



INTERNATIONAL
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QUESTION BOOKLET



ICATS
SCIENCE
CONTEST 2019

**GRADE 7 & 8
(JUVENILES)**

Time Allowed: 90 Mins
Maximum Marks: 90

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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 / ANSWERSHEET.
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
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT INFO@CATSCONTESTS.ORG

- Q1.** Jillani conducted an experiment that compared effects of different sounds on growth of bean plants. He planted bean seeds of same type and size in three containers using same type of soil in each container. He placed containers in the locations shown below.

Bean Seedling Locations and Sounds

Container	Location and Sounds
1	bedroom with 4 hours of pop music per day
2	living room with 4 hours of television per day
3	empty room with no sound

Jillani gave each plant the same amount of water at the same time each day. After two weeks, Jillani observed that the plant in the living room was the largest and had the most leaves. Jillani concluded that bean plants grow the fastest when exposed to television sounds. Which is the greatest error that Jillani made in his experimental design?

- A** | Jillani did not control other variables that might affect plant growth.
- B** | Jillani did not control for the variables of soil type or amount of water.
- C** | Jillani did not plant the beans from seeds.
- D** | Jillani did not use enough different types of music.

- Q2.** The chart shows whether different objects will scratch rocks.

Rock	Is Scratched By			
	Fingernail (2.2)	Penny (3.0)	Glass (5.5)	Quartz (7.0)
W	no	no	yes	yes
X	no	no	no	no
Y	no	no	no	yes
Z	yes	yes	yes	yes

Which list shows these rocks in order from the hardest to the softest?

A | XWYZ

B | XYWZ

C | ZYWX

D | ZWYX

Read the information given below and answer the questions 3 through 8.

Petroleum, or crude oil, is refined by separating it into different by-products. This process is called fractional distillation, whereby the crude oil is heated and each different product is distilled, or drawn off, at different stages. Each product is distilled at certain temperature ranges and collected in separate receivers. Petroleum refining is carried out in a boiler and a fractionating tower. The crude oil is super-heated in the boiler to about 600° C, which vaporizes the crude oil. The vapors then rise in the tower to certain levels where they cool and condense, according to their chemical structure. When the vapor reaches a height in the tower where the temperature in the column is equal to the boiling point of the substance, the vapor turns into liquid (condenses), collects in troughs, and flows into various tanks for storage, as shown in Figure 1. Table 1 below summarizes the characteristics of the by-products obtained from the fractional distillation of petroleum.

Petroleum by-product	Condensation temperature (°C)
Petroleum gas	20-40
Gasoline	40-70
Kerosene	100-120
Gas oil	120-200
Lubricating oil stocks	200-300
Residue	600

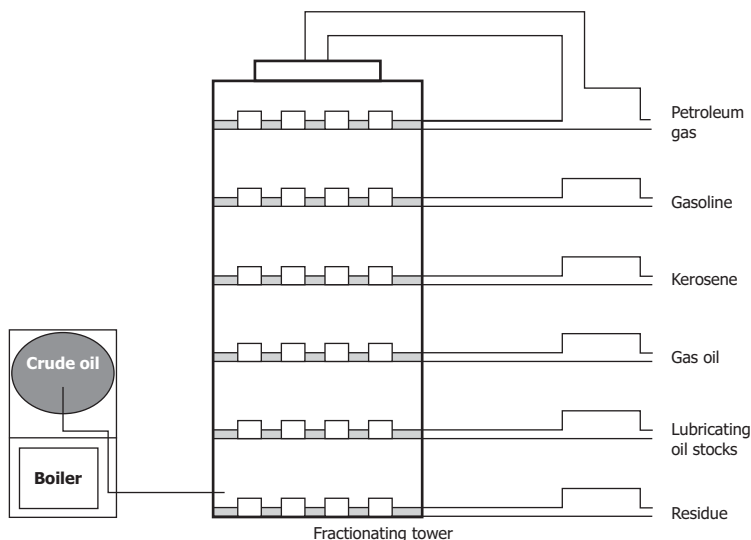


Figure 1

Q3. According to the passage, the temperature at which gasoline condenses is most likely:

A | less than 0°C.

B | less than 40°C.

C | greater than 20°C.

D | greater than 70°C.

Q4. According to the passage, which by-product formed in the fractionating tower condenses first?

A | Petroleum gas

B | Kerosene

C | Gas oil

D | Residue

Q5. According to Figure 1, fractional distillation uses which of the following as a raw material?

A | Gasoline

B | Residue

C | Crude oil

D | Gas oil

Q6. Given that naphtha, another by-product of petroleum distillation, has a condensation point of approximately 90°C, between which two petroleum by-products would this substance be found in a fractionating tower?

A | Gasoline and Kerosene

C | Kerosene and Gas oil

B | Lubricating oil stocks and Gas oil

D | Residue and Lubricating oil stocks

Q7. According to the passage, at what temperature is most of the crude oil vaporized?

A | 600°C

B | 300°C

C | 100°C

D | 20°C

Q8. According to the passage, as the vapor rises in the fractionating tower:

A | the condensation temperature increases only.

B | the condensation temperature decreases only.

C | the condensation temperature increases quickly, then slowly decreases.

D | the condensation temperature remains stable at 600°C.

Read the information given below and answer the questions 9 through 15.

While digging in a remote site in Africa, paleontologists discovered a collection of fossilized dinosaur bones. The bones were dated back to the Jurassic period, and have been confirmed to be from a dinosaur known as a velociraptor. Two paleontologists discuss the finding.

Paleontologist 1

Once the well-preserved bones are assembled it is clear that they are velociraptor bones from the Jurassic period. The bones are long in the arms, indicating that the velociraptor was definitely capable of flight. You can see that there are cuts within the arm/wing bones of this dinosaur, indicating that it was caught while in flight. Perhaps it was attempting an escape from a more predatory dinosaur, such as tyrannosaurus rex. It is obvious from the body structure of the velociraptor that it was an effective hunter and predator. It was most likely quick to swoop in on its prey and was more than able to carry the prey away on its own. The form and function of the velociraptor has been misunderstood until this important discovery. The condition of these bones offers a clear picture of the way in which the velociraptor lived.

Paleontologist 2

Indeed, the velociraptor bones are in excellent condition. The long arm bones are indicative of the dinosaur's ability to scavenge prey and fend off larger predators. The cuts within the arm bones show that the velociraptor often stole its meals—the marks resemble defense wounds, perhaps from forcing other would-be scavengers away from the free meal. The structure of the velociraptor's feet indicates that it was a fast runner and was able to maneuver well through the high trees and undergrowth. This would certainly have allowed the velociraptor to quickly escape predators and possibly arrive at a kill-site before other larger dinosaurs, such as tyrannosaurus rex, descended upon the leftovers. The bones that were discovered answer many questions about the velociraptor, but they also bring up many new issues to consider.

Q9. Paleontologist 1's viewpoint contains the basic assumption that the velociraptor must have been:

A | unknown until the discovery of these bones

C | previously mischaracterized

B | an ineffective hunter

D | unable to escape large predators

Q10. Paleontologist 1 would most likely state that the cuts on the velociraptor bones were the result of:

A | failed attempts to fly

C | an attack by a larger predator

B | fending off a competing scavenger

D | mistakes made in assembling the bones

Q11. Suppose that the fossilized remains of another dinosaur species with long arm bones were discovered, and scientists determined that this dinosaur lived at the same time as the velociraptor. According to the passage, Paleontologist 2 would most likely conclude that:

A | the new dinosaur could fly

B | the new dinosaur could be a scavenger

C | the new dinosaur could not escape from predators

D | the new dinosaur could swoop in on its prey

Q12. Paleontologist 2's viewpoint regarding the velociraptor as a scavenger was based on the dinosaur's:

A | strong musculature

B | excellent condition

C | long arm bones

D | ability to fly

Q13. Paleontologist 1 would most likely support which of the following statements about the lifestyle of the velociraptor?

A | The velociraptor was a predatory dinosaur capable of flight, and is only now being understood.

B | The velociraptor was a dinosaur who scavenged other dinosaurs' kills.

C | The velociraptor was a fast runner that could easily out-manuever its predators in order to survive.

D | The velociraptor was hunted by many other dinosaurs during its time on Earth.

Q14. Assuming all are true, both paleontologists would most likely agree with which of the following facts concerning the velociraptor?

A | It was threatened by larger dinosaurs, such as tyrannosaurus rex.

B | It was unable to sustain flight.

C | It was not built for speed, and therefore, could not easily fend for itself.

D | It was not an effective hunter.

Q15. Both Paleontologists 1 and 2 would most likely agree with which of the following statements about the discovery of the velociraptor bones? The bones:

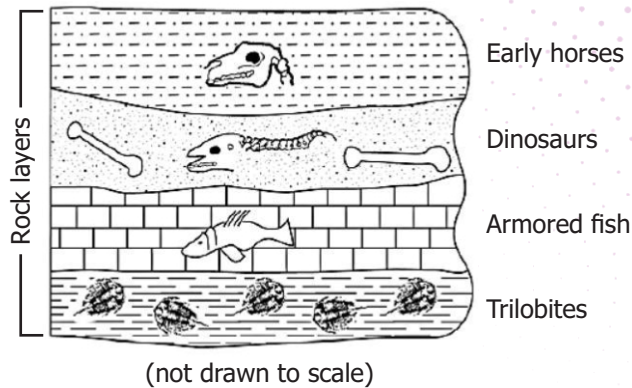
A | did not clarify any assumptions about the velociraptor

B | provided some useful information regarding the velociraptor

C | could not be assembled properly due to the poor condition in which they were found

D | completely altered both paleontologist's viewpoints regarding the velociraptor

Q16. The cross section below shows fossils and the rock layers in which they are found. Crustal movement has not displaced the rock layers.



Which fossil is considered the oldest in the cross section shown?

A | armored fish

B | dinosaurs

C | early horses

D | trilobites

Q17. The map below shows the four major time zones in the continental United States.



If it is 9 am in the Eastern Time Zone, what time is it in the Pacific Time Zone?

A | 3:00 am

B | 6:00 am

C | 6:00 pm

D | 9:00 pm

Q18. The length of a year is equivalent to the time it takes for one

A | rotation of Earth

C | revolution of Earth around the Sun

B | rotation of the Sun

D | revolution of the Sun around Earth

Q19. The diagram below shows a spinning water sprinkler. Water comes through a hose and is sprayed by the sprinkler.



Which principle best explains why the sprinkler spins?

A | Every action has an equal and opposite reaction.

B | Solid substances are usually more dense than liquid substances.

C | Energy is released when water condenses.

D | Most substances expand when heated and contract when cooled.

Q20. The diagram below shows a hammer being used by a person to remove a nail from a piece of wood.

Force exerted
by person



Hammer

Nail

The hammer is being used as which type of simple machine?

A | wheel and axle

B | inclined plane

C | lever

D | pulley

Q21. The diagram below shows a bar magnet resting on top of a piece of white paper. The north and south poles of the magnet are labeled N and S. Points A, B, C, and D represent four locations around the magnet.

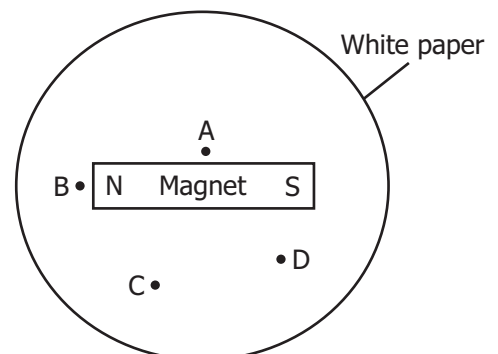
If iron filings were sprinkled evenly across the entire paper circle, at which location would the greatest concentration of iron filings be found after 30 seconds?

A | A

C | C

B | B

D | D



Q22. Scurvy is a disease that sailors often got on long voyages. It was discovered that scurvy could be prevented by eating oranges and lemons. This suggests that scurvy is a disease caused by

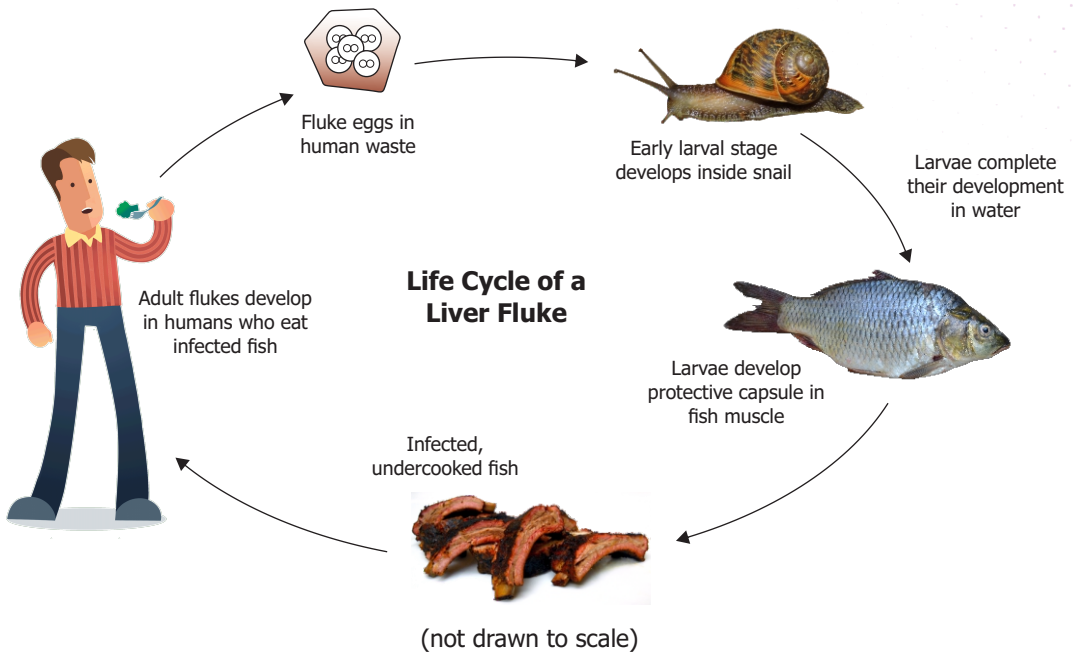
A | exposure to sea air

B | a nutritional deficiency

C | a microorganism

D | lack of exercise

Q23. The diagram below shows the life cycle of a liver fluke.



This diagram shows that the liver fluke

A | depends on other organisms for survival

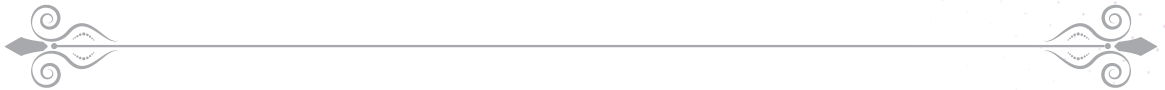
B | dies when it enters the fish

C | completes its life cycle in the snail

D | survives at very high temperatures

Q24. Which statement provides evidence that evolution is still occurring at the present time?

- A** | The extinction rate of species has decreased in the last 50 years.
- B** | Many bird species and some butterfly species make annual migrations.
- C** | New varieties of plant species appear more frequently in regions undergoing climatic change.
- D** | Through cloning, the genetic makeup of organisms can be predicted.

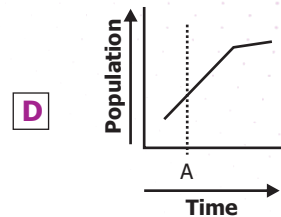
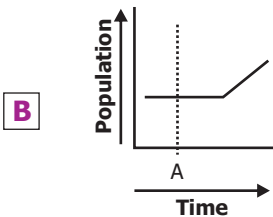
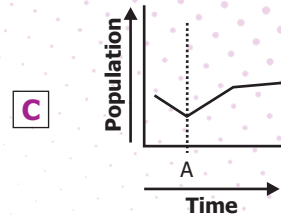
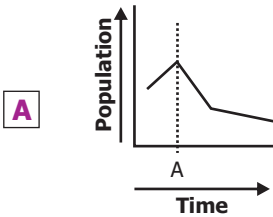


Q25. The walking catfish is a species of fish that walks on land using its pectoral fins. During drought conditions, when there is little water in its habitat, the walking catfish can use its pectoral fins to get to areas with water.

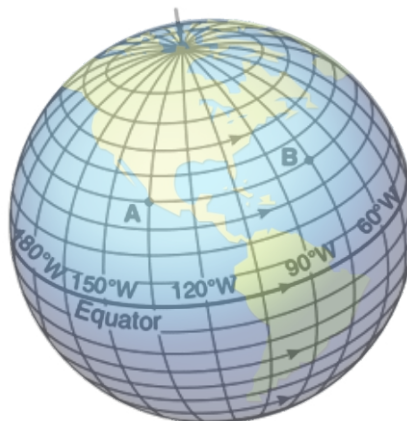
Which of these will **MOST LIKELY** happen to a population of walking catfish over time if all nearby aquatic environments dry up permanently?

- A** | Walking catfish with small pectoral fins are more likely to survive a trip to distant areas of water. The population is likely to evolve to have smaller pectoral fins.
- B** | Walking catfish with large pectoral fins are more likely to survive a trip to distant areas of water. The population is likely to evolve to have larger pectoral fins.
- C** | Walking catfish with large pectoral fins and those with small pectoral fins are equally likely to survive a trip to distant areas of water. Both types survive, so evolution is unlikely to occur.
- D** | Walking catfish with large pectoral fins and those with small pectoral fins are equally likely to not survive the trip to distant areas of water. Both types of catfish will then become extinct.

Q26. Which graph shows what most likely would happen to the population of a certain animal if a new predator were introduced at time A?



Q27. The diagram below represents a portion of Earth's latitude/longitude system. A and B are locations on Earth's surface. The arrows show the direction of Earth's rotation.



If it is noon at location A, then at location B it is

A | morning

B | noon

C | afternoon

D | midnight

Q28. Which group would most likely have the greatest survival success during a long period of environmental changes?

- A** | a small population of rabbits living in a field of grass
- B** | a large population of red ants living in a forest
- C** | an endangered population of polar bears living near an iceberg
- D** | one species of bird that nests only in sugar maple trees

Base your answers to questions 29 and 30 on the passage below and on your knowledge of science.

Corals come in about 1,500 known species—from soft swaying fans to stony varieties with hard skeletons that form reef bases. They are made up of polyps, tiny animals that live in colonies and feed at night on microscopic plants and creatures. The coral's surface is the living part, with color infused by single-celled algae called zooxanthellae that live in polyp tissue. The algae act like solar panels, passing energy to the coral as they photosynthesize while feeding on the coral's waste. Extremely sensitive, corals survive in a narrow range of temperature, sunlight and salinity. An uncommonly severe El Niño (an anomalous warming of sea-surface temperatures) in 1998 raised ocean temperatures and changed currents, causing bleaching that devastated reefs worldwide. Scientists say parts of the Indian Ocean lost up to 90 percent of corals. The bleaching struck reefs around the Persian Gulf, East Africa, Southeast Asia and the Caribbean. Some recovered. Many died.

Q29. The relationship between the polyps and the zooxanthellae can best be described as

- A** | negative for both
- B** | neutral for both
- C** | positive for both
- D** | negative for one and positive for the other

Q30. The passage contains information concerning

A | limiting factors

B | reproductive methods

C | bacteria

D | competition

ICATS English Linguistics Contest 2019 National Toppers

Student Name	Father Name	Grade	School	City
AMATULLAH	ADNAN	1	MSB EDUCATIONAL INSTITUTE	KARACHI
MUHAMMAD MOHSIN	WAHEED SHEHZAD	1	RANGERS PUBLIC SCHOOL FOR BOYS	LAHORE
ZAIN-UL-ABIDIN	INAM-ULLAH	2	ARMY PUBLIC SCHOOL GARRISON JUNIOR	LAHORE
MUHAMMAD ASIS JAVED	MUHAMMAD SHAHEER JAVED	3	THE CITY SCHOOL CHASHMA BRANCH	MIANWALI
AYESHA SIDDIQUI	M. ASHRAF UL KABIR SIDDIQUI	4	THE CITY SCHOOL GULSHAN JUNIOR CAMPUS	KARACHI
AYESHA FAISAL	FAISAL EHSAN	5	LAHORE GRAMMAR SCHOOL LANDMARK PROJECT	LAHORE
ASAD IMRAN	M. IMRAN	6	THE CITY SCHOOL CANTT CAMPUS II	QUETTA
MANAAL TARIQ	DR. TARIQ MEHMOOD	7	THE CITY SCHOOL GIRLS CAMPUS	SIALKOT
FIZZA RIZVI	ALI ABBAS RIZVI	8	HABIB GIRLS SCHOOL	KARACHI
LAMISAH BEHRAM KHAN	BEHRAM BASHIR KHAN	9	LAHORE GRAMMAR SCHOOL	ISLAMABAD
FAIZ UL HASSAN GILANI	GHULAM UL HUSSAIN GILANI	10	THE CITY SCHOOL TOWN SENIOR SECTION	PESHAWAR

ICATS Mathematics Contest 2019 National Toppers

Student Name	Father Name	Grade	School	City
HIBA MALIK	BILAL MALIK	1	KOHSAR CHILDREN'S ACADEMY	MANSEHRA
DURYAB ZAHRA	MUHAMMAD RASHID	1	BEACONHOUSE HAFIZABAD	HAFIZABAD
ABDUL RASHEED	ABDUL WAHEED	2	ARMY PUBLIC SHOOOL & COLLEGE SYSTEM SADDAR CAMPUS	KARACHI
BURHANUDDIN	M. ALI ASGHER SAMIWALA	2	MSB EDUCATIONAL INSTITUTE	KARACHI
M. HUMMAS	M. SHAKIL	3	DEFENCE HOUSING AUTHORITY COLLEGE AND SCHOOL SYSTEM	KARACHI
EHAN QURESHI	ASSADULLAH QURESHI	4	FFC GRAMMAR SCHOOL AND COLLEGE	MIRPUR MATHELO
MAHAD ABID	M. HARIIS UMER	5	THE CITY SCHOOL CHENAB CAMPUS	FAISALABAD
UROOJ AJMAL	AJMAL IBRAHIM	6	KIPS SCHOOL	LAHORE
MUHAMMAD SALAMAT	SADAT MEHMOOD	7	GARRISON ACADEMY TUFAIL SHAHEED CAMPUS (SENIOR)	LAHORE
ABDULLAH JUNAID KHAN	ABDUL RAUF	8	THE SCIENCE SCHOOL	ISLAMABAD
SAAD ALI HASSAN	ABDUL HAYEE	8	THE SCIENCE SCHOOL	RAWALPINDI
DANIYAL KALEEM SHEIKH	MUHAMMAD KALEEM	9	ROOTS IVY INTERNATIONAL SCHOOL IB CAMPUS	RAWALPINDI
AHMED ALI	AUN ALI	10	MSB EDUCATIONAL INSTITUTE	KARACHI

COMPETE if you are
the **BEST**