



S-CAT GRAND FINALE

Sample Paper

(Based on the new exam pattern)



TOTAL MARKS
100



QUESTIONS
50



DURATION
60 mins

Instructions for Student:

- Read the question carefully before answering.
- Each question has 4 options (A, B, C & D).
- Choose one correct option as your answer from the 4 options.
- **New Exam Pattern:**
 1. Each question will carry 1, 2, or 4 marks, depending on its difficulty level.
 2. **Negative Marking:** Additional marks will be deducted for every incorrect answer (0.25 marks for a 1-mark question, 0.5 marks for a 2-mark question, and 1 mark for a 4-mark question).
 3. The Assessment Round score will be included in the Grand Finale score using a weighted average method. 30% of the Assessment Round and 70% of the Grand Finale score.
 4. New Method to Calculate Marks for Grand Finale Awards.

	Assessment Round	Grand Finale
Actual Marks	60	80
Weightage	30%	70%
Marks After Weighted Average Rule	$60 \times 30/100 = 18$	$80 \times 70/100 = 56$
Final Marks for Grand Finale Awards	$18 + 56 = 74$	

- On the answer sheet blacken the correct option against the corresponding question number.
- **Use pencil to mark your answer.**
- If you wish to change your answer, erase the previous mark completely.

All The Best !

SECTION 1: Concept Check

- 1. What is the main purpose of adding manure or fertilizers to soil? (1m)**
 - a. To kill weeds
 - b. To improve soil fertility
 - c. To control pests
 - d. To increase soil water retention
- 2. In flowering plants, what role do the pollen grains play in reproduction? (1m)**
 - a. They carry the female gamete.
 - b. They nourish the seed.
 - c. They contain the male gamete.
 - d. They protect the flower from insects.
- 3. Which structure is directly involved in the nourishment and development of the embryo in humans? (1m)**
 - a. Ovary
 - b. Uterus
 - c. Fallopian tube
 - d. Sperm duct
- 4. Which of the following glands is both an exocrine as well as an endocrine gland? (1m)**
 - a. Pancreas
 - b. Adrenal
 - c. Thyroid
 - d. Pituitary
- 5. Which type of reaction occurs when an acid reacts with a base to form salt and water? (1m)**
 - a. Neutralization
 - b. Precipitation
 - c. Decomposition
 - d. Combustion
- 6. In an atom, where are the neutrons located? (1m)**
 - a. In the nucleus
 - b. In the electron cloud
 - c. Orbiting the nucleus
 - d. Between the protons and the electrons
- 7. Who proposed the planetary model of the atom? (1m)**
 - a. John Dalton
 - b. J.J. Thomson
 - c. Ernest Rutherford
 - d. Niels Bohr
- 8. What makes biogas an environment-friendly fuel? (1m)**
 - a. It emits a large amount of smoke.
 - b. It produces only methane gas.
 - c. It is made from organic waste and reduces pollution.
 - d. It burns at very low temperatures.
- 9. What is the SI unit of force? (1m)**
 - a. Newton (N)
 - b. Joule (J)
 - c. Pascal (Pa)
 - d. Meter (m)
- 10. Which physical quantity is measured in Joules (J)? (1m)**
 - a. Force
 - b. Energy
 - c. Power
 - d. Length

SECTION 2: Skill Application

- 11. A student plants seeds of similar quality in two pots, Pot A and Pot B. In Pot A, they add compost to the soil, while in Pot B, they do not. After two weeks, they observe that plants in Pot A have grown taller than those in Pot B. What can the student infer from this experiment? (2m)**
 - a. Compost inhibits plant growth.
 - b. Compost helps in increasing plant growth.
 - c. Pot A received less sunlight.
 - d. Pot B had better quality seeds.

12. In which condition would you expect a higher rate of transpiration? (2m)

- a. During night time with low temperatures
- b. In a closed, dark room with high humidity
- c. In bright sunlight with high temperature and low humidity
- d. During winter with low humidity

13. A scientist examines a colony of amoebas and notes that each amoeba splits into two identical amoebas. What is the method of reproduction called? (2m)

- a. Budding
- b. Spore formation
- c. Binary fission
- d. Fragmentation

14. A researcher notices that a teenager has low levels of thyroxine. What condition could this indicate? (2m)

- a. Hyperactivity
- b. Obesity
- c. Goiter
- d. Gigantism

15. Which of the following best explains why gases can be easily compressed while solids cannot? (2m)

- a. Gases have stronger molecular bonds.
- b. Gas particles have large spaces between them.
- c. Gas particles are tightly packed.
- d. Solids are less dense than gases.

16. The table below shows the boiling points of different substances: (2m)

Substance	Boiling Point (°C)
Water	100
Oil	300
Mercury	357
Acetone	56

Based on the data, which substance will evaporate fastest at room temperature (25°C)?

- a. Water
- b. Oil
- c. Mercury
- d. Acetone

17. Given that the atomic number of an element is 9 and the mass number is 19, calculate the number of neutrons in the element. (2m)

- a. 9
- b. 19
- c. 10
- d. 28

18. Why is water ineffective for extinguishing oil-based fires? (2m)

- a. It cools the fire.
- b. It evaporates too quickly.
- c. Oil floats on water and keeps burning.
- d. Water itself catches fire.

19. Which of the following statements explains why aluminium is often used in the aircraft manufacturing? (2m)

- a. Aluminium is very dense.
- b. Aluminium is lightweight and strong.
- c. Aluminium is a poor conductor.
- d. Aluminium is very reactive.

20. Observe the data below: (2m)

Metal	Reaction with HCl
Magnesium	Vigorous
Zinc	Moderate
Iron	Slow
Copper	No reaction

Based on the reactivity table with HCl, which metal is the most reactive?

- a. Copper b. Iron c. Zinc d. Magnesium

21. Why is milk of magnesia effective in treating stomach acidity? (2m)

- a. It is acidic. b. It neutralizes stomach acid.
c. It produces more acid in the stomach. d. It absorbs acid.

22. What type of reflection is observed when light strikes a plane mirror? (2m)

- a. Diffuse reflection b. Regular reflection c. Scattering d. Both a and b

23. Which of the following is an example of potential energy? (2m)

- a. A moving car b. A stretched rubber band
c. A running athlete d. Water flowing in a river

24. If the work done in lifting an object is 200 J and the distance is 5 meters, what is the force applied? (2m)

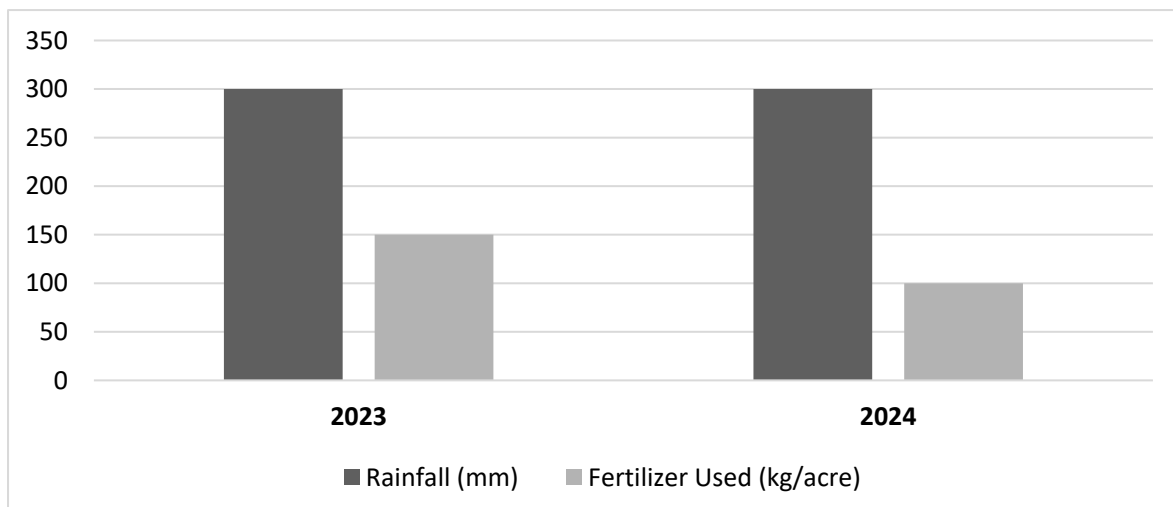
- a. 40 N b. 50 N c. 25 N d. 10 N

25. A blacksmith heats iron and then beats it into a thin sheet. Which property of iron is being used? (2m)

- a. Ductility b. Malleability c. Transparency d. Solubility

SECTION 3: Case-Based Science

26. A farmer observes that his wheat crop yield has decreased by 30% compared to the previous year. The following chart shows the rainfall pattern and fertilizer use in both years: (2m)



Based on this data, which factor is most likely responsible for the decrease in crop yield?

- a. Decreased use of fertilizers b. Increased rainfall
c. Decreased rainfall d. Increased use of fertilizers

- 27. A student places a leafy shoot in coloured water. After some time, the student observes that the leaves have taken on the colour of the water. This experiment demonstrates that: (2m)**
- Leaves absorb water directly from the atmosphere.
 - Water moves through the xylem vessels to different parts of the plant.
 - The plant is undergoing photosynthesis.
 - The roots of plants are not essential for absorbing minerals.
- 28. During an experiment, a student observes mould growing on a piece of bread over several days. What is most likely to increase the growth rate of the mould? (2m)**
- Placing the bread in a freezer
 - Placing the bread in a warm, humid place
 - Exposing the bread to direct sunlight
 - Keeping the bread in an oven heated to 180°C
- 29. A student observes a slide of a micro-organism under the microscope. It has a distinct nucleus and is moving with a tail-like structure. It lacks chlorophyll. This micro-organism is most likely: (2m)**
- Bacteria
 - Virus
 - Algae
 - Protozoa
- 30. Riya is about to enter the examination hall for an important exam. She is feeling nervous and stressed. Which hormone released by the adrenal glands helps the body to cope with stress? (2m)**
- Insulin
 - Adrenaline
 - Estrogen
 - Testosterone
- 31. In a study, a researcher observes the growth patterns in children before and after puberty. If there is a rapid increase in height and weight during puberty, which of these is it associated with? (2m)**
- Thyroxine, Adrenal gland
 - Growth Hormone, Pituitary gland
 - Estrogen, Thyroid gland
 - Growth Hormone, Thyroid gland
- 32. During a laboratory activity, a student blows air through a straw into a test tube containing clear limewater. After a few seconds, the limewater turns milky because a new substance, calcium carbonate, is formed. What type of change is demonstrated by this observation? (2m)**
- Physical change
 - Chemical change
 - Reversible change
 - Melting
- 33. During a science activity, the teacher opened a bottle of perfume in one corner of the classroom. After a few moments, students sitting at different places in the room could smell the perfume, even though the bottle was not moved. What does this observation show about the behaviour of particles of matter? (2m)**
- The perfume changes directly from liquid to solid.
 - Perfume particles become heavier and settle at the bottom.
 - Perfume particles move from a region of higher concentration to a region of lower concentration.
 - Perfume particles change into a liquid due to cooling.
- 34. During a classroom activity, a teacher lights two identical candles. One candle is left uncovered, while the other is covered with an inverted glass jar. After a short time, the candle under the jar goes out, even though some air is still trapped inside the jar. Which explanation best describes why the covered candle extinguishes? (2m)**
- The wax inside the candle is completely used up.
 - The available oxygen inside the jar is gradually consumed, so combustion can no longer continue.
 - The temperature inside the jar falls suddenly, causing the flame to freeze.
 - The air pressure inside the jar increases and pushes the flame out.

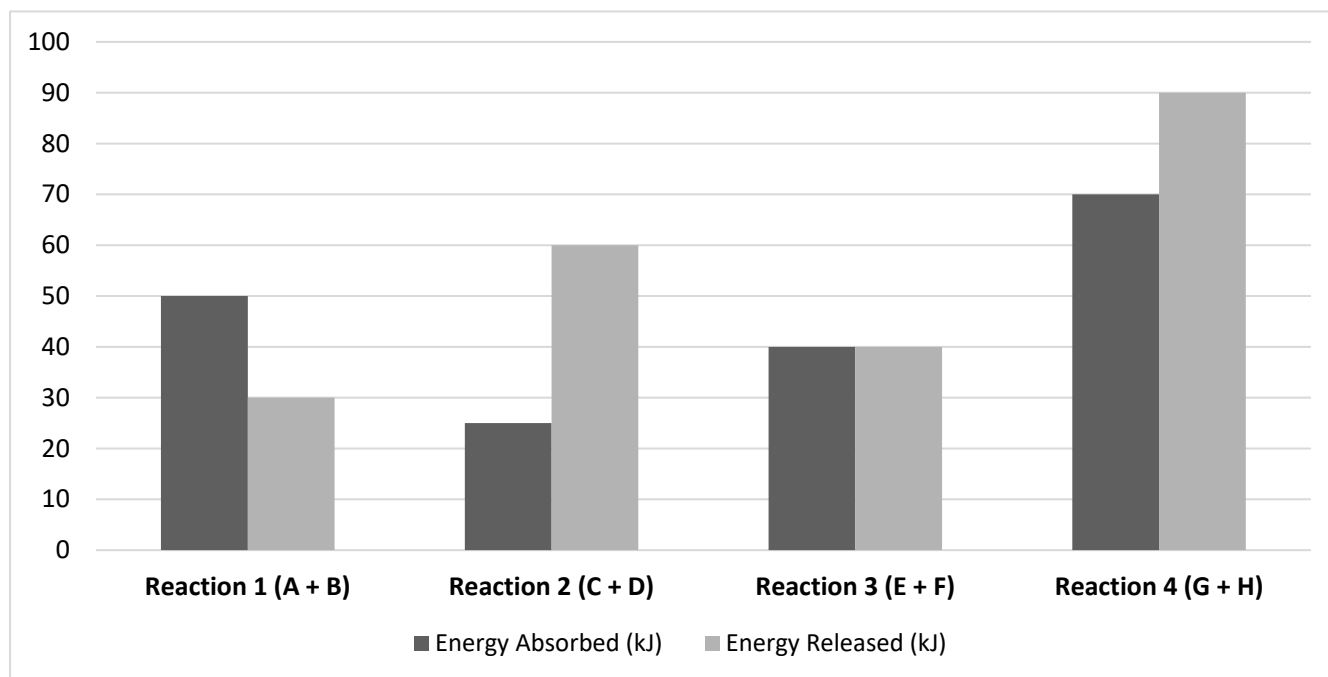
- 35. A student places clean iron nails into a test tube containing blue copper sulphate solution. After some time, the blue colour of the solution becomes lighter, and a reddish-brown coating appears on the iron nails. Which conclusion can be drawn from this observation? (2m)**
- Iron is less reactive than copper and cannot react with copper sulphate.
 - Copper reacts with iron sulphate and changes the colour of the solution.
 - Copper evaporates from the solution and gets deposited on the iron nails.
 - Iron is more reactive than copper and displaces copper from copper sulphate solution.
- 36. During a laboratory activity, a student is given an unknown colourless solution and is asked to determine whether it is basic. The teacher instructs the student to use a method that provides objective and reliable evidence rather than relying on physical sensations. Which method would be the most reliable for confirming that the solution is basic? (2m)**
- Taste the solution to check for a bitter taste.
 - Touch the solution to check whether it feels soapy.
 - Measure its pH and check whether the value is greater than 7.
 - Smell the solution to identify its characteristic odour.
- 37. Rohan is relaxing on the snow. Why does he sink less into the snow when lying down compared to standing? (2m)**
- Pressure is less when standing.
 - Pressure is less when lying down.
 - Force is more when standing.
 - Force is more when lying down.
- 38. During an experiment, a student directs a beam of light from Medium A into Medium B at an angle. The refractive index of Medium A is 1.5, while that of Medium B is 2.0. Based on the given information, which statement correctly predicts the path of the light in Medium B? (2m)**
- The light will bend away from the normal because it enters a medium of lower optical density.
 - The light will bend towards the normal because it enters a medium with a higher refractive index.
 - The light will not bend because both media are transparent.
 - The light will continue in a straight line because the refractive indices are constant.
- 39. During a space mission, a rocket is launched from Earth. As the fuel burns, the gases produced are expelled at high speed, causing the rocket to move upward with increasing speed. As the rocket rises, its height also increases. Which option correctly describes the main energy transformation involved in the rocket's upward motion? (2m)**
- Chemical energy of the fuel is converted mainly into wind energy.
 - Chemical energy of the fuel is converted mainly into magnetic energy.
 - Chemical energy of the fuel is converted only into potential energy, with no kinetic energy involved.
 - Chemical energy of the fuel is converted mainly into kinetic energy.
- 40. A student sets up a simple circuit using a battery, a switch, a connecting wire, and a small electric bulb. When the switch is closed, the bulb glows, indicating that electric current is flowing through the circuit. The student wants to determine the amount of current flowing through the bulb. Which device should the student use, and how should it be connected? (2m)**
- Voltmeter – connected in series with the bulb to measure current
 - Ammeter – connected in series with the bulb to measure current
 - Ohmmeter – connected in parallel with the bulb to measure current
 - Resistor – connected in series with the bulb to measure current

41. Sara observes that different electrical appliances at home use electrical energy in different ways. When she switches on the electric bulb, it produces light. The toaster produces heat, while the electric fan starts rotating and produces motion. Which appliance in Sara's home mainly converts electrical energy into mechanical energy? (2m)
- a. Electric bulb
 - b. Toaster
 - c. Electric fan
 - d. Electric iron
42. While playing outdoors, Deepa accidentally gets a small injury to her eye that is making her vision blurry. Her doctor explains that the injured part is a transparent, curved layer that allows light to enter the eye and damage to this part can make vision blurred. Which part of Deepa's eye has most likely been injured? (2m)
- a. Cornea
 - b. Iris
 - c. Retina
 - d. Lens
43. Aditi was conducting an experiment in the laboratory. She heated a copper vessel strongly in the presence of air. After some time, she noticed that the shiny reddish-brown copper surface developed a black coating. What type of chemical reaction has taken place in Aditi's experiment? (2m)
- a. Combination reaction
 - b. Decomposition reaction
 - c. Oxidation reaction
 - d. Displacement reaction
44. During a science activity, Kavya filled a glass completely with water and placed a stiff piece of cardboard over its mouth. She carefully turned the glass upside down while holding the cardboard in place. When she released her hand, the cardboard remained in position and the water did not fall out. Which of the following best explains why the cardboard remains attached to the glass? (2m)
- a. The water exerts an upward force greater than its weight.
 - b. Atmospheric pressure acts upward on the cardboard and supports it.
 - c. The cardboard produces a magnetic force that holds the water.
 - d. The air inside the glass exerts greater pressure than the atmosphere.
45. Rohan took two similar plants and kept them under the same environmental conditions. He watered Plant A only at night and Plant B only during the daytime. After several days, he observed the condition of both plants. Which of the following observations is most likely? (2m)
- a. Both plants remain healthy.
 - b. Only Plant A remains healthy, while Plant B wilts.
 - c. Only Plant B remains healthy, while Plant A wilts.
 - d. Both plants wilt because plants cannot absorb water at night.

SECTION 4: Challenger's Section

46. A farmer wants to produce alcohol using yeast. He keeps three vessels under different conditions: (4m)
- P: Cold, oxygen-rich
Q: Warm, oxygen-poor
R: Warm, oxygen-rich
- Arrange the vessels in order from the most suitable to the least suitable condition for alcohol production by yeast.
- a. $R \rightarrow Q \rightarrow P$
 - b. $Q \rightarrow P \rightarrow R$
 - c. $Q \rightarrow R \rightarrow P$
 - d. $P \rightarrow Q \rightarrow R$

47. A student conducts four chemical reactions and records the amount of energy absorbed. (4m)



Which of the following is correct?

- Reaction 1 is endothermic; Reaction 2 is exothermic
- Reaction 2 is endothermic; Reaction 4 is exothermic
- Reaction 3 is endothermic; Reaction 1 is exothermic
- Reaction 4 is endothermic; Reaction 3 is exothermic

48. During a laboratory investigation, a student is given three colourless solutions A, B and C. The student tests each solution using different indicators and records the observations below: (4m)

Solution	Blue Litmus	Red Litmus	Phenolphthalein	Methyl Orange
A	No change	Turns blue	Turns pink	Remains yellow
B	Turns red	No change	Remains colourless	Turns red
C	No change	No change	Remains colourless	Remains yellow

Based on the observations, which option correctly identifies the nature of two of the solutions?

- B is acidic and C is basic.
- A is basic and C is acidic.
- A is basic and B is acidic.
- B is neutral and A is acidic.

49. Consider the following statements about the resistance of a conductor: (4m)

- For a given material and temperature, resistance increases with an increase in the length of the conductor.
- For a given material and temperature, resistance decreases when the cross-sectional area of the conductor increases.
- The resistance of a conductor is independent of the nature of the material used.
- A change in temperature can cause a change in the resistance of a conductor.

Which of the statements given above are correct?

- 1, 2 and 3 only
- 1, 2 and 4 only
- 2, 3 and 4 only
- 1, 3 and 4 only

50. Consider the following statements: (4m)

1. Hydrogen and oxygen are elements, whereas water is a compound.
2. The properties of water are different from the properties of hydrogen and oxygen.
3. The elements present in a compound can be separated by physical methods such as filtration.
4. A compound always contains two or more different elements.

Which statements are correct?

- a. 1 and 3 only
- b. 2 and 3 only
- c. 1, 2 and 4 only
- d. 1, 2, 3 and 4

