



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. Which of the following is essential for photosynthesis and is obtained by stomata through gaseous exchange? (1m)**
a. Oxygen b. Water c. Carbon Dioxide d. Nitrogen
- 2. In which part of the cell does cellular respiration primarily occur? (1m)**
a. Nucleus b. Mitochondria
c. Ribosome d. Cytoplasm
- 3. Which component of blood is responsible for transporting oxygen? (1m)**
a. Plasma b. Platelets
c. Red blood cells d. White blood cells
- 4. Which tool would be most useful for observing pollen grains? (1m)**
a. Microscope b. Telescope c. Ruler d. Stopwatch
- 5. Which gas is produced during the reaction of vinegar and baking soda? (1m)**
a. Oxygen b. Hydrogen c. Carbon dioxide d. Nitrogen
- 6. Which of the following is a common household acid, used in cooking? (1m)**
a. Sodium hydroxide b. Hydrochloric acid
c. Acetic acid d. Ammonium hydroxide
- 7. Which statement best describes a compound? (1m)**
a. A substance made of only one kind of atom.
b. A mixture of different substances.
c. A substance made of two or more elements chemically combined.
d. A mixture of gases.
- 8. Which non-metal is essential for respiration in all living organisms including plants? (1m)**
a. Carbon b. Oxygen c. Nitrogen d. Sulfur
- 9. Which of the following is a method of heat transfer that does not require a medium? (1m)**
a. Conduction b. Convection
c. Radiation d. Evaporation
- 10. If an object covers equal distances in equal intervals of time, its motion is said to be: (1m)**
a. Non-uniform b. Uniform
c. Accelerated d. Circular

SECTION 2: Skill Application

- 11. If you are testing a leaf for starch, what would be the correct sequence of steps? (2m)**
a. Boil the leaf in water v boil it in alcohol → Rinse in water → Add iodine solution
b. Dip the leaf in alcohol → Boil in water → Add iodine solution
c. Add iodine solution directly on the leaf
d. Boil in water → Add iodine solution directly

12. Which pigment, responsible for the green colour of leaves, is essential for capturing light energy during photosynthesis, and where is it specifically located within the plant cell? (2m)

- a. Carotene - Located in the cytoplasm; it captures green light.
- b. Anthocyanin - Found in chloroplasts; it reflects green light.
- c. Chlorophyll - Found in the chloroplasts; it absorbs light energy.
- d. Xanthophyll - Located in the nucleus; it helps absorb blue light.

13. To observe the villi of the small intestine, which tool or process would be most useful? (2m)

- a. Staining and observing under a light microscope
- b. Using a magnifying glass
- c. Heating the sample
- d. Measuring the length of the intestine

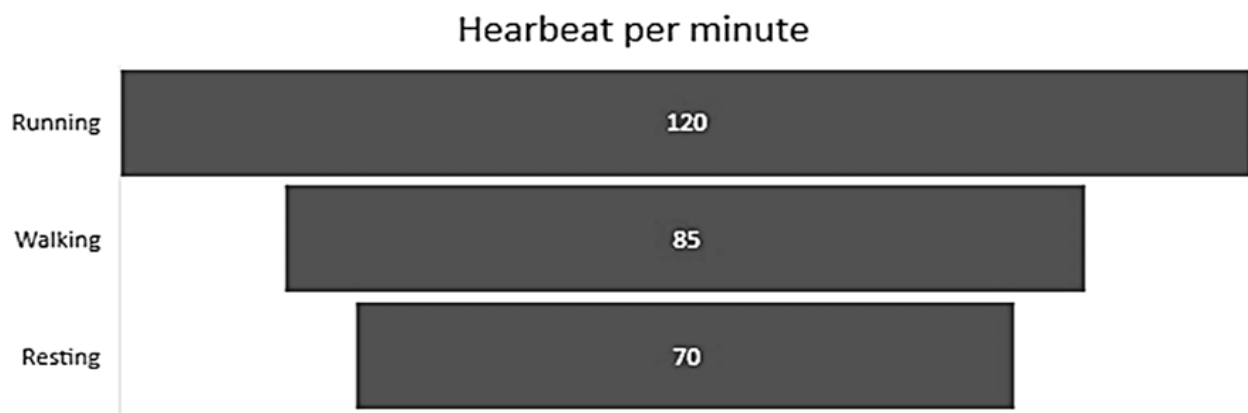
14. The following data shows the time taken by different food types to digest in the human stomach:

Carbohydrates	Proteins	Fats
1-2 hours	2-4 hours	4-6 hours

Which food type is most likely to keep a person feeling full for the longest time? (2m)

- a. Carbohydrates
- b. Proteins
- c. Fats
- d. All keep a person full equally

15. Given the following data on heartbeats per minute under different activities: (2m)

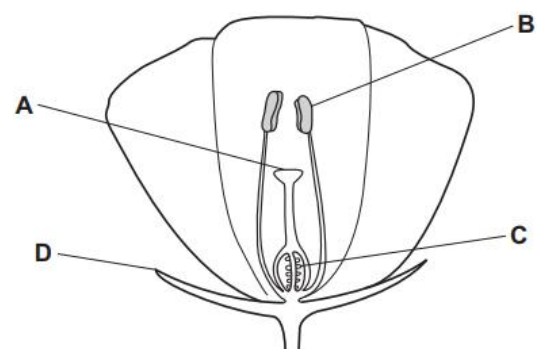


During which activity is the rate of circulation the highest?

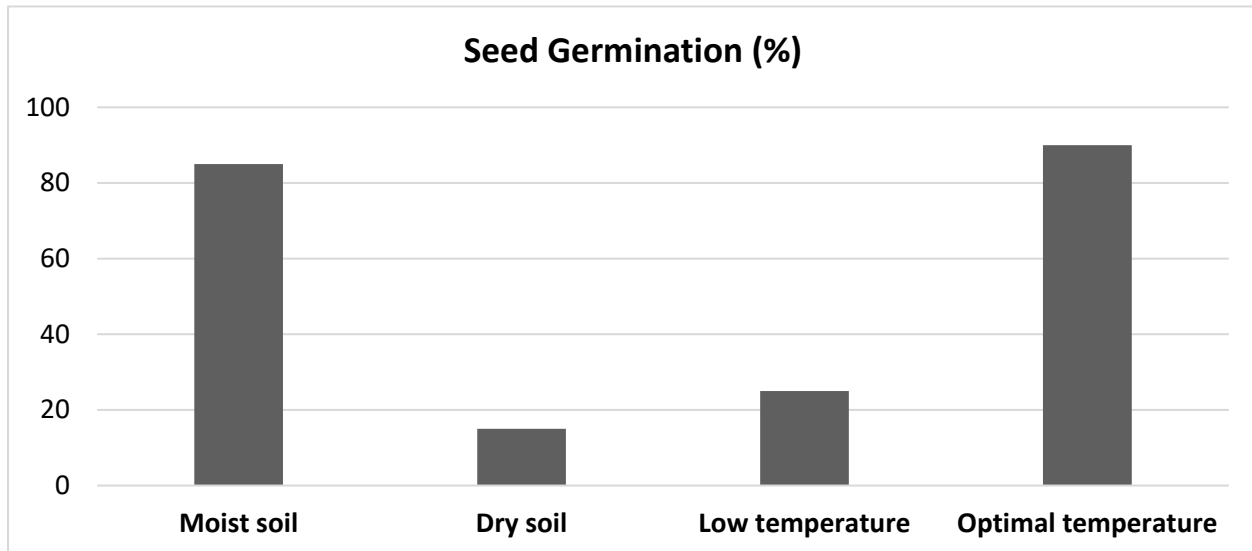
- a. Resting
- b. Walking
- c. Running
- d. Cannot be determined

16. Which part of a flowering plant contains the male reproductive organs? (2m)

- a. A
- b. B
- c. C
- d. D



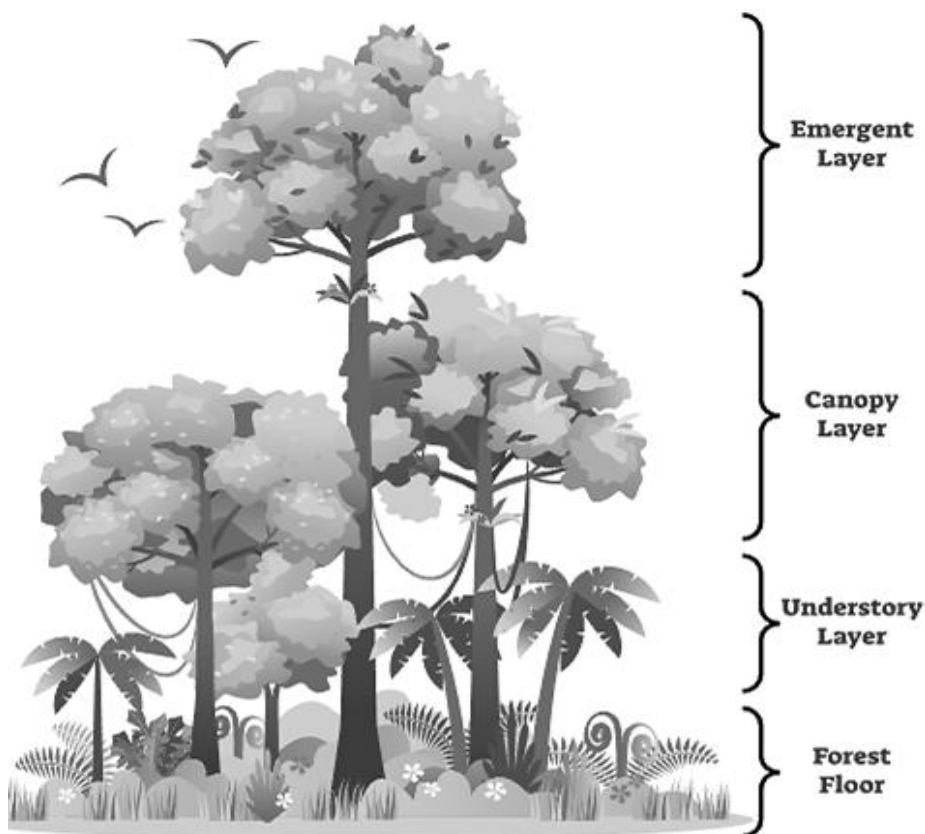
17. The graph below shows the percentage of seed germination under different conditions. (2m)



Under which condition is seed germination the highest?

- a. Moist soil
- b. Dry soil
- c. Low temperature
- d. Optimal temperature

18. Which layer of a forest receives the least amount of sunlight? (2m)



- a. Canopy
- b. Understory
- c. Forest floor
- d. Emergent layer

19. In a forest ecosystem, different plants coexist with fungi and animals. What does this suggest? (2m)

- a. Lack of biodiversity
- b. Biodiversity and interdependence
- c. Lack of decomposers
- d. Monoculture

20. The table below shows mass changes during rust formation: (2m)

Iron Before (g)	Rust Formed (g)
50	55

What does the mass increase indicate?

- a. Loss of energy
- b. Addition of oxygen
- c. Decomposition reaction
- d. Evaporation

21. Study the table given below. (2m)

Substance	State Change	Time Taken
Ice	Solid to Liquid	10 minutes
Wax	Solid to Liquid	5 minutes
Water	Liquid to Gas	15 minutes

Which substance has the fastest change of state?

- a. Ice
- b. Wax
- c. Water
- d. All are the same

22. Non-metals like nitrogen are critical in agriculture because they: (2m)

- a. React with other non-metals
- b. Form salts needed for soil
- c. Are part of the soil's nutrient cycle
- d. Dissolve in water

23. If you place a pot of water on a stove and observe the water, you notice bubbles form at the bottom of the pot. What does this observation indicate? (2m)

- a. The water is absorbing heat through conduction.
- b. The heat is transferred through radiation.
- c. Heat does not get transferred from solid to liquid.
- d. The water is evaporating.

24. A car moves at a speed of 60 km/h for 2 hours. After that, it moves at 40 km/h for 3 hours. What is the total distance travelled? (2m)

- a. 160 km
- b. 180 km
- c. 240 km
- d. 220 km

25. Which of the following is an effect of electric current? (2m)

- a. Magnetisation
- b. Cooling
- c. Heating
- d. All of these

SECTION 3: Case-Based Science

26. A farmer observes that cows can efficiently digest fibrous plant materials, unlike dogs or cats. What unique feature of the cow's digestive system enables this, and how does it function? (2m)

- a. Presence of a simple stomach that secretes strong acids.
- b. Multi-chambered stomach with microbial fermentation to break down cellulose.
- c. Canine teeth for grinding plant material more effectively.
- d. Enzymes in saliva that fully digest fibres before entering the stomach.

27. During physical exercise, a student notices that their breathing rate increases. What is the likely reason for this observation? (2m)

- a. The body needs less oxygen during exercise.
- b. The body produces less energy during exercise.
- c. The body requires more oxygen to meet the increased energy demand.
- d. The body does not need oxygen during exercise.

28. In an experiment, a student wants to test if bone tissue is harder than cartilage. Which of the following methods is most suitable? (2m)

- Applying equal force on both tissues and observing any breakage
- Measuring the weight of both tissues
- Heating both tissues to observe which one burns first
- Observing both tissues under a microscope to see the cellular structure

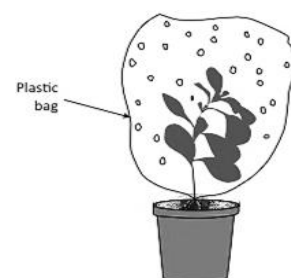
29. Sara has a ligament tear. Her doctor has advised her to take adequate rest and physiotherapy sessions along with medications. Choose the type of tissue the ligament is and its function. (2m)

- Epithelial tissue: Connects bone to bone
- Muscular tissue: Connects muscles to tissue
- Connective tissue: Connects bone to bone
- Nervous tissue: Transmits signals from one neuron to another

30. A student conducts an experiment as shown alongside. (2m)

The process he is studying is:

- Photosynthesis
- Transpiration
- Absorption
- Guttation



31. When observing human blood under a microscope, a student identifies cells without a nucleus. What are these cells? (2m)

- White blood cells
- Red blood cells
- Plasma cells
- None of the above

32. A student records the pH of a substance over several days as it decays.

The pH values are given below.

Days	1	2	3	4	5
pH values	7	6.8	6.5	6.2	6

What conclusion can be drawn by the student from the data? (2m)

- The solution is becoming more acidic.
- The solution is becoming more basic.
- The solution is neutral.
- The solution is stable.

33. The table below shows the effect of different indicators on solutions: (2m)

Solution	Litmus	Phenolphthalein
A	Red	No change
B	Blue	Pink
C	No change	No change

Which of these is likely a neutral solution?

- Solution A
- Solution B
- Solution C
- None

34. During a laboratory activity, a student is given a mixture of iron filings and copper filings. The teacher asks the student to separate the two substances using their different physical properties. The student observes that one of the substances is attracted to a magnet, while the other is not.

Which method should the student use to separate the mixture most effectively? (2m)

- Dissolve the mixture in water and then filter it.
- Dissolve the mixture in water and evaporate the water.
- Use a magnet to attract and remove the iron filings.
- Heat the mixture and then collect the condensed substances.

35. A student accidentally mixes equal amounts of oil and water in a transparent beaker. After stirring the mixture and leaving it undisturbed, two distinct layers are observed, with the oil layer on top of the water. What does this observation tell us about the two liquids? (2m)

- a. Oil is denser than water.
- b. Water is denser than oil.
- c. Oil and water are chemically combined.
- d. Oil is soluble in water.

36. Remy is investigating the properties of an unknown element X. He reacts element X with oxygen and observes that the oxide formed shows basic properties. Based on Remy's observation, what is the most reasonable inference about element X? (2m)

- a. It is a non-metal.
- b. It is a metal.
- c. It is a gas.
- d. It is an alloy.

37. Maya holds a small piece of ice in her palm. After a short while, she notices that the ice begins to melt and her palm feels cooler. What does Maya's observation indicate about the transfer of heat? (2m)

- a. The ice absorbs heat from her hand and changes into water.
- b. The ice produces cold air, which cools her hand.
- c. The ice expands in size as it receives heat from her hand.
- d. The ice absorbs water from her hand and changes into a liquid.

38. A metal and a non-metal are both heated at one end. In the experiment comparing heat conduction in both materials, the following data is recorded. What conclusion can be drawn? (2m)

Material	Time Taken to Heat (s)	Temperature Change (°C)
Metal	30	15
Non-metal	90	5

- a. Non-metal conducts heat faster than the metal.
- b. Metal conducts heat faster than the non-metal.
- c. Both materials conduct heat equally.
- d. Metal and non-metal do not conduct heat.

39. A student needs to choose a material for making the connecting wires in a simple electric circuit. Which material should the student select to allow electric current to flow easily with minimal resistance? (2m)

- a. Rubber
- b. Glass
- c. Copper
- d. Wood

40. Students of grade VII are conducting experiments concerning electricity. Which safety precaution/s are essential while conducting experiments with electric circuits? (2m)

- a. Ensuring that the wires are insulated
- b. Keeping water away from the circuit
- c. Using low-voltage power sources
- d. All of these

41. A student builds a simple electromagnet by winding insulated wire around an iron nail and connecting the wire to a battery. When the circuit is switched on, the nail attracts small iron pins. When the circuit is switched off, the pins fall away. What does this observation tell us about an electromagnet? (2m)

- a. It is a permanent magnet that cannot lose its magnetism.
- b. Its magnetism can be turned on and off by controlling the electric current.
- c. It produces magnetism even when no electric current flows.
- d. It must always be made using permanent magnets.

42. A student shines a torch on four different surfaces: a black surface, a rough surface, a shiny metal surface, and a transparent sheet. Which surface would reflect light most effectively? (2m)
- A black surface
 - A rough surface
 - A shiny metal surface
 - A transparent surface
43. During an experiment with lenses, you notice that the image formed is inverted and magnified. What can you infer about the lens? (2m)
- The lens is a concave lens.
 - The lens is a convex lens.
 - The lens is a plane mirror.
 - The lens is not working properly
44. During a school sports day, Emily participates in a running event. She runs 400 metres in the first 2 minutes and then runs another 200 metres in the next 1 minute. What is Emily's average speed? (2m)
- 2 m/s
 - 3.3 m/s
 - 4 m/s
 - 6 m/s
45. During the summer, Rohan noticed that a nearby forest area was being cleared for road construction. A few days later, a leopard was spotted in the nearby city. What could be the most likely reason for the leopard entering the city? (2m)
- Decrease in rainfall
 - Loss of its natural habitat
 - Increase in forest cover
 - Decrease in human population

SECTION 4: Challenger's Section

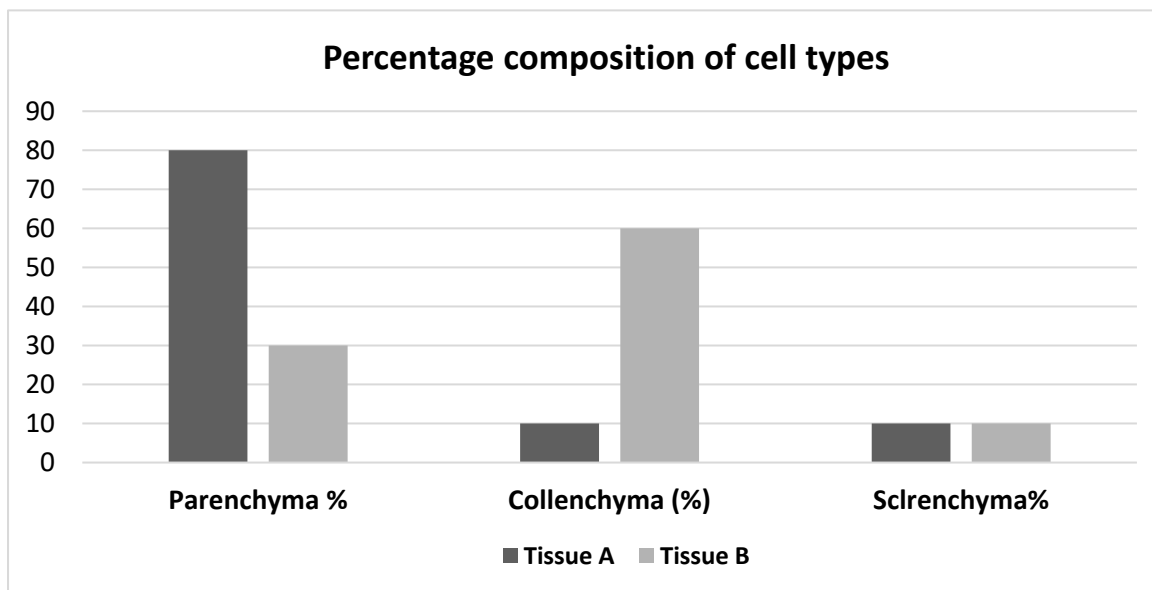
46. The table below shows the average breathing rates of four organisms. (4m)

Organism	Breathing Rate (breaths/minute)
Human	16
Dog	30
Mouse	60
Elephant	8

Based on the data, which statement best explains the relationship between breathing rate and metabolic activity?

- The elephant has the highest metabolic rate because it is the largest organism.
- The dog has the highest metabolic rate because its breathing rate is higher than that of a human.
- The mouse likely has a higher metabolic rate because it has the highest breathing rate among the organisms listed.
- The human has the lowest metabolic rate because its breathing rate is lower than that of a dog.

47. The bar graph below shows the percentage composition of cell types in two plant tissues. (4m)



Which tissue is likely to provide more flexibility to the plant? Why?

- Tissue A, because it has a high percentage of parenchyma.
- Tissue B, because it has a high percentage of collenchyma.
- Tissue A, because it has a high percentage of sclerenchyma.
- Tissue B, because it has a high percentage of sclerenchyma.

48. During a science experiment, a student places a small piece of magnesium ribbon into a test tube containing dilute hydrochloric acid. The student observes rapid bubbling and hears a fizzing sound. The test tube also becomes slightly warm. Based on these observations, which of the following conclusions is most appropriate? (4m)

- The magnesium is only dissolving physically in the acid.
The fizzing is caused by air trapped on the surface of the magnesium.
- A chemical reaction is taking place between magnesium and hydrochloric acid.
The fizzing is caused by the magnesium changing from a solid into a liquid.
- Hydrogen gas is being released as a product of the reaction.
The reaction is exothermic because heat is released.
- No chemical reaction is taking place.
The increase in temperature is caused only by the student handling the test tube.

49. Match the electrical components in Column A with their corresponding symbols in Column B. (4m)

Column A – Component	Column B – Symbol
1. Battery	a.
2. Switch	b.
3. Diode	c.
4. Resistor	d.

Choose the correct matching:

- 1-a, 2-d, 3-c, 4-b
- 1-c, 2-b, 3-a, 4-d
- 1-b, 2-c, 3-d, 4-a
- 1-d, 2-a, 3-b, 4-c

50. In an experiment, a student shines a ray of light at different angles onto the surface of a transparent material. The student measures the angle of incidence, angle of reflection, and angle of refraction. The results are recorded below: (4m)

Angle of Incidence (°)	Angle of Reflection (°)	Angle of Refraction (°)
10	10	15
20	20	30
30	30	47
40	40	75

What can be concluded from this experiment?

- a. The angle of reflection is always greater than the angle of incidence.
The angle of refraction is always equal to the angle of reflection.
- b. The angle of reflection is always equal to the angle of incidence.
The angle of refraction is always smaller than the angle of incidence.
- c. The angle of reflection is always equal to the angle of incidence.
The angle of refraction depends on the angle of incidence and the medium.
- d. The angle of reflection is always equal to the angle of incidence.
The angle of refraction is always larger than the angle of incidence.

