ICATS SCIENCE CONTEST

2022

QUESTION BOOKLET

GRADE 9 & 10 ADOLESCENTS

Time Allowed: 90 Mins.
Maximum Marks: 90

INTERNATIONAL CATS CONTESTS
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ICATS SCIENCE CONTEST 2022

ADOLESCENTS (GRADE 9 & 10)

TIME ALLOWED : 90 MINUTES, 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. 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
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT INFO@CATSCONTESTS.ORG

Read the text below and answer the questions.

In 1997, a 7-month-old sheep named Dolly became a celebrity. Dr. Ian Wilmut, a Scottish scientist, announced to the world that he had created her using a procedure called cloning. Cloning is a method that scientists use to produce a genetic copy of another individual. In other words, Dolly was a clone of her mother.

1. Scientists took udder cells from Dolly's DNA mother. They let the cells multiply and then they stopped the process when they had divided enough.
2. They took an egg cell from a different sheep and removed the nucleus.
3. They put one udder cell next to the egg cell without a nucleus and joined them using electricity.
   The egg cell now contained all the udder cell's DNA.
4. The egg cell divided until it developed into an embryo. An embryo is the early stage of an animal before it has been born or hatched. This embryo was placed inside a third sheep. Five months later, this sheep gave birth to Dolly.

It took scientists 277 tries to succeed in cloning Dolly. To make her, Dr. Wilmut used a complicated method called "nuclear transfer." In this method scientists remove a nucleus from one cell and transfer, or move, it to a different cell.

Q1. Why did scientists select nucleus for the cloning of a sheep?

A The nucleus contains the somatic cells
B Nucleus transforms the udder cells into an embryo
C Nucleus is responsible for the transfer of genetic material
D Nucleus comes from udder cells

Q2. This passage describes the sequence of events involved in cloning a sheep. What happened after the scientists took udder cells and an egg cell from different sheep?

A The egg cell was joined to an udder cell using electricity.
B The embryo was placed inside another sheep.
C Scientists took udder cells from Dolly's DNA mother.
D The egg cell was divided until it formed an embryo.

Q3. **As part of the process of cloning a sheep, scientists placed the embryo inside a sheep, which eventually gave birth to Dolly. Based on this evidence, what conclusion can be made?**

A Cloning a sheep requires many egg cells and udder cells.
B An embryo can develop into an animal on its own, outside another animal's body.
C The embryo had to develop inside a "mother" sheep for a period of time.
D The embryo has to develop in the "DNA mother's" body for the cloning process to be successful.

Q4. **Based on the information in the text, what can you infer about the process of cloning a sheep?**

A Cloning cannot be done more than once.
B Cloning a sheep can happen overnight.
C Cloning does not happen naturally in sheep.
D Cloning is the easiest way to produce sheep.

Q5. **What is mainly did you understand from the text?**

A An embryo is the early stage of an animal before it has been born or hatched.
B Dolly's DNA mother provided the udder cells that helped scientists make Dolly.
C Scientists cloned a sheep using udder cells from one sheep and an egg cell from another.
D Udder cells and egg cells can be joined together using an electric current.

Q6. **Choose the answer that best completes the sentence:**
"The udder cell and the egg cell were joined using electricity. As a result, the egg cell contained the entire udder cell's _____."

A nucleus
B embryo
C DNA
D udder cells

Q7. **Identify the correct option by evaluating the statements.**

Statement A: Scientific research has identified many possible reasons for the decline of European honeybee population including viruses, parasites, insecticides, stress, and diet.
Statement B: Colony collapse disorder (CCD) is the disappearance of honeybee population from their colonies in summer.

A Statement A is incorrect and statement B is correct.

B Both statements are correct.

C Statement A is correct and B is incorrect.

D Both statements are incorrect.

Q8. **The passage below describes an experiment. Read the passage and identify the question that (Ali's experiment can best answer.**

Antibiotics are substances that can prevent bacteria from growing. In his laboratory, Daniel prepared 15 Petri dishes, which are used to grow bacteria. Five of the dishes contained no antibiotic, five contained a low concentration of antibiotic, and five contained a high concentration of antibiotic. Daniel added an equal amount of one species of bacteria to each dish. He kept the dishes at 37°C, allowing the bacteria to grow overnight and form colonies in the dishes. The next day, Daniel counted the number of bacteria colonies that had grown on each dish.

A Do more bacterial colonies grow at 37°C compared to 25°C?

B Do more bacterial colonies grow on Petri dishes with high concentration of antibiotics compared to low concentration?

C Does the concentration of antibiotic in Petri dishes affect the number of bacterial species that can grow on the dishes?

D Do the bacterial colonies form white colonies or blue colonies?

Q9. **Laiba leaves some chocolates in her jacket pocket. When she finds the chocolates later, she notices that some of them have melted. She wonders what factors affect how quickly chocolate melts. So, she decides to design an experiment. She has the following supplies available:**

- one bar of milk chocolate
- one bar of dark chocolate
- a stove
- a pot

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

A Does milk chocolate or dark chocolate melt faster when heated on the stove?

B Does milk chocolate melt faster when heated in a microwave or an a stove?

C Does dark chocolate or white chocolate melt faster when heated on the stove?

D Does dark chocolate melt faster when heated in a microwave or on a stove?

Q10. **What is the main function of the Golgi in an animal cell?**

A to fill the space between the cell membrane and the nucleus

B to break down sugar and release energy that the cell can use

C to package proteins and other substance and send them to different parts of the cell

D to break down worn-out cell parts

Q11. **Ajmal is an astronaut standing on the surface of the moon. He throws a ball upwards. The ball would:**

A directly fall down from the point it is released

B hang in space

C go up and then come back to the surface of the moon

D keep going up never to come back

Q12. People can use the engineering-design process to develop solutions to problems. One step in the process is testing if a potential solution meets the requirements of the design.
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.

Asif was installing solar panels on the roof of a client's house. The panels had to provide enough electricity to power the house year-round. He needed to decide how many panels to install and which side of the roof to install them on. If he put the panels on the side that got the most sun, then he could use fewer panels, and the client would save money. Asif installed sunlight sensors on both sides of the roof. Then, he measured the amount of sunlight the sensors on each side of the roof recorded over one sunny summer day.

Which of the following could Asif's test show?

A which side of the roof got more sun over one day?
B the amount of sunlight the roof would get throughout the year?
C how many solar panels could fit on each side of the roof?
D All of the above.

Q13. **In a study about headaches, doctor gave patients Alieve, Tylenol, Advil and Excedrin to see which medication would relieve the headache pain the fastest. The doctors timed how long it took the medication to work. Which is the following is and independent variable?**

A Amount of medication
B Headaches
C Amount of time until pain was relived
D Types of pain reliever

Q14. Look at the variety of plants growing together in this greenhouse. One of the types of plants shown has genes that contain instructions for growing broad, red leaves. Another type has genes that contain instructions for growing flowers and green leaves.

all the plants received about the same amount of water, nutrients and sunlight as they grew.

What most likely caused the different types of plants in the greenhouse to have different traits?

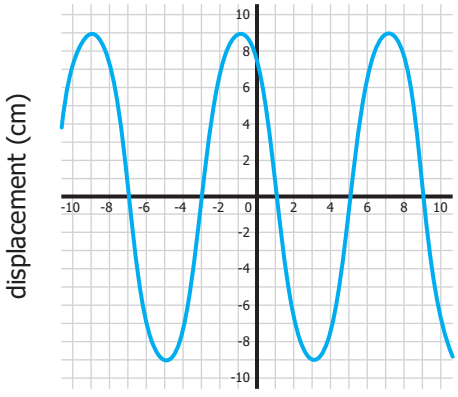
A Mainly genetic factors

B Mainly environmental factors

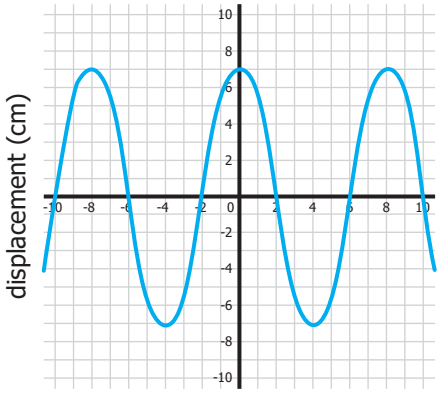
C Pollination

D Cross breeding

Q15. **The graphs below represent two waves. The waves are traveling at the same speed through the same medium.**



Wave 1



Wave 2

Select the correct option:

A The amplitude is greater for wave 1

B The frequency is greater for wave 2

C The amplitude is equal for both the waves

D The frequency is equal to the amplitude

Q16. **A car begins to move. It speeds up until it reaches a constant speed. It continues to travel at this constant speed for the rest of the journey. What happens to the acceleration and what happens to the velocity of the car during the journey?**

A Both the acceleration and the velocity change.

B Only the acceleration changes.

C Only the velocity changes.

D Neither the acceleration nor the velocity changes.

Q17. **Ken took two identical baked potatoes out of an oven. One potato was wrapped in foil and one was not. This table shows how the temperature of each baked potato changed over 30 minutes.**

Baked potato	Initial Temperature (°C)	Final Temperature (°C)
Potato not wrapped in foil	98	68
Potato wrapped in foil	104	79

The next time Ken bakes a potato, he does not want it to cool down quickly. What should he do?

A Leave the potato unwrapped.

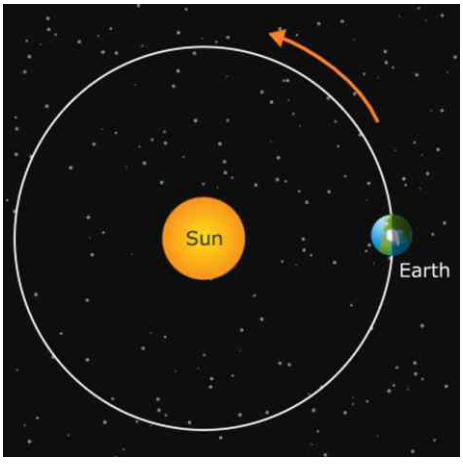
B Wrap the potato in foil.

C Either; the rate of thermal energy transfer is the same whether or not the potato is wrapped in foil.

D Wrap the potato in foil for some time and then leave it unwrapped later.

Q18. **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.



Complete the sentence:

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

A half as much
B twice as much
C the same
D thrice as much

Q19. An ecosystem with higher biodiversity is often better able to support life. When an ecosystem has many different species, it can provide more types of food, shelter, and other resources for the organisms living there. Having many species may also increase an ecosystem's resilience, or ability to handle stress or damage. If one species is wiped out by a disaster or disease, another species may be able to fill the same role in the ecosystem. For example, a disease could wipe out a species that is eaten by many predators. An ecosystem with higher biodiversity is more likely to have other species that those predators can eat.

How might high biodiversity help a coral reef?

A It makes the reef more likely to recover from a natural disaster, such as a storm.
B It could help the reef's ecosystem adjust if one of its species goes extinct.
C It provides the reef's organisms with more types of food and shelter.
D All of the above.

Q20. **Select the ecosystem with the highest biodiversity.**

A

This open ocean ecosystem is home to large fish and marine mammals. Because this ecosystem does not have many different habitats, it does not have many different species.

B

This tundra ecosystem is very cold for most of the year. Only a few species, such as caribou and wolves, are able to survive under these harsh conditions.

C

This desert ecosystem often has hot, dry weather. It has many different species of plants and animals that have adaptations for staying cool and storing water.

D They all have some level of biodiversity.

Q21. **This picture shows a fossil of an ancient animal called Megaloceros. An adult Megaloceros could grow over seven feet tall.**

Which traits did Megaloceros have? Select the traits you can observe on the fossil.

A A mane on the back of its neck.

B A tail with long hair.

C Antlers

D All of these.

Q22. **Earth is surrounded by a layer of gases called the atmosphere. The gases that 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? Select the correct option.**

A Oxygen

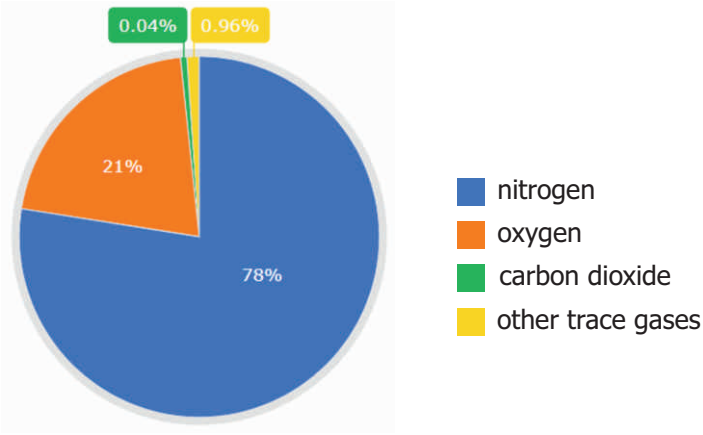
B Stable temperatures

C Carbon dioxide

D All of these.

Q23. The circle graph below shows the concentrations of the gases that make up Earth's atmosphere, except for water vapor. The concentration is the amount of particles in a given volume and is shown here as a percentage of the total number of gas particles in the atmosphere. Gases present at concentrations less than 1%, such as carbon dioxide, are called trace gases.

Concentration of gases in Earth's atmosphere



Based on the graph, which of the following are true?

A For every one hundred particles of oxygen in Earth's atmosphere, there is about one particle of carbon dioxide.

B Earth's atmosphere contains mostly oxygen particles.

C There are over three times as many particles of nitrogen in the atmosphere as of all the other gases combined.

D Carbon dioxide makes up 4% of the gas particles in Earth's atmosphere.

Q24. Hawk moths visit many types of plants to find nectar, including petunias. Petunias produce nectar deep inside their flowers. To reach the nectar, a moth puts its long, tubular mouthpart, called a proboscis, inside a flower. While the moth drinks nectar, pollen from the flower sticks to the moth's head and proboscis. Later, the moth visits another petunia flower to drink more nectar. When pollen on the moth's head and proboscis is transferred to the female part of the other flower, that flower is pollinated. After the moth pollinates the flower, the petunia is able to reproduce.

Which type of relationship is formed when a hawk moth visits a pentunia flower?

A commensal

B mutualistic

C parasitic

D None of these

Q25. The temperate mountains of Yellowstone National Park in Wyoming are made from volcanic rocks. These mountains are home to many large mammal species. For example, gray wolves are common predators in this habitat.

Gray wolves hunt in packs to capture the elk, white-tailed deer, and bison that live in the mountains. Coyotes often eat the scraps of prey animals that wolf packs leave behind. After the coyotes have fed, birds such as ravens and magpies eat the meat that remains on the animal bones.

Which of the following best describes a population in the mountains of Yellowstone National Park?

A The elk, the coyotes, and the volcanic rock

B The magpies and the ravens

C A pack of gray wolves

D None of the above.

Q26. Sam is making soap at home using the saponification reaction. Her soap recipe uses coconut oil. The melting point of coconut oil is 76°F.

Sam is making the soap in her kitchen, where the temperature is currently 82°F.

Which of the following statements is true?

A Because the temperature in Sam's kitchen is higher than the melting point of the coconut oil, the coconut oil is a liquid.

B The coconut oil forms the soap regardless of the higher temperature in Sam's kitchen.

C A substance's melting point is lower when the attractions between its molecules are stronger.

D A large amount of coconut oil has a higher melting point than a small amount of coconut oil.

Q27. **A non-metal used to preserve food material is:**

A Carbon | B Phosphorus | C Sulphur | D Nitrogen

Q28. **Aluminum is used for making cooking utensils. Which of the following properties of aluminum are responsible for the same?**

(i) Good thermal conductivity
(ii) Good electrical conductivity
(iii) Ductility
(iv) High melting point

A (i) and (ii) | B (i) and (iii) | C (ii) and (iii) | D (i) and (iv)

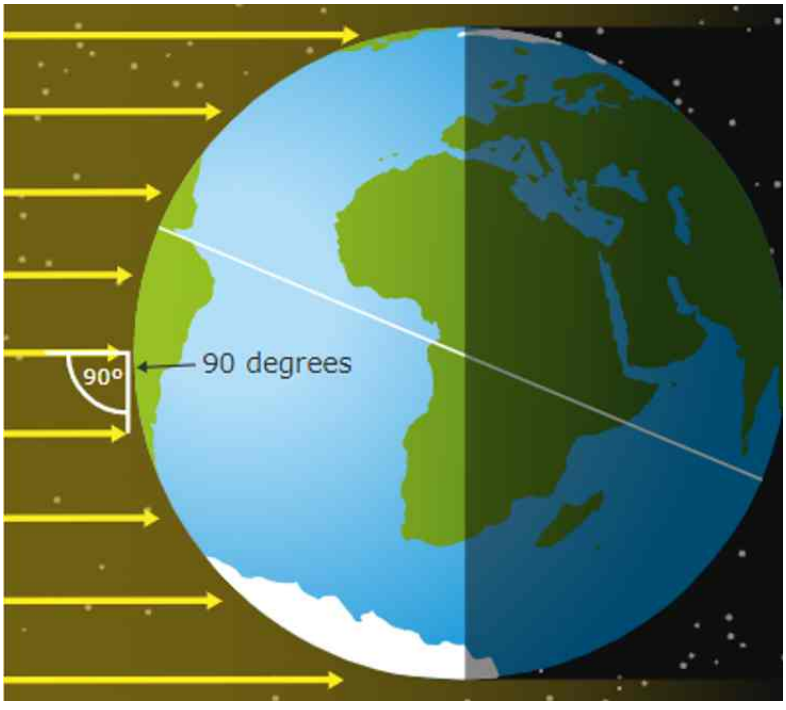
Q29. **Consider the following claim about how a snail leech can increase its reproductive success:**

Covering its eggs with its body increases the chances that the leech's eggs will hatch.

Which of the following observation best supports the claim?

A Leech eggs are eaten less often when they are covered by the leeches.
B Water snails that live in freshwater streams often try to eat leech eggs.
C Most leeches do not move anywhere while they are covering their eggs.
D All of the above.

Q30. **Look at the picture below and answer the following question.**



At which of the following locations does light strike Earth with the greatest intensity?

A The equator.

B The North Pole.

C The South Pole.

D The intensity of the sunlight will be the same at all locations on Earth.

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Congratulations

ICATS Art Contest 2022
National Toppers

Student Name	Father Name	Grade	School
HUMNA NADIR	M. NADIR IKRAM	1	FOUNDATION PUBLIC SCHOOL
HAIDER ALI	ALI MUSHTAQ	2	ARMY PUBLIC SCHOOL & COLLEGE
MUHAMMAD YOUSAF	KAMRAN ASHRAF	3	KOHSAR CHILDREN'S ACADEMY
MUHAMMAD ZAID	M. SOHAIB NIZAMI	4	GENERATIONS SCHOOL
HANIA ABID	MRS. ASMA LATIF	5	FATIMA FERTILIZER SCHOOL
RUQAIYAH ALI ASGHER	ALI ASGHER KHAMBATWALA	5	MSB EDUCATIONAL INSTITUTE
RAMISHA ALI	ABID ALI MUGHAL	6	GOVT. QUEEN MARY GRADUATE COLLEGE
SYEDA FATIMA SURIYA	SYED TAHIR HUSSAIN	7	BEACONHOUSE SCHOOL SYSTEM
MANAL ARSHAD	MUHAMMAD ARSHAD	8	HABIB GIRLS SCHOOL
MARYAM SHAHID	SHAHID IQBAL	9	BAHRIA COLLEGE
AREEBA KHAN	DURAIZ KHAN	10	PRESENTATION CONVENT HIGH SCHOOL

ICATS Creative Writing Contest 2022
National Toppers

Student Name	Father Name	Grade	School
HASSAN WASEEM	M. WASEEM	1	PAKISTAN INT'L PUBLIC SCHOOL
M. AFNAN SUFDER	SUFDER HUSSAIN	2	ARMY PUBLIC SCHOOL AND COLLEGE SYSTEM
FATIMA NOOR	BILAL YOUSAF	3	LAHORE GRAMMAR SCHOOL
M. ABDULLAH HASSAN	RIZWAN AHMAD	3	LAHORE GRAMMAR SCHOOL
SHANZAY ADNAN	ADNAN FAROOQ	3	ARMY PUBLIC SCHOOL
PRATIK PARKASH	PARKASH LAL	4	THE CITY SCHOOL
DANIYAL SHAHZAD	SHAHZAD ASLAM	5	LAHORE GRAMMAR SCHOOL
HASSAN ALI	IMRAN ALI SHAH	6	ARMY PUBLIC SCHOOL & COLLEGE
MAIDA SOHAIL	SOHAIL AKRAM	7	BEACONHOUSE SCHOOL SYSTEM
ATIYA ATIF	MUHAMMAD ATIF NAZAR	8	ROOTS IVY INTERNATIONAL SCHOOL
AYESHA HAFEEZ	CH. GHULAM HAFEEZ	8	ISLAMABAD COLLEGE OF ARTS & SCIENCES
PARTHAM KUMAR	DOULAT RAM	9	AGA KHAN HIGHER SECONDARY SCHOOL
AMNA HUSNAIN	SYED ALI ZAFAR	10	AES SCHOOL FOR GIRLS
RASIKH JAVED	M JAVED	10	BAHRIA FOUNDATION COLLEGE

Compete
if you are the best

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