



# INTERNATIONAL CATS CONTESTS

COMPETENCE & APTITUDE TESTING SERVICES

**FASTEST GROWING CONTESTS IN PAKISTAN**



## ICATS SCIENCE

CONTEST 2021

### Question Booklet

### GRADE 9 & 10

### ADOLESCENTS

*Time Allowed: 90 Mins.*

*Maximum Marks: 90*

# ICATS SCIENCE CONTEST 2021

## ADOLESCENT (GRADE 9 & 10)

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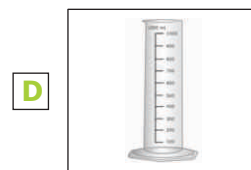
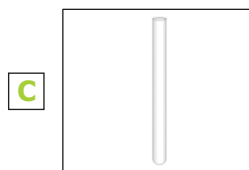
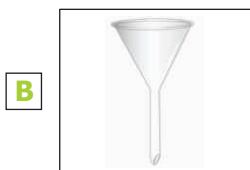
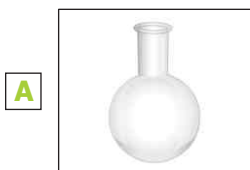
**MAXIMUM MARKS : 90**

**TOTAL QUESTIONS : 30 MCQS**

### INSTRUCTIONS

1. DON'T START ATTEMPTING THE PAPER UNTIL INSTRUCTED BY THE INVIGILATORS.
2. INSTRUCTIONS FROM THE EXAMINATION INVIGILATORS MUST BE CARRIED OUT PROMPTLY.
3. CAREFULLY RECHECK YOUR NAME, FATHER NAME, SCHOOL NAME, ADDRESS ETC AT THE BUBBLE SHEET / ANSWER SHEET.
4. RECORD ALL ANSWERS ON THE BUBBLE SHEET ONLY. SELECT BEST ANSWER FROM THE FOUR GIVEN OPTIONS AND MARK ONLY ONE OPTION IN EACH QUESTION.
5. USE BLUE / BLACK INK TO FILL UP THE CIRCLES FOR YOUR ANSWERS ON THE BUBBLE SHEET. USE OF LEAD PENCIL IS NOT ALLOWED.
6. USE OF ANY HELPING MATERIAL INCLUDING CELL PHONES AND ELECTRONIC DEVICES IS STRICTLY PROHIBITED.
7. EVERY CORRECT ANSWER EARNS THREE POINTS. THERE WOULD BE NEGATIVE MARKING. ONE POINT WOULD BE DEDUCTED FOR EVERY INCORRECT ANSWER.
8. CANDIDATES MAY NOT LEAVE THE EXAMINATION ROOM UNESCORTED FOR ANY REASON, AND THIS INCLUDES USING THE WASHROOM.
9. NO MATERIALS OR ELECTRONIC DEVICES SHALL BE BROUGHT INTO THE ROOM.
10. THERE ARE FIVE CATEGORIES OF THE CONTEST AS UNDER:
  - A. TODDLERS (GRADE 1 & 2)
  - B. KIDS (GRADE 3 & 4)
  - C. JUNIORS (GRADE 5 & 6)
  - D. JUVENILES (GRADE 7 & 8)
  - E. ADOLESCENTS (GRADE 9 & 10 / O-LEVELS)
11. ONLY REGISTERED STUDENTS CAN PARTICIPATE IN THE CONTEST.
12. NO CANDIDATE SHALL TAKE OUT OF THE HALL ANY ANSWER BOOK(S) OR PART OF AN ANSWER BOOK, WHETHER USED OR UNUSED, OR OTHER SUPPLIED MATERIAL.
13. IF A PARTICIPANT DOES NOT UNDERSTAND A WORD OR PHRASE ON THE EXAM PAPER, NEITHER EXAMINER NOR INVIGILATOR IS PERMITTED TO ANSWER.
14. FOR INFORMATION ABOUT UPCOMING CONTESTS OR PROVIDING VALUABLE FEEDBACK, PLEASE VISIT [WWW.CATSCONTESTS.ORG](http://WWW.CATSCONTESTS.ORG)
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT [INFO@CATSCONTESTS.ORG](mailto:INFO@CATSCONTESTS.ORG)

**Q1.** Ali needs a test tube for his experiment in the lab. Which of the following he needs?



**Q2.** The passage below describes an experiment. Read the passage and think about the variables that are described.



Glasses of cola with ice

Emmy's brother thought that crushed ice would keep his soda cooler than whole ice cubes.

To test this idea, Emmy divided a large bottle of soda equally among six glasses. Emmy added five whole ice cubes to each of the first three glasses while her brother crushed five ice cubes into small pieces before adding them to each of the other three glasses. Ten minutes after all the ice had been added to the glasses, Emmy used a thermometer to measure the temperature of the soda in each glass.

Which of the following was an independent variable in this experiment?

**A** | the temperature of the soda

**C** | both are independent variables

**B** | the size of the ice pieces

**D** | none is independent variable

- Q3.** The passage below describes an experiment. Read the passage and then follow the instructions below.



a catapult for launching ping pong balls

Gary placed a ping pong ball in a catapult, pulled the catapult's arm back to a  $45^\circ$  angle, and launched the ball. Then, Gary launched another ping pong ball, this time pulling the catapult's arm back to a  $30^\circ$  angle. With each launch, his friend Lamar measured the distance between the catapult and the place where the ball hit the ground. Gary and Lamar repeated the launches with ping pong balls in four more identical catapults. They compared the distances the balls traveled when launched from a  $45^\circ$  angle to the distances the balls traveled when launched from a  $30^\circ$  angle.

Identify the question that Gary and Lamar's experiment can best answer.

- A** | Do ping pong balls travel farther when launched from a  $30^\circ$  angle compared to a  $45^\circ$  angle?
- B** | Do ping pong balls stop rolling along the ground sooner after being launched from a  $30^\circ$  angle or a  $45^\circ$  angle?
- C** | Both of the above.
- D** | None of the above.



- Q4.** The kind of theory in which testing goes on by suggesting new hypotheses is classified as

- A** | productive theory    **B** | deductive theory    **C** | observatory theory    **D** | reductive theory

**Q5.** Gary is washing dishes after cooking his dinner. He notices that some of the dishes still feel oily after being washed. He wonders what factors affect how clean dishes are after they are washed. So, he decides to design an experiment. He has the following supplies available:

- a sponge
- liquid dish detergent
- a bar of soap
- hot water
- cold water
- a pile of dirty dishes

Using only these supplies, which question can Gary investigate with an experiment?

**A** | Are dishes cleaner when washed with liquid dish detergent or with bar soap?

**B** | Are dishes cleaner when washed with a soapy sponge or with a soapy rag?

**C** | Are dishes washed in a dishwasher cleaner than dishes washed by hand?

**D** | All of the above.



**Q6.** Aisha notices that her cell phone charges more quickly sometimes and more slowly other times. She wonders what factors affect how quickly a phone charges. So, she decides to design an experiment. She has the following supplies available:

- one cell phone
- a two-foot-long charging cable
- a five-foot-long charging cable
- a stopwatch
- a wall outlet

Using only these supplies, which question can Aisha investigate with an experiment?

**A** | Does a cell phone charge faster when plugged into a wall outlet or into a computer?

**B** | Does a tablet charge faster with a two-foot-long charging cable or a five-foot-long charging cable?

**C** | Does a cell phone charge more quickly when it is turned on or when it is turned off?

**D** | All of the above.

**Q7.** The passage below describes how the engineering-design process was used to test a solution to a problem. Read the passage. Then answer the question below.

Logan was a landscape architect who was hired to design a new city park. The city council wanted the park to have space for outdoor concerts and to have at least 20% of the park shaded by trees. Logan thought the concert area should be at least 150 meters from the road so that traffic noise didn't interrupt the music. He developed three possible designs for the park with the concert area in a different location in each design. Then, he tested each design by measuring the distance between the road and the concert area.

Which of the following could Logan's test show?

- A | which design would have the greatest distance between the concert area and the road
- B | if at least 20% of the park would be shaded by trees in each design
- C | which design would have the least traffic noise in the concert area
- D | All of the above



**Q8.** Tyrone was hired by the city council to design a new park with space for outdoor concerts. The city council had two requirements:

- Requirement 1: The park had to have between 2 and 3 kilometers of walking trails.
- Requirement 2: The concert space had to be more than 150 meters away from the road.

Tyrone designed and measured three models of the park. His results are shown below.

Design	Length of walking trails (kilometers)	Distance between concert space and road (meters)
A	2.5	152
B	2.8	146
C	3.2	149

Which of the following designs meets both of the requirements?

- A | design A
- B | design B
- C | design C
- D | none of these

**Q9.** What do these two changes have in common?

- dew appearing on grass in the morning
- an iceberg melting slowly

**A** | Both are only physical changes.

**C** | Both are caused by heating.

**B** | Both are chemical changes.

**D** | Both are caused by cooling.



**Q10.** Consider the following force:

**A hockey stick is pushing on a hockey puck.**

**According to Newton's third law, what other force must be happening?**

**A** | The hockey puck is pushing on the hockey stick.

**B** | The hockey puck is pulling on the hockey stick.

**C** | Both of the above.

**D** | None of the above.



**Q11.** The name of the mosquito which is responsible for transmitting dengue fever is \_\_\_\_\_ .

**A** | Culex mosquito

**C** | Anopheles mosquito

**B** | Aedes mosquito

**D** | None of above

**Q12.** Read the following passage and think about the evidence that kinetic energy, chemical potential energy, and thermal energy changed.

Ellen biked in a straight line along the street. Then, to avoid the sun, she moved over to ride under the shade of some trees. But as she pedaled faster and sped up, Ellen started to feel hot even in the shade.

Consider the following claim:

While Ellen was pedaling, chemical potential energy was converted to both kinetic energy and thermal energy.

Which piece of evidence best supports the claim?

**A** | The sun was bright during Ellen's bike ride, but Ellen rode in the shade.

**B** | Ellen first rode in a straight line, and then she turned.

**C** | Ellen used her muscles to move faster, and the effort made her hot.

**D** | None of the above.



**Q13.** The table shows data about how the temperature of each cake changed over 5 minutes.

Cake	Initial temperature (°C)	Final temperature (°C)
Cake on the plate	91	81
Cake in the pan	91	83

Which statement is correct?

**A** | Thermal energy was transferred more quickly out of the cake on the plate.

**B** | Thermal energy was transferred more quickly out of the cake in the pan.

**C** | Thermal energy was transferred out of the both cakes at the same rate.

**D** | None of the above.



**Q14.** All organisms need food for energy. But how does an organism's body actually get energy out of food? Read the following passage to answer.

Food supplies an organism with many small, energy-rich molecules. These molecules are taken in by the organism's cells. Inside cells, the molecules from food are broken down to release energy that cells can use. This energy powers cell processes that allow the entire organism to grow and live.

1. Molecules from food can provide energy to cells.
2. Breaking down molecules can release energy.
3. Cells use energy to promote the organism's growth.
4. Cells usually take in large food molecules.

Which of the above statements are true?

**A** | 1 & 2

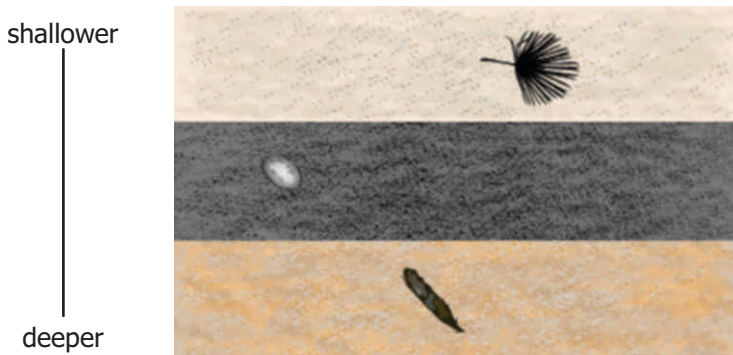
**B** | 2 & 3

**C** | 3 & 4

**D** | 1, 2 & 3



**Q15.** This diagram shows fossils in an undisturbed sedimentary rock sequence.

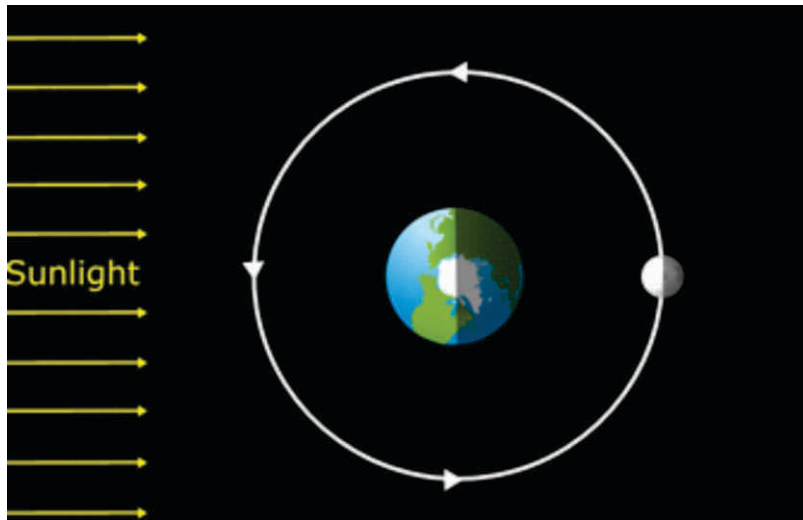


Which of the following fossils is older? Select the more likely answer.



**D** | None of the above.

**Q16.** The model below shows the Moon at one position in its orbit around Earth. The white half of the moon represents the part of the Moon that is lit up by the Sun.



Select the phase of the Moon shown in the model.

**A**



**B**



**C**



**D** | None of the above



**Q17.** The energy of running water is exploited to run turbines in

**A** | hydroelectric power stations

**B** | railway stations

**C** | oceans

**D** | rural area

**Q18.** Although solar energy is safe, free of pollution and freely available but it is difficult to

**A** | harness

**B** | conserve

**C** | store

**D** | transfer



**Q19.** Coal, crude, petroleum and natural gas are examples of

**A** | elements

**B** | man made fuels

**C** | fossils fuel

**D** | compounds



**Q20.** How long is a paintbrush? Select the best estimate.

**A** | 12 inches

**B** | 12 feet

**C** | 12 yards

**D** | 12 miles



**Q21.** What is the temperature of a warm swimming pool? Select the best estimate?

**A** | 129°C

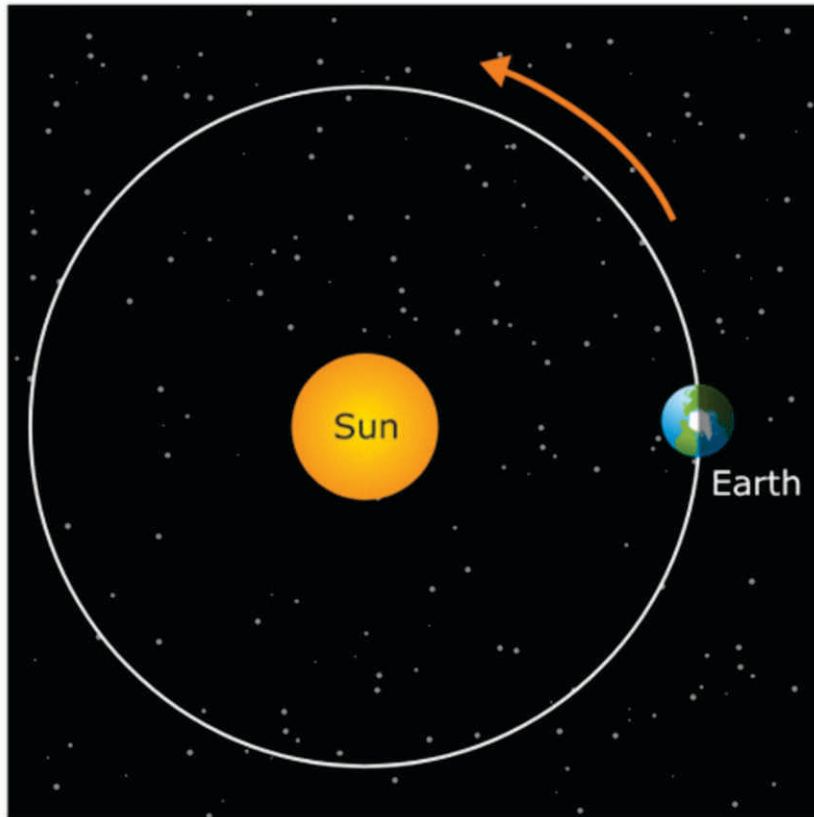
**B** | -129°C

**C** | 29°C

**D** | 29°F

**Q22.** Complete the following sentence after reading the passage below.

The Sun gives off light, which is a form of energy. A constant amount of sunlight travels away from the Sun at all times. The sunlight travels in straight lines in all directions. The model below shows the shape of Earth's orbit around the Sun. Earth is shown at one point in its orbit during the month of December.



The total amount of sunlight that approaches Earth is about \_\_\_\_\_ in June as in December.

**A** | the same

**B** | twice as much

**C** | half as much

**D** | four times

**Q23.** Read the text. Then answer the question.



Earth is surrounded by a layer of gases called the atmosphere. These gases make up the atmosphere sustain life on Earth. Living organisms take in and release some of these gases. Gases in the atmosphere also help insulate Earth from extreme temperatures and block some harmful forms of sunlight.

Earth's organisms rely on the atmosphere for which of the following?

1. stable temperatures

2. oxygen

3. carbon dioxide

4. sunlight

**A** | 1 & 2

**B** | 2 & 3

**C** | 3 & 4

**D** | 1, 2 & 3



**Q24.** Bowl shaped depressions due to cutting of mountain walls by glacier are called

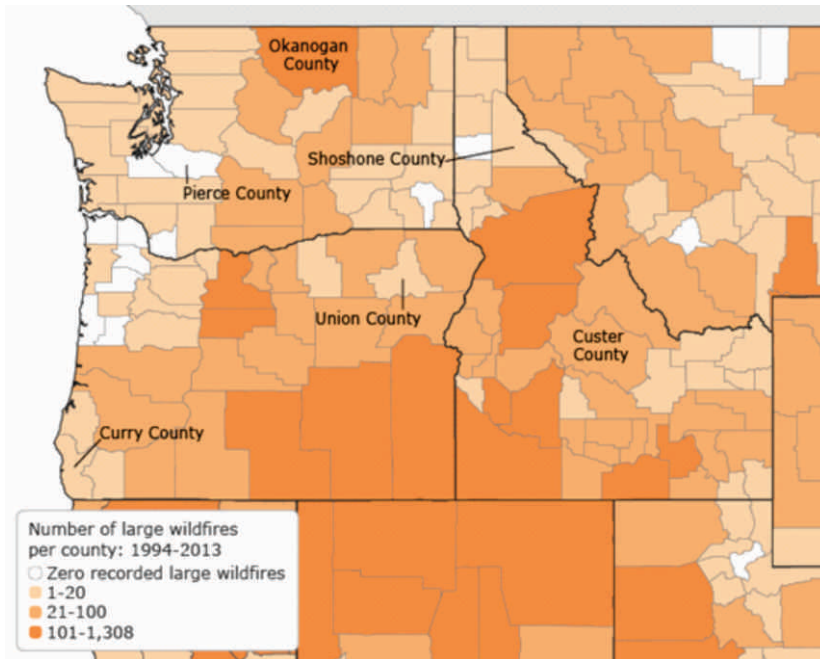
**A** | horns

**B** | cirques

**C** | Arties

**D** | hanging valleys

**Q25.** Read the passage below the map and answer the following question.



Source: Federal Emergency Management Agency

Scientists make hazard maps for many different types of natural hazards. The map below shows data about wildfires, which are unplanned fires burning in wilderness areas. This map shows wildfire data for each county in one region of the United States.

Based on the following map, which statement is true?

- A** | Between 1994 and 2013, Custer County had fewer large wildfires than Okanogan County.
- B** | Between 1994 and 2013, Pierce County had more large wildfires than Curry County.
- C** | Between 1994 and 2013, Shoshone County and Union County had the exact same number of large wildfires.
- D** | The number of wildfires in all the countries was same.

**Q26.** Read the passage below and answer the following question.

**Meteorologists can make predictions about weather events. For example, the passage below describes how a meteorologist might use observations of Earth's atmosphere to predict a tornado event.**



A tornado passing through a field

**A meteorologist uses atmospheric maps to examine air masses, which are large areas of air in Earth's lower atmosphere. The meteorologist notices that an air mass with dry air is approaching an air mass with warm, moist air. In the same region, there are strong winds higher in the atmosphere. The meteorologist recognizes that this combination of air masses and winds in the region could lead to a tornado event.**

- 1. Scientists can study air masses to predict weather events.**
- 2. Some air masses contain dry air; other air masses contain moist air.**
- 3. Meteorologists are scientists who study meteors.**
- 4. Air masses cannot be used to predict weather events.**

**Which of the above statements are true?**

**A** | 1 & 2

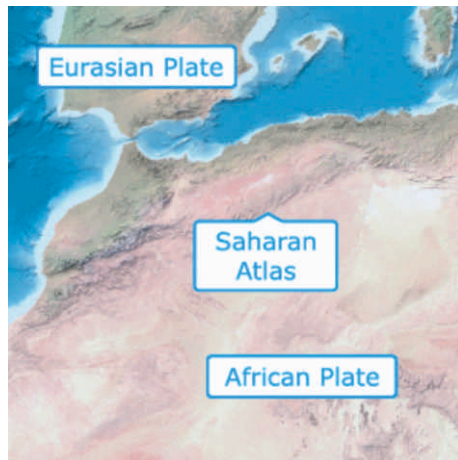
**B** | 1 & 3

**C** | 2 & 3

**D** | None of these

**Q27.** Read the passage and look at the picture.

- The Saharan Atlas, a mountain range in northern Africa, began to form millions of years ago as the Eurasian Plate and the African Plate moved toward each other. As the plates collided, the continental crust was forced upward to form tall mountains.
- Along the sides of the mountains in the Saharan Atlas, there are riverbeds called wadis. Wadis contain water only during wet seasons. The rest of the year, the river beds are dry.



**Complete the Sentence.**

The Saharan Atlas formed at a \_\_\_\_\_ boundary.

**A** | divergent

**B** | convergent

**C** | transform

**D** | None of these

**Q28.** The walls of left ventricle are thicker than the walls of right ventricle because

**A** | blood reaches this ventricle with extra pressure

**B** | it has to pump the blood to lungs

**C** | blood reaches this ventricle in huge amount

**D** | it has to pump blood to the whole body



**Q29.** Which of the following are characteristics of tropical coral reefs?

A tropical coral reef is a type of ecosystem in the ocean. Tropical coral reefs are found in warm, shallow water near the equator. They have many large formations called corals.

Corals may look like rocks or plants, but they are actually structures made up of living animals and can grow over time.

Corals provide shelter for fish, crabs, eels, and many other organisms. These coral reef organisms are prey for larger animals, such as sea turtles, sharks, and dolphins. Most of these organisms need tropical coral reefs in order to survive and reproduce.



A tropical coral reef



Several types of corals

1. They are usually found in the deep ocean.
2. They are used by many different organisms.
3. They have warm, salty water.
4. They have many large rocks called corals.

**A** | 1 & 2

**B** | 1 & 3

**C** | 2 & 3

**D** | None of the above



**Q30.** Phases of appearance of moon are caused by the movement of moon around the

**A** | sun

**B** | earth

**C** | planets

**D** | stars



National Toppers  
ICATS  
ART  
Contest  
2021

Student Name	Father Name	Grade	School
TEHREEM SHIRAZ	SYED SHIRAZ ALAM	1	CANTT. PUBLIC HIGH SCHOOL & GIRLS COLLEGE (HYDERABAD)
MUHAMMAD AHMED KHAN	UZAIR AHMAD KHAN	2	ARMY PUBLIC SCHOOL (JUNIOR)
RAMISHA SAHAR	RAJA ISHAQ ASAD	3	FATIMA FERTILIZER SCHOOL
ZARLISH MOMINAH	TAYYAB SIDDIQUE	4	ARMY PUBLIC SCHOOL (DEFENCE COMPLEX ISLAMABAD)
DARSAMIN RAFIQUE	AZHAR RAFIQUE	5	NOVA CITY SCHOOL
AAFEEN KHALIL	KHALIL FAZIL	6	ISLAMABAD COLLEGE OF ARTS AND SCIENCES
HOORIA NOUMAN	NOUMAN ILYAS	7	KOSHAR CHILDREN'S ACADEMY
FATIMA RIZWAN	RIZWAN LIAQAT	8	LAHORE GRAMMAR SCHOOL
DUA ZAIN	M. ZAIN	9	HIRA FOUNDATION SCHOOL
WAJIHA SHAKEEL	SHAKEEL SIDDIQ	10	THE INTELLECT SCHOOL

*Congratulations*

National Toppers  
ICATS  
Creative Writing  
Contest  
2021

Student Name	Father Name	Grade	School
MUHAMMAD HAZIQ UMAR	UMAR SARWAR	1	LAHORE GRAMMAR SCHOOL
M ABDULLAH	IKHTIYAR AHMED	2	FAUJI FOUNDATION SCHOOL (IAND)
ALISHBA HAMEED	ABDUL HAMEED	3	ST. GREGORY'S HIGH SCHOOL
SHAHMEER	AMEER HUSSAIN	4	LAHORE GRAMMAR SCHOOL (VALENCIA TOWN)
ESHAAL ALEEM	ALEEM AHMED KHAN	5	THE CITY SCHOOL (GULSHAN JUNIOR CAMPUS)
MUHAMMAD YAHYA	IFTIKHAR MANZOOR	6	INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD SCHOOL
SYEDA SABA ZAWAR	SYED ZAWAR	7	THE CITY SCHOOL (JHELUM CAMPUS)
EMAN AMNA	AFTAB	8	HAYAT SCHOOL & COLLEGE
ALIZHA NOOR ARSHAD	MRS. FOZIA ARSHAD	9	THE INTERNATIONAL SCHOOL OF CHOUEIFAT
MANAAM RAZA	RAZA UL MOHSIN	10	LAHORE GRAMMAR SCHOOL (1A1 SENIOR)

*Congratulations*

Compete  
if you are the best