and what happens to its pH if acids or bases are added.

3. BIOLOGY

3.1 THEORY CHALLENGE BIOLOGY

DIVISION: 4

Question 1: Which organelle is responsible for cellular respiration?

- A) Mitochondria
- B) Chloroplast
- C) Ribosome
- D) Nucleus

STAGE 2 - YOUR REASONING:

Define cellular respiration. Explain the role of mitochondria in converting glucose into ATP and why this process is essential for life.

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Question 2: In Mendel's pea plant experiments, what is the genotype of a heterozygous tall plant (T = tall, t = short)?

- A) TT
- B) Tt
- C) tt
- D) T

STAGE 2 - YOUR REASONING:

Define genotype and phenotype. Explain the difference between homozygous dominant, homozygous recessive, and heterozygous. Use Mendel's laws to explain why a heterozygote shows the dominant trait.

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Question 3: What is the function of the xylem in plants?

- A) Transport of sugars
- B) Release of oxygen
- C) Transport of water and minerals
- D) Absorption of carbon dioxide

STAGE 2 - YOUR REASONING:

Compare xylem and phloem. Explain the structure of xylem (vessels and tracheids) and how it facilitates the upward movement of water and minerals.

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Question 4: Which of the following is an example of an animal adaptation for survival in cold environments?

- A) Large ears
- B) Thin skin
- C) Bright coloration
- D) Thick fur and blubber

STAGE 2 - YOUR REASONING:

Define adaptation and explain how natural selection leads to the development of adaptations. Discuss how thick fur and blubber help animals survive in polar regions.

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3.2 THEORY CHALLENGE BIOLOGY

DIVISION: 5

Question 1: What is the role of tRNA in protein synthesis?

- A) Transports amino acids to the ribosome
- B) Carries the genetic code from DNA
- C) Forms the ribosome structure
- D) Copies DNA during replication

STAGE 2 - YOUR REASONING:

Describe the steps of translation. Explain how tRNA molecules recognize codons on mRNA and deliver the correct amino acids to build a polypeptide chain.

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Question 2: The Hardy – Weinberg principle assumes which of the following conditions?

- A) High mutation rate, strong selection, small population size
- B) No mutation, no selection, large population size, random mating, no migration
- C) Non – random mating, frequent migration, small population
- D) Presence of natural selection, mutation, and genetic drift

STAGE 2 - YOUR REASONING:

List all five conditions required for Hardy – Weinberg equilibrium. Explain why this is a null hypothesis and what happens when these conditions are violated.

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Question 3: What type of ecosystem is characterized by low rainfall, extreme temperatures, and succulent plants?

- A) Tropical rainforest
- B) Savanna
- C) Desert
- D) Taiga

STAGE 2 - YOUR REASONING:

Describe the abiotic factors (temperature, precipitation) that define a desert ecosystem. Explain how succulent plants like cacti have adapted to conserve water.

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Question 4: Which hormone is responsible for the regulation of blood glucose levels by increasing blood sugar?

- A) Insulin
- B) Estrogen
- C) Thyroxine
- D) Glucagon

STAGE 2 - YOUR REASONING:

Explain the roles of insulin and glucagon in maintaining homeostasis. Describe the negative feedback loop that controls blood glucose levels.

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4. CHEMISTRY

4.1 THEORY CHALLENGE CHEMISTRY

DIVISION: 4

Question 1: What type of bond is formed when electrons are shared between atoms?

- A) Covalent bond
- B) Ionic bond
- C) Metallic bond
- D) Hydrogen bond

STAGE 2 - YOUR REASONING:

Compare covalent and ionic bonding. Explain how electron sharing differs from electron transfer and give an example of a molecule formed by covalent bonds.

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Question 2: In the reaction $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, how many moles of water are produced from 2 moles of H_2 ?

- A) 1 mole
- B) 2 moles
- C) 3 moles
- D) 4 moles

STAGE 2 - YOUR REASONING:

Explain the concept of stoichiometry and the mole ratio. Show how the coefficients in the balanced equation are used to determine the amount of product formed.

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Question 3: What is the pH of a solution with a hydrogen ion concentration of $1 \times 10^{-5} \text{ M}$?

- A) 7

- B) 9
- C) 5
- D) -5

STAGE 2 - YOUR REASONING:

Write the formula for pH. Show the calculation step by step and explain what the pH value indicates about the acidity or basicity of the solution.

Question 4: Which gas is most abundant in the Earth's atmosphere?

- A) Oxygen
- B) Carbon dioxide
- C) Argon
- D) Nitrogen

STAGE 2 - YOUR REASONING:

List the major components of the atmosphere. Explain why nitrogen is the most abundant gas and discuss the role of each gas in supporting life and processes on Earth.

4.2 THEORY CHALLENGE CHEMISTRY

DIVISION: 5

Question 1: What is the activation energy of a reaction?

- A) The minimum energy required to initiate a reaction
- B) The energy released during the reaction
- C) The energy stored in chemical bonds
- D) The total energy of the reactants

STAGE 2 - YOUR REASONING:

Explain the concept of activation energy in terms of collision theory and the transition state. Describe how catalysts affect the activation energy and the rate of reaction.

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Question 2: Which of the following functional groups is present in a carboxylic acid?

- A) -OH (alcohol)
- B) -COOH (carboxyl)
- C) -NH_2 (amine)
- D) -CHO (aldehyde)

STAGE 2 - YOUR REASONING:

Identify the structural formula of a carboxylic acid. Explain the acidity of carboxylic acids compared to other functional groups and describe the properties associated with this group.

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Question 3: The Nernst equation is used to calculate which of the following?

- A) The equilibrium constant
- B) The reaction rate
- C) The cell potential under non – standard conditions
- D) The activation energy

STAGE 2 - YOUR REASONING:

Write the Nernst equation. Explain each term in the equation and describe how it is used to determine the potential of an electrochemical cell when concentrations differ from standard conditions.

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Question 4: What condition must be true for a reaction to be spontaneous at all temperatures?

- A) $\Delta H > 0$ and $\Delta S < 0$
- B) $\Delta H < 0$ and $\Delta S < 0$
- C) $\Delta H > 0$ and $\Delta S > 0$
- D) $\Delta H < 0$ and $\Delta S > 0$

STAGE 2 - YOUR REASONING:

State the Gibbs – Helmholtz equation: $\Delta G = \Delta H - T\Delta S$.

Explain how the signs of ΔH and ΔS determine spontaneity at different temperatures.

Discuss why the given combination leads to spontaneity under all conditions.

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5. PHYSICS

5.1 THEORY CHALLENGE PHYSICS

DIVISION: 4

Question 1: What is the acceleration of an object with a mass of 5 kg when a net force of 20 N is applied?

- A) 4 m/s^2
- B) 0.25 m/s^2
- C) 100 m/s^2
- D) 25 m/s^2

STAGE 2 - YOUR REASONING:

State the specific physical law that defines the relationship between an object's mass, the net force acting on it, and its resulting motion. Show your complete algebraic solution, including all appropriate scientific units.

Question 2: What is the kinetic energy of a 2 kg object moving at a velocity of 3 m/s?

- A) 6 J
- B) 9 J
- C) 18 J
- D) 3 J

STAGE 2 - YOUR REASONING:

Write down the fundamental physical equation used to quantify the energy an object possesses due to its motion. Substitute the given parameters, detail each step of your calculation, and explain how changing an object's speed dynamically influences this specific type of energy.

Question 3:

A resistor of $10\ \Omega$ is connected to a battery of 12 V. What is the current flowing through the circuit?

- A) 0.8 A
- B) 2.0 A
- C) 1.2 A
- D) 0.5 A

STAGE 2 - YOUR REASONING:

State Ohm's law: $V = I \times R$. Rearrange the formula to solve for current I . Show your calculation and explain the relationship between voltage, current, and resistance.

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Question 4: What type of wave is a sound wave?

- A) Transverse wave
- B) Electromagnetic wave
- C) Standing wave
- D) Longitudinal wave

STAGE 2 - YOUR REASONING:

Distinguish between transverse and longitudinal waves. Explain why sound requires a medium to travel and how the particles in the medium oscillate in the direction of wave propagation.

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5.2 THEORY CHALLENGE PHYSICS

DIVISION: 5

Question 1: A wheel has a moment of inertia of $2 \text{ kg} \cdot \text{m}^2$.

If a torque of $6 \text{ N} \cdot \text{m}$ is applied, what is its angular acceleration?

- A) 3 rad/s^2
- B) 12 rad/s^2
- C) 0.33 rad/s^2
- D) 4 rad/s^2

STAGE 2 - YOUR REASONING:

State the rotational equivalent of Newton's second law: $\tau = I \times \alpha$. Rearrange the formula to solve for angular acceleration α . Show your calculation and explain the analogy between linear and rotational motion.

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Question 2: The efficiency of a Carnot engine operating between temperatures T_h and T_c is given by:

- A) T_h/T_c
- B) $1 - T_c/T_h$
- C) $1 - T_h/T_c$
- D) T_c/T_h

STAGE 2 - YOUR REASONING:

Derive the Carnot efficiency equation. Explain why the efficiency depends only on the temperatures of the hot and cold reservoirs and why no real engine can exceed this efficiency.

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Question 3: A spaceship is moving at $0.8c$ relative to Earth. According to an observer on Earth, the spaceship's length appears to be:

- A) Longer than its proper length
- B) The same as its proper length

- C) Shorter than its proper length
- D) Infinite

STAGE 2 - YOUR REASONING:

State the length contraction formula: $L = L_0 \sqrt{1 - v^2/c^2}$.

Explain what "proper length" means and why the observed length is always less than the proper length for an object in relative motion.

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Question 4: What is the energy of a photon with a frequency of 5×10^{14} Hz? (Use $h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s}$)

- A) $6.63 \times 10^{-19} \text{ J}$
- B) $1.326 \times 10^{-19} \text{ J}$
- C) $3.315 \times 10^{-34} \text{ J}$
- D) $3.315 \times 10^{-19} \text{ J}$

STAGE 2 - YOUR REASONING:

State the Planck – Einstein relation: $E = hf$. Substitute the given values and show the multiplication. Explain how this equation connects quantum physics with wave properties of light and why energy is quantized

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ENGLISH

GRADE 3-4 SET (9-10 years)

Question 1: *"Matilda was only three years old, but she had already taught herself to read... Her father did not like this. He said, 'Girls should watch television, not read books!' But Matilda did not listen..."*

What does this passage tell us about Matilda?

- A) She was afraid of her father.
- B) She was smart, independent, and loved reading.
- C) She only watched television.
- D) She did not like the library.

STAGE 2: Name two things Matilda does that show she is independent. Why do you think her father does not like her reading? What would you say to Matilda's father to convince him that reading is good for children?

Question 2: *"Harry lived in a small, dark cupboard under the stairs. It was dusty and full of spiders... He never complained because he thought all children lived this way."*

How does Harry feel about his living space?

- A) He loves it and thinks it is beautiful.
- B) He does not know any different, so he accepts it.
- C) He is angry and shouts every day.
- D) He runs away from home.

STAGE 2: List three things you see in Harry's cupboard. How would you feel if you had to sleep in a place like this? What does the phrase "he never complained" tell you about Harry's personality?

Question 3: *"Matilda's parents did not care about her... She became very smart because she practiced reading all the time."*

Why did Matilda become so smart?

- A) Her parents taught her everything.
- B) She watched a lot of television.
- C) She taught herself by reading books every day.
- D) She went to a special school.

STAGE 2: What do Matilda's parents do instead of caring for her? What does Matilda do instead of watching television? Explain how Matilda's actions made her smart. What could her parents have done differently to help her?

Question 4: Vocabulary

"Harry was amazed when Hagrid told him he was a wizard... Harry felt relieved. Finally, someone believed him."

What does the word "relieved" mean in this passage?

- A) Angry and upset
- B) Happy because a worry went away
- C) Scared and nervous
- D) Bored and tired

STAGE 2: How did Harry feel before Hagrid told him the truth? How did he feel after? Why did his feelings change? Describe a time when you felt relieved after learning something important.

Question 5: Main Idea

"The tall, angry headmistress shouted at the small, frightened children."

Which of the following is true about the headmistress?

- A) She is kind to the children.
- B) She is a tall, angry person.
- C) She likes to read books with students.
- D) She is small and quiet.

STAGE 2: List the words that describe the headmistress. How do these words make the reader feel about her? If you were one of the children, what would you do when the headmistress walks into the room?

GRADE 5-6 SET (11-12 years)

Question 6: *"The Trunchbull hated children. She believed they were small, disgusting creatures... When she walked into a classroom, every child sat perfectly still, too afraid to even breathe."*

How do the students feel about the Trunchbull?

- A) They love her and think she is kind.
- B) They are terrified of her.
- C) They ignore her completely.
- D) They think she is funny.

STAGE 2: What three things does the Trunchbull do that make children afraid? Why would a teacher who never praises students be bad for their learning? Describe a teacher you would want to have and explain why.

Question 7: *"Harry mounted his broomstick... Harry felt a rush of happiness. For the first time in his life, he felt like he was good at something. He felt like he belonged at Hogwarts."*

Why is Harry so happy when he flies the broomstick?

- A) Because he wants to win a trophy.

- B) Because he feels free and like he finally belongs.
- C) Because he wants to impress his friends.
- D) Because he is showing off.

STAGE 2: Why does Harry feel like he "finally belongs" at Hogwarts? How is Hogwarts different from the Dursleys' house? Explain how feeling like you belong can change a person's confidence.

Question 8: *"Some parents show the world how much they love their children. They buy them gifts and post photos online. But at home, they ignore them. Roald Dahl writes about parents like this to show that not everything is what it seems."*

Why did Roald Dahl write about parents like Matilda's?

- A) To show parents how to buy better gifts.
- B) To show children that not all adults are good and to think critically.
- C) To make parents feel guilty.
- D) To describe a perfect family.

STAGE 2: What is the difference between how Matilda's parents act in public and how they act at home? Why is it important for children to know that some adults are not honest? What should a child do if they feel ignored by their parents?

Question 9: *"Dumbledore said, 'It takes courage to stand up to enemies, but it takes even more courage to stand up to friends.' Harry nodded."*

What is Dumbledore saying about courage?

- A) Friends are always right.
- B) Standing up to friends is sometimes harder than fighting enemies.
- C) Enemies are easier to deal with than friends.
- D) You should never correct your friends.

STAGE 2: Why is it hard to tell a friend they are wrong? Describe a situation where

someone might need to stand up to a friend. Why is this type of courage important in friendships?

Question 10: *"Matilda read her books every night because they made her happy."*

What does this sentence suggest about Matilda?

- A) She is forced to read by her parents.
- B) Reading is a personal choice that brings her joy.
- C) She only reads because she has nothing else to do.
- D) She doesn't really enjoy books.

STAGE 2: What does "joy" mean in your own words? Why might books make someone happy? If you had to describe Matilda in one word, what would it be and why?

GRADE 7-8 SET (13-14 years)

Question 11: *"The Mirror of Erised showed Harry his parents. They were alive, waving... His heart felt like it had been crushed into dust."*

What literary device is used in "his heart felt like it had been crushed into dust"?

- A) Simile
- B) Metaphor
- C) Hyperbole
- D) Personification

STAGE 2: Explain the difference between a simile and a metaphor. Why does the author use a simile here instead of simply saying "Harry was sad"? How does this comparison help the reader understand Harry's emotions more deeply?

Question 12: *"Miss Honey told Matilda, 'You have a brilliant mind. But you also have courage. People will try to make you feel small... Do not believe them. Your mind is your power...'"*

What is the main message (theme) of this passage?

- A) Wealth is the most important thing.
- B) Intelligence and courage help you overcome difficulties.
- C) Adults are always correct.
- D) Reading is a waste of time.

STAGE 2: What does Miss Honey mean when she says "your mind is your power"? How can intelligence and courage help someone in real life? Give two examples of situations where a young person might need both intelligence and courage.

Question 13: *"Harry looked at the Sorting Hat... Harry glanced at Malfoy, whose face was twisted with anger. Harry smiled. He felt proud and relieved."*

Whose perspective is this passage written from?

- A) Malfoy's perspective
- B) Harry's perspective
- C) The Sorting Hat's perspective
- D) An all-knowing narrator who knows everyone's thoughts

STAGE 2: How do you know this is from Harry's perspective? What clue shows that the narrator does not know what Malfoy is thinking? Rewrite one sentence from Malfoy's perspective and explain how it changes the scene.

Question 14: *"At first, Matilda was scared... But after watching her bully innocent children, Matilda's fear turned into anger... She decided to use her intelligence to fight back."*

How has Matilda changed in this passage?

- A) She became more afraid.

- B) She decided to run away.
- C) She went from being scared to being determined to fight back.
- D) She decided to become friends with the Trunchbull.

STAGE 2: Describe the three stages of Matilda's emotional change. What causes each stage? Why is fighting with intelligence sometimes better than fighting with physical strength?

Question 15: *"The invitation was sent to Harry by a giant owl."*

What kind of conflict does the arrival of the invitation represent?

- A) Internal conflict (Harry vs. himself)
- B) External conflict (The wizarding world intruding on Harry's normal life)
- C) No conflict exists here.
- D) A conflict between the owl and the postman.

STAGE 2: Explain why this event changes Harry's world. Is this a positive or negative conflict for Harry? Justify your answer.

GRADE 9-10 SET (15-16 years)

Question 16: Symbolism

"The Sorting Hat was old and patched... But inside, it held immense magic. It could see into a student's heart and mind. It did not care about family names or money."

What does the Sorting Hat symbolize in this passage?

- A) The importance of wealth and status
- B) Fairness and judging people by their character, not appearance
- C) The value of old objects
- D) The dangers of magic

STAGE 2: How does the Hat's physical appearance contrast with its inner power? What

message is the author sending about judging people? Apply this idea to real life – why is it harmful to judge people by their appearance?

Question 17: *"Mr. Wormwood beamed with pride when Michael announced he had failed his exams... Meanwhile, Matilda sat quietly reading, having just won a mathematics competition. Her father didn't even glance at her."*

What type of irony is present in this scene?

- A) Verbal irony
- B) Situational irony
- C) Dramatic irony
- D) No irony

STAGE 2: Explain the irony in Mr. Wormwood's reaction to his two children. What social message is Roald Dahl communicating about society's values? How is this message still relevant today?

Question 18: *"The third-floor corridor was strictly forbidden... But as Harry passed, he heard scratching from behind the door. Something large. Something alive. Something waiting."*

What does this passage most likely foreshadow?

- A) Harry will ignore the warning and discover a dangerous secret.
- B) The corridor will become a student lounge.
- C) Dumbledore is joking.
- D) Nothing important will happen.

STAGE 2: Identify three specific clues in this passage that create suspense. Why does the author include Dumbledore's warning despite knowing it will make Harry curious? Predict what is behind the door and justify your prediction.

Question 19: *"The Trunchbull was not just strict – she was a monster. Her hands were slabs of meat. Her voice was a drill. Her eyes burned with hatred. She was not a teacher; she was a tyrant."*

What technique is the author using most prominently in this passage?

- A) Simple factual descriptions
- B) Multiple metaphors to create a terrifying image
- C) Dialogue
- D) A calm, neutral tone

STAGE 2: Identify three metaphors in this passage. For each, explain what is being compared and what effect the comparison creates. How does the author's word choice shape the reader's emotional response? Create one original metaphor to describe a kind teacher.

Question 20: *"If Harry were to face Voldemort alone, he would need immense courage."*

What does this hypothetical statement reveal about Harry's journey?

- A) Harry has already defeated Voldemort.
- B) Harry is constantly worried about Voldemort.
- C) Harry is preparing for a future, dangerous challenge.
- D) Harry does not want to fight.

STAGE 2: Why is it important for the author to show Harry thinking about future challenges? How does this type of preparation show character development? Explain the difference between being "brave" and being "prepared."