NELTAS
PATH TO EDUCATIONAL EXCELLENCE

S-CAT
International Science Competition

S-CAT GRAND FINALE

Sample Paper

(Based on the new exam pattern)

TOTAL MARKS	QUESTIONS	DURATION
100	50	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 X 30/100 = 18	80 X 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. A cube has a side length of 5 cm. Calculate its volume. (1m)

a. 25 cm^3 b. 75 cm^3 c. 125 cm^3 d. 100 cm^3

2. In which type of reproduction is only one parent involved? (1m)

a. Sexual reproduction
b. Asexual reproduction
c. External fertilization
d. Germination

3. Which statement correctly describes a renewable resource? (1m)

a. A resource that can be renewed naturally and is always available.
b. A resource that is limited in supply and cannot regenerate quickly.
c. A resource that comes from fossilized plants and animals.
d. A resource that is non-reusable and only used once.

4. Which of the following is NOT a renewable resource? (1m)

a. Sunlight b. Wind c. Coal d. Water

5. What is pollination? (1m)

a. The process by which seeds are spread away from the parent plant.
b. The transfer of pollen from the anther to the stigma of a flower.
c. The process of a seed developing into a new plant.
d. The fusion of male and female gametes to produce a zygote.

6. Which layer of the atmosphere contains the ozone layer that protects Earth from harmful solar radiation? (1m)

a. Troposphere b. Mesosphere c. Stratosphere d. Exosphere

7. When two liquids cannot mix and form a uniform solution, it is considered: (1m)

a. Soluble b. Immiscible c. Miscible d. None of these

8. Which property of a sound wave determines its pitch? (1m)

a. Amplitude b. Frequency c. Loudness d. Wavelength

9. Which of these is NOT a domestic use of water? (1m)

a. Cleaning b. Cooking c. Gardening d. Irrigation

10. Does light travel faster in water than in air? (1m)

a. Yes b. No c. Maybe d. Can't be determined

SECTION 2: Skill Application

11. Which of the following groups of food helps to protect against diseases? (2m)

a. Vegetables, Citrus fruits, and nuts
b. Rice, chapati, water
c. Ghee, butter, oil
d. Fish, eggs, beans

12. If a child has bleeding gums and rough skin, what deficiency disease might he have? (2m) Which Vitamin should be taken?

a. Scurvy, Vitamin C
b. Rickets, Vitamin A
c. Scurvy, Vitamin B
d. Beri beri, Vitamin B

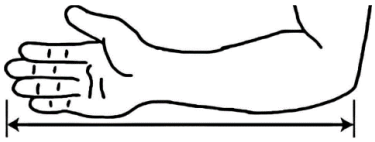
13. Observe the picture given below carefully. Which systems of the boy's body are most likely involved in performing the high jump at the Olympics? (2m)

a. Skeletal system and Digestive system
b. Digestive system and Excretory System
c. Skeletal system and Muscular system
d. Muscular system and Excretory system

14. Identify the type of joint shown in the picture: (2m)

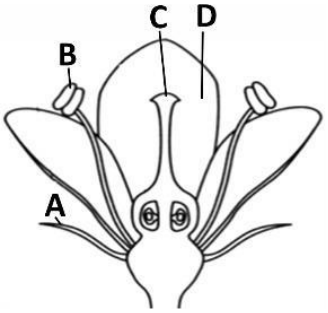
a. Hinge joint
b. Ball and socket joint
c. Gliding joint
d. Pivot joint

15. What type of unit is this? (2m)



a. Standard
b. Non-standard
c. Fundamental
d. Derived

16. Choose the correct option. (2m)



a. A-Stamen, B- Pistil, C-Anther, D-Sepal
b. A-Sepal, B-Anther, C-Stigma, D-Petal
c. A-Petal, B-Anther, C-Ovule, D-Sepal
d. A-Sepal, B-Stigma, C-Anther, D-Petal

17. In the process of sedimentation, what happens to the heavier particles in a mixture of mud and water? (2m)

a. They dissolve in water.
b. They float on the water.
c. They settle at the bottom.
d. They disappear completely.

18. A small metal coin sinks when placed in a glass of water, while a cork floats on the surface. What property of matter does this experiment illustrate? (2m)

a. All solids float on water.
b. Density affects an object's ability to float.
c. All objects sink in water unless they are hollow.
d. Objects only float if they are lighter than air.

19. A study shows that after cutting down trees on a large scale in a hilly area, the average temperature of the area increased by 2 degrees Celsius. What can be inferred from this data? (2m)

a. Deforestation reduces the amount of oxygen in the air.
b. Deforestation helps in climate regulation.
c. Cutting down trees causes a rise in average temperature.
d. Trees cause the temperature to increase in hilly areas.

20. Which of the following correctly defines ligaments? (2m)

a. Tissues connecting muscles to bones
b. Tissues joining two bones together
c. Tissues that protect the outer layer of bones
d. Tissues that attach the skin to the muscles

21. What can we calculate if we know the time taken and the distance covered? (2m)

a. Area
b. Volume
c. Speed
d. Density

22. A forest department wants to protect animals whose numbers are decreasing. Which of the following actions would be MOST effective in helping protect wildlife? (2m)

a. Allowing hunting in the forest
b. Cutting down trees to reduce the forest area
c. Creating and maintaining wildlife sanctuaries
d. Destroying the natural habitats of animals

23. Which object would form a dark shadow when placed under a light source? (2m)

a. Clear plastic sheet
b. Frosted glass
c. Wooden block
d. Thin fabric

24. Which of these is the most likely outcome of excessive burning of fossil fuels? (2m)

a. Release of excessive water in the atmosphere leading to floods
b. Release of excessive carbon dioxide in the atmosphere leading to global warming
c. Release of excessive oxygen in the atmosphere resulting in cleaner air
d. Release of excessive water vapour in the atmosphere resulting in foggy weather

25. In which of these situations would you experience an echo? (2m)

a. Walking in a densely packed forest
b. Speaking in a large, empty hall
c. Listening to music in a furnished room
d. Running along a crowded beach

SECTION 3: Case-Based Science

26. Rohan planted seeds in his garden, but only some sprouted. He noticed that some of the seeds were kept in water, while others were kept in dry soil without watering. Which seeds are more likely to have germinated, and why? (2m)

a. The seeds in dry soil, because they received oxygen.
b. The seeds kept in water, because water is necessary for germination.
c. Both sets, because all seeds germinate naturally over time.
d. Neither, as seeds need soil to germinate.

27. A teacher places a piece of camphor (a solid) on a plate and heats it gently. Students observe that the camphor turns directly into vapour without becoming liquid. Which property of matter does this experiment demonstrate? (2m)

a. Evaporation
b. Condensation
c. Sublimation
d. Freezing

28. Ritu saw these spiny seeds near her school.

How would the dispersal of these seeds take place? (2m)

a. Through wind b. Through water c. Through animals d. Through bird droppings

29. During a solar eclipse, Monica observes that the Moon comes between the Sun and Earth, blocking sunlight in some areas. Based on this information, what can she infer about the shadow cast on Earth? (2m)

a. It covers the entire Earth.
b. It only covers the area directly in the path of the eclipse.
c. It results in a lunar eclipse.
d. It increases daylight.

30. Students are given a balloon, a syringe, and an empty plastic bottle. They are asked to push the syringe's plunger when the balloon is inside the bottle. The balloon slightly inflates as air is pushed in. What property of air is being demonstrated here? (2m)

a. Air has no mass.
b. Air cannot be compressed.
c. Air is invisible and does not take up space.
d. Air occupies space and can be compressed.

31. Aditi sprays some perfume in one corner of her room. After a few moments, she notices that she can smell the perfume from the other side of the room. Which property of gases allows the aroma to spread throughout the room? (2m)

a. The molecules are close to each other.
b. The molecules move freely in all directions.
c. The molecules have less space between them.
d. The molecules take the shape of the container.

32. Aryan is learning about work in physics. During an activity, he applies a force of 15 Newtons (N) to move a box through a distance of 4 meters (m) in the same direction as the force. How much work does Aryan do on the object? (2m)

a. 45 Joules (J) b. 30 Joules (J) c. 60 Joules (J) d. 75 Joules (J)

33. Ramesh's family uses a lot of coal and wood for cooking at home. Recently, they noticed more smoke and soot collecting inside the house, making breathing difficult. Which type of fuel could Ramesh switch to for a cleaner and healthier cooking environment? (2m)

a. Diesel b. Kerosene
c. LPG (Liquid Petroleum Gas) d. Petrol

34. John stands in a large, empty hall and claps his hands. After a short moment, he hears the sound of his clap repeated. What property of sound is demonstrated by this observation? (2m)

a. Sound waves pass directly through surfaces.
b. Sound waves reflect off surfaces, creating an echo.
c. Sound waves are absorbed by the floor and walls.
d. Sound travels in a straight line without reflecting.

35. Lucy's city that is facing severe water scarcity. The city has limited water resources, so the authorities are looking for ways to conserve water and manage the available supply sustainably. Lucy and her friends are discussing different methods that could help address the problem.
Which of the following methods would be most effective for managing the city's limited water supply sustainably? (2m)

a. Increasing groundwater extraction
b. Implementing rainwater harvesting systems
c. Using more river water for irrigation
d. Increasing urban development in areas where water is limited

36. Priya places a straw in a glass of water and observes that the straw appears bent or broken at the surface of the water. What concept is demonstrated by her observation? (2m)

a. Reflection of light
b. Absorption of light
c. Refraction of light
d. Dispersion of light

37. Sara places some ice inside a clear glass and covers it with a lid. After a few minutes, she notices that water droplets have formed on the outside of the glass. The glass is not cracked or leaking.
Where do these water droplets come from? (2m)

a. The glass is evaporating.
b. The droplets come from moisture in the surrounding air.
c. The glass is leaking water from the bottom.
d. The glass is melting.

38. Ravi is doing an activity with a torch, an object, and a screen. He notices that the shadow changes shape based on the position of the light source. Based on her observation, where is the light source likely to be positioned when the shadow is small? (2m)

a. Very close to the object
b. Very far from the object
c. Directly above the object
d. At an angle of 45 degrees from the object

39. Sakshi mixes some muddy water in a container and leaves it undisturbed for some time. The heavier soil particles settle at the bottom. She then carefully pours the clear water into another container without disturbing the settled particles. Which method is Sakshi using to separate the clear liquid from the settled particles? (2m)

a. Filtration
b. Decantation
c. Distillation
d. Evaporation

40. Nidhi is conducting an experiment with a vibrating tuning fork. She wants to determine how many complete vibrations the tuning fork makes in one second. Which unit will she use to measure this quantity? (2m)

a. Decibel
b. Hertz
c. Ampere
d. None of these

41. A school installs solar panels on its roof. During the day, sunlight falls on the panels and they generate electricity that is used to operate fans in the classrooms. Which energy conversion BEST describes this process? (2m)

a. Electrical energy → Solar energy → Mechanical energy
b. Mechanical energy → Solar energy → Electrical energy
c. Solar energy → Electrical energy → Mechanical energy
d. Heat energy → Chemical energy → Electrical energy

42. During a science experiment, a student places some bean seeds on moist cotton. After a few days, she notices that a small structure grows downward from each seed, while another structure grows upward. Which statement BEST explains what she observed? (2m)

a. The plumule grows downward to form roots, while the radicle grows upward to form leaves.
b. The radicle grows downward to form the root, while the plumule develops into the shoot.
c. The cotyledon grows downward to form roots, while the seed coat forms leaves.
d. The seed coat grows into the root, while the embryo grows into the seed.

43. A student pushes two identical boxes. Box X is pushed for a distance of 2 metres and Box Y is pushed for 5 metres. The same force is applied to both boxes.
Which of the following statements is correct? (2m)

a. Equal work is done on both boxes
b. More work is done on Box X
c. No work is done
d. More work is done on box Y

44. During a power cut, Divya lights a candle to see in the dark. She holds her hand near the flame and feels warm. Which statement best explains her observation? (2m)

a. The candle produces mainly movement and magnetic energy.
b. The candle produces mainly sound and electrical energy.
c. The candle produces light and heat.
d. The candle produces only light, while the warmth comes from the air.

45. Shreya visits her village and observes that people are using water from wells and hand pumps. Which type of water are they using? (2m)

a. Lake water
b. Groundwater
c. Seawater
d. Saltwater

SECTION 4: Challenger's Section

46. A school wants to cover the floor of a rectangular science laboratory. The laboratory is 8 m long, 5 m wide, and 4 m high. The school buys exactly enough tiles to cover the entire floor. If 20 tiles are needed to cover the floor, which of the following could be the dimensions of each tile? (4m)

a. Length = 1 m, Breadth = 2 m, Thickness = 1 cm
b. Length = 2 m, Breadth = 2 m, Thickness = 1 cm
c. Length = 1 m, Breadth = 1 m, Thickness = 2 cm
d. Length = 4 m, Breadth = 2 m, Thickness = 1 cm

47. A teacher gives students this information: (4m)
Species X: Several thousand individuals remain, but its population is decreasing rapidly.
Species Y: No living individuals remain anywhere in the world.
How should the two species be classified?

a. X is extinct and Y is endangered.
b. X is endangered and Y is extinct.
c. Both X and Y are endangered.
d. Both X and Y are extinct.

48. Match each situation in Column A with the correct type of heat transfer in Column B. (4m)

Column A – Situation	Column B – Heat Transfer
1. A metal spoon becomes hot when placed in hot soup.	**i. Radiation**
2. Water circulates as it is heated in a pan.	**ii. Conduction**
3. We feel heat from the Sun.	**iii. Convection**
4. A metal pan gets heated on a stove.	

Choose the correct option:

a. 1 – iii, 2 – ii, 3 – i, 4 – iii
b. 1– ii, 2 – i, 3 – iii, 4 – ii
c. 1 – ii, 2 – iii, 3 – i, 4 – ii
d. 1 – i, 2– iii, 3 – ii, 4 – i

49. Consider the following statements: (4m)

Statement 1: The length of an object can be measured using a ruler or a measuring tape.
Statement 2: The SI unit of mass is the kilogram (kg).
Statement 3: Temperature is measured using a metre scale.
Which of the following is correct?

a. Only Statement 1 is correct
b. Statements 1 and 2 are correct
c. Statements 2 and 3 are correct
d. All three statements are correct

50. Consider the following statements: (4m)

1. **The skull protects the brain.**
2. **The rib cage protects important organs such as the heart and lungs.**
3. **Bones and muscles work together to help the body move.**
4. **The skeleton is made only of soft tissues.**

Which of the following is correct?

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