Let Us Do Some Problems

(Focus: Aryabhatt National Maths Competition)

Prof. SB Dhar

Aryabhatt National Maths Competition is organized by *All India Council For Technical Skill Development* (AICTDSD) and *IIT Bombay Alumini*. It works on the basis that Mathematical Analysis is the brain of every technological revolution and research. Aryabhatt National Maths Competition is a part of the mission of AICTSD to promote and create the leaders from the student community among the country.

Eligibility Criteria

Any school or College aspirant to present their mathematical skills at National Level and becoming the Technology Scientist of Future India can participate.

Rewards

The First Prize consists of Rs. 1,50,000/, the Second Prize of Rs. 1,00,000/, and the Third Prize of Rs. 50,000/

Groups

The groups are as under:
Group 1 for age 10 to 13 years old
Group 2 for age 14 to 17 years old
Group 3 for age 18 to 24 years old

Exam format: MCQ

Duration: 45 minutes.
Number of Questions: 30.
Total marks: 60.
Note: Each wrong answer attracts 1 negative mark.
Contact: director@aictsd.com

Some questions are written here for the aspirants to understand the standard of the Question Paper. The solutions are not being written here. Only the answers have been given. If any student wants solution, he or she may request the Coordinator's Desk for that.

Questions For Group 1 Aspirants

Q1. Divide 32 into two parts such that the sum of their reciprocal is $\frac{1}{6}$.

Ans. 8 and 24

Q2. Two fifth of $\frac{95}{8}$ is less than two third of $\frac{99}{4}$ by what?

Ans. $\boldsymbol{\frac{47}{4}}$

Q3. Two numbers 97* and #0 have a missing digit. The difference of the missing digits is 7. Find the greatest possible remainder when bigger number is divided by the smaller number.

Ans. 72

Q4. Divide 180.544 by 14. Find the difference of the place value of the digits at thousandth place and the tens place of the quotient obtained by dividing the given number.

Ans. 9.994

Q5. 19 is the second largest factor of a number which has only three factors. Find the difference between its largest and the smallest factor.

Ans. 360

Q6. Which of the following fractions is closed to $\frac{2}{5}$?

$\frac{32}{65}, \frac{28}{58}, \frac{26}{54}, \frac{27}{69}$

Ans. $\boldsymbol{\frac{27}{69}}$

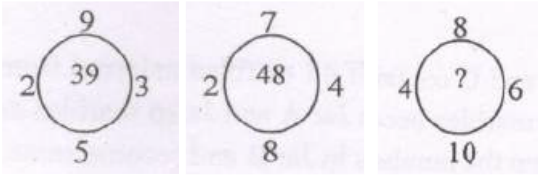
Q7. Manasvi spend Rs. 87.50 on a pen and $\frac{1}{3}$ of the remaining money on a pencil. She was still left with $\frac{1}{4}$ of her money. Find the cost of the pencil.

Ans. Rs. 17.5

Q8.Ria mixed 25% of 65.8 litres water, 34% of 27.5 litres sugar syrup and 4 litres of lime juice. After distributing the drink equally among 8 of her friends, she is left with 17.4 litres of the drink. Find the quantity of drink given to each friend.

Ans. 1.55 litre

Q9. Fill in the missing number:



Ans. 56

Q10. Look at the series and fill in the blank:

6,9, $\frac{27}{2}, \frac{81}{4}$,….

Ans. $\boldsymbol{\frac{243}{8}}$

Q11. Savik and Manik travelled from wonderland to Amazing Arena which are 360 km apart. Manik started his journey 30 minutes earlier than Savik but arrived 30 minutes later than Savik. Savik covered this

journey at an average speed of 1500 m/min. Find the average speed of Manik.

Ans. 1200 m/min

Q12. Amrita loves to eat chocolates. Her mother allows her to eat a definite number of chocolates every month. August being her birthday month, she is allowed to eat double the number of chocolates as she does in the rest of the months. Find the fraction of total chocolates she eats in April.

Ans. $\frac{1}{13}$

Q13. In a mathematics exam there are 24 questions. The questions carried either 5 marks or 3 marks. A student attempted all questions and scored 104 marks. Find the number of questions carrying 5 marks.

Ans. 16

Q14. Solve the following and answer in Roman Numerals:

MMDCCXXXVI ÷ CCCXLII + MMMCDLXXXVIII - MDLXXIX

Ans. MCMXVII

Q15. Krittika bought all items at 30% discount during Christamas. She paid Rs 382.90 for flowers and Rs 669.20 for mugs after discount. Then she also bought a flower vase priced at Rs 560. Find the total savings she had on purchase of three items.

Ans. Rs. 618.9

Q16. Mr. Stitchman had 24 m more cloth than Mr. Pantman. Mr. Stitchman used 12.8 m of cloth whereas Mr. Pantman used 1.9 m of cloth every day. When Mr. Stitchman finished all the cloth he had, Mr. Pantman was still left with 6.60 m of cloth. Find the total length of cloth Mr. Stitchman and Mr. Pantman had in the beginning.

Ans. 846.4m

Q17. Three jars A, B, C contain marbles. If 48 marbles are transferred from Jar A to Jar C, then the number of marbles becomes same in Jar A and Jar C. If 26 marbles are transferred from Jar B to Jar C, then the number of marbles in Jar B and Jar C become same. Find the number of more marbles in Jar A than Jar B.

Ans. 44

Q18. In a necklace, the number of diamonds is 2.8 times the number of pearls. The number of rubies is 1.125 times the number of diamonds whereas 0.03 of the number of pearls is 18. Find the percentage of diamonds in the necklace.

Ans. 40.29% approx

Q19. On the opening of a new shop the shopkeeper gave gifts it its customers on the first day. Every 2 customers got 1 pen, every 3 customers got 2 key-chains and every 4 customers got 3 calendars. A total of 91 gifts were given. Find the number of customers who visited the ship on the first day.

Ans. 47

Q20. The average weight of Seema and Reema was 15 kg less than the average weight of Mona and Sona. The average weight of all four people is 50 kg. However,

Seema weighs 70% as much as Reema. Find the weight of Seema.

Ans. 35 kg

Q21. Anupra is baking muffins. When she packs 3 muffins in a box, 2 muffins are left. If she packs 5 muffins in a box, 3 muffins are left. When she packs 7 muffins in a box, she is left with as many muffins as were left when she packed 5 muffins. Find the least number of muffins she baked.

Ans. 38

Q22. At an ice cream testing event, 55% of the people liked chocolate ice cream, 70% of the people liked kiwi gelato and 40% liked both. There were 45 people who did not like any of the flavours. Find the total number of people at the event.

Ans.300

Q23. Anurag walks to his school which is 1600 m away from his house at a speed of 80m/minute. One day, his friend Ankit who was cycling at a speed of 80m/minute gave him a ride. On that day, Anurag was able to reach the school in 15 minutes. Find the duration of time Anurag walked before taking the ride.

Ans. 11 min

Q24. Area of a rectangle is 324.9 square meter which is $11\frac{2}{5}$ times its length. The breadth of the rectangle is $\frac{2}{5}$ its length. Find the perimeter of this rectangle.

Ans.79.8 m

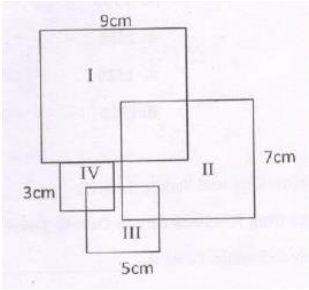
Q25. Geeta is facing South-West. After making a 225^0 clock-wise rotation followed by a 315^0 anti-clockwise rotation, what direction she is facing now?

Ans. South-East

Q26. Dhruv has several cuboids each measuring 8cm × 6 cm × 3 cm. Find the number of such cuboids needed to make the smaller possible cube.

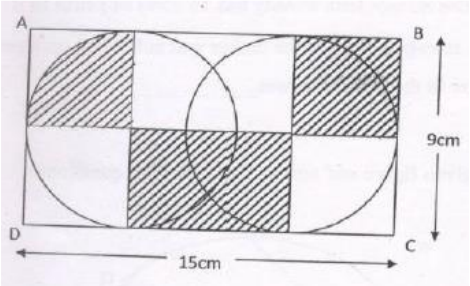
Ans. 12

Q27. The figure below is made up of four squares. The corner of square I touches the center of the square II, the corner of square II touches the center of the square III and the corner of the square III touches the center of the square IV. Find the total area of the figure shown in the figure.



Ans.143.25cm^2

Q28. Look at the given figure and find the perimeter of the shaded region.

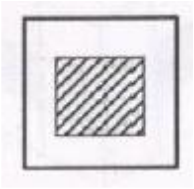


Ans. 55.065 cm

Q29. An oil tanker transfers petrol in an underground storage tank measuring 80cm × 30cm × 40cm. The storage tank already has 15 litres of petrol in it. When petrol is filled up to $\frac{5}{8}$ height of the storage tank, $\frac{4}{9}$ of the tanker was filled with petrol. Find the amount of petrol in the tanker in the beginning.

Ans. 81 litre.

Q30. The area of the un-shaded portion is 32 sq m in the figure below.



Find the total area of the bigger square.

Ans. 36 or 81 cm^2.