



# Summer Fields School

KAILASH COLONY, NEW DELHI-110048

Roll No.							
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<h1>A</h1>
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- Please check that this questionnaire contains 10 printed pages.
- Code A, B or C given on the right hand top corner of the questionnaire should be written on the answer sheet in the space provided.
- Please check that this questionnaire contains 60 questions.

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## 30<sup>th</sup> ARYABHATTA INTER-SCHOOL MATHEMATICS COMPETITION - 2013

### CLASS - VIII

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Time Allowed: 2 Hours

Max. Marks: 100

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#### GENERAL INSTRUCTIONS:

1. Do not write your name on the questionnaire.
  2. Write your roll no. on each page of the questionnaire and the Answer Sheet in the space provided.
  3. All the questions are compulsory.
  4. Read questions carefully; think twice before you write the answer. **No overwriting or cutting is allowed on the Answer Sheet.** Another copy of the questionnaire or answer sheet will not be provided.
  5. Do your rough work in the space provided in the questionnaire.
  6. The questionnaire contains four sections. Section A contains 10 questions on Logical Reasoning of 1 mark each, Section B contains 20 Multiple Choice Questions of 1 mark each, Section C contains 20 Free Response Type Questions of 2 marks each and Section D contains 10 Free Response Type Questions of 3 marks each.
  7. No working or descriptive answers of any question is to be given. Only the Answers are to be written on the Separate Answer sheet provided to you.
  8. Use Blue or Black pens to write the answer on the Answer Sheet.
  9. Answers should be clearly written in the space provided on the Answer sheet.
  10. Use of calculator is not allowed.
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**SECTION -A**

**Rough Work**

**Write the correct option in the Answer Sheet.**

1. Which letter replaces the question mark?

6	4	4	1
4	N	L	7
5	U	?	1
6	10	14	2

- a) P  
b) R  
c) Q  
d) T
2. In the following expression each '\*' is to be replaced with either + or - in such a way that the result of the calculation is 100.  
 $123 * 45 * 67 * 89$   
 The number of + signs used is  $p$  and the number of - signs used is  $m$ . What is the value of  $p-m$ ?
- a) -3  
b) -1  
c) 0  
d) 1
3. In the multiplication grid given below, the input factors ( in the first row and the first column ) are all missing and only some of the products within the table have been given. What is the value of  $A + B + C + D + E$  ?

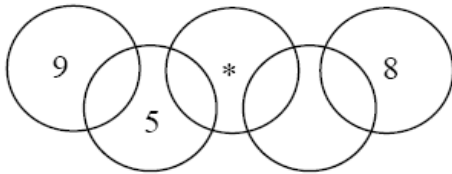
x					
	A	10		20	
	15	B	40		
	18		C	60	
		20		D	24
			56		E

- a) 132  
b) 145  
c) 161  
d) 178

**Rough Work**

4. A, B, C, D, E, F, G and H are the family members. B is the sister of G and G is the brother of C. E is the wife of A, whose father is H. D is the husband of B and F is the son of G. A is the father of B. How 'F' is related to 'E'?
- Son
  - Grandson
  - Father
  - nephew

5. Rohan has been challenged to place the numbers 1 to 9 inclusive in the nine regions formed by the Olympic rings so that there is exactly one number in each region and the sum of the numbers in each rings is 11. The diagram shows part of his solution. What number goes in the region marked \*?
- 6
  - 4
  - 3
  - 2



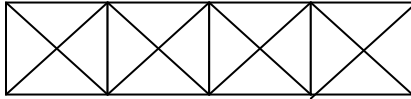
6. Six boys A, B, C, D, E and F play a game of cards. Each has a pack of 10 cards. F borrows 2 cards from A and gives away 5 to C who in his turn gives 3 to B, while B gives 6 to D who passes on 1 to E. How many cards does D have?
- 8
  - 15
  - 12
  - 7

7. Find the next term of the given pattern  
 2 Z 5    7 Y 7    14 X 9    23 W 11    34 V 13    ?
- 27 U 24
  - 47 U 15
  - 45 U 15
  - 47 X 14

8. A and C are good in Dramatics and Athletics. D and A are good in Athletics and Studies. C and B are good in General Knowledge and Dramatics. D, B and E are good in Studies and General Knowledge. E and D are good in Studies and Social work. Who is good in Studies, Athletics and Social work?
- A
  - B
  - C
  - D

**Rough Work**

9. Look at this series: 36, 34, 30, 28, 24 . . . What number should come next?  
a) 20  
b) 22  
c) 23  
d) 26
10. Identify the number of triangles in the given figure.



- a) 16  
b) 32  
c) 38  
d) 40

**SECTION - B**

**Write the correct option in the answer sheet .**

11. The salaries of A, B and C are in the ratio 2:3:5. If the increments of 15% , 10% and 20% are allowed respectively in their salaries , then the ratio of their new salaries is :  
a) 3:3:10  
b) 10:11:20  
c) 23:33:60  
d) 3:5:7
12. Aman is 50 years, 50 months, 50 weeks and 50 days old. What will be his age in years, on his next birthday?  
a) 56  
b) 55  
c) 54  
d) 53
13. If the two consecutive class marks of a frequency distribution are 12.5 and 17.5 , then the class size is :  
a) 5  
b) 10  
c) 15  
d) 30
14. Two students appeared in an examination. One of them secured 9 marks more than the other and his marks were 56% of the sum of their marks. The lesser marks obtained are :  
a) 30  
b) 34  
c) 32  
d) 33

**Rough Work**

15. If one-eighth of a pencil is black, half of the remaining is yellow and the remaining  $3\frac{1}{2}$  cm is blue, then the total length of the pencil is :
- a) 8cm
  - b) 7cm
  - c) 6cm
  - d) 11 cm
16. If the L.C.M. of two numbers is 280 and their ratio is 7:8. The smaller of the two numbers is :
- a) 70
  - b) 35
  - c) 42
  - d) 28
17. The height of a room is 40% of the semi-perimeter of the floor. It costs Rs. 260 to paper the walls of the room with paper 50cm wide at the rate of Rs.2 per meter allowing an area of  $15\text{m}^2$  for doors and windows. The height of the room is :
- a) 2.6m
  - b) 3.9m
  - c) 4m
  - d) 4.2m
18. Number of keystrokes needed to type numbers from 1 to 1000 is :
- a) 3001
  - b) 2893
  - c) 2704
  - d) 2890
19. The number that should be subtracted from  $x^3 + 4x^2 - 7x + 12$  to make it perfectly divisible by  $x+3$  is :
- a) 42
  - b) 39
  - c) 13
  - d) 24
20. The smallest number that has exactly 12 factors is :
- a)  $2^{11}$
  - b) 60
  - c) 120
  - d) 96

**Rough Work**

21. The differences of ages of two brothers are a prime number. Sum of their ages is also a prime number. If the elder brother is 28 years old, how many different values can the age of the younger brother take?
- 1
  - 2
  - 3
  - 4
22. How many scalene triangles exist whose sides  $a$ ,  $b$  and  $c$  are natural numbers less than 8?
- 16
  - 15
  - 14
  - 13
23. A square sheet of paper is converted into a cylinder by rolling it along its length. The ratio of the base radius to the side of the square is
- $1:\pi$
  - $1:2\pi$
  - $2\pi:1$
  - $\pi:1$
24. Rajesh is 10 years younger to Bhaskar. 10 years back, Rajesh's age was two-third that of Bhaskar's. Bhaskar's present age is
- 30 years
  - 20 years
  - 40 years
  - 50 years
25. The circumference of the front wheel of a cart is 30 ft long and that of the back wheel is 36 ft long. The distance travelled by the cart when the front wheel has done five revolutions more than the rear wheel is :
- 500ft
  - 700ft
  - 900ft
  - 1000ft
26. If  $(x+2)^2 = 9$  and  $(y+3)^2 = 25$ , then the maximum value of  $x/y$  is:
- $\frac{1}{2}$
  - $\frac{5}{8}$
  - $\frac{2}{5}$
  - $\frac{8}{5}$

**Rough Work**

27. An owner of a pizza stand sold small slices of pizza for Rs. 150 each and large slice for Rs. 250 each. One night he sold 5000 slices, for a total of Rs. 10.50 lakh. The number of small slices sold is :
- 3000
  - 4000
  - 2000
  - 2500
28. The surface area of the three cotermious faces of a cuboid are 6, 15, 10 sq. m respectively. The volume of the cuboid is :
- $30 \text{ m}^3$
  - $40 \text{ m}^3$
  - $20 \text{ m}^3$
  - $50 \text{ m}^3$
29. A regular hexagon is inscribed in a circle of radius 10cm. The perimeter of the hexagon is
- 40 cm
  - 30 cm
  - 50 cm
  - 60 cm
30. Anita had to do a multiplication. Instead of taking 35 as one of the multipliers, she took 53. As a result, the product went up by 540. The new product is
- 1560
  - 1590
  - 1950
  - 1960

**SECTION - C**

**Write the answer in the answer sheet.**

31. Factorize the expression:  $9x^2 - 6ax + (a^2 - b^2)$ .
32. There are 12 pipes that are connected to a tank. Some of them are fill pipes and the others are drain pipes. Each of the fill pipes can fill the tank in 8 hours and each of the drain pipes can drain the tank completely in 6 hours. If all the fill pipes and the drain pipes are kept open, an empty tank gets filled in 24 hours. How many of the 12 pipes are fill pipes?
33. In a triangle ABC, the lengths of the sides AB and AC are 17.5 cm and 9 cm respectively. Let D be the point on the line segment BC such that AD is perpendicular to BC. If  $AD = 3\text{cm}$ , then what is the radius (in cm) of the circle circumscribing the triangle?

**Rough Work**

34. The average wage of a worker during a fortnight comprising 15 consecutive working days was Rs. 90 per day. During the first 7 days, his average wage was Rs.87 per day and the average wage during the last 7 days was Rs. 92 per day. What was his wage on the 8<sup>th</sup> day?
35. The time in the clock is 20 minutes past 2. What is the angle between the minute and hour hands of the clock?
36. A circle of maximum possible size is cut from a square sheet of board of side 10cm. Subsequently, a square of maximum possible size is cut from the resultant circle. What will be area of the final square?
37. A candidate gets 20% marks fails by 10 marks but another candidate who gets 42% marks gets 12% more than the passing marks. Find the maximum marks.
38. Each interior angle of a regular polygon is  $120^\circ$  greater than each exterior angle. How many sides are there in the polygon?
39. A stairway 10ft high is such that each step accounts for half a foot upward and one-foot forward. What distance will an ant travel if it starts from the ground level to reach the top of the stairway?
40. If a sum of money grows to  $144/121$  times when invested for two years in a scheme where interest is compounded annually, how long will the same sum of money take to treble if invested at the same rate of interest in a scheme where interest is compounded using simple interest method?
41. A 4 cm cube is cut into 1 cm cubes. What is the percentage increase in the surface area after such cutting?
42. Find the largest five digit number that is exactly divisible by 7,10,15,21 and 28.
43. In an election contested by two parties, Party D secured 12% of the total votes more than Party R. If Party R got 132,000 votes , by how many votes did it lose the election ?
44. If apples are bought at the rate of 30 for a rupee, how many apples must be sold for a rupee so as to gain 20%?
45. A, B and C play cricket. A's runs are to B's runs and B's runs are to C's runs as 3:2. They get altogether 342 runs. How many runs did A make?



**Rough Work**

46. The marks scored by a candidate in three subjects are in the ratio 4:5:6. If the candidate scored an overall aggregate of 60% of the sum of the maximum marks and the maximum marks in all three subjects is the same, in how many subjects did he score more than 66%?
47. A takes 3 min 45 seconds to complete a kilometer. B takes 4 minutes to complete the same 1km track. If A and B were to participate in a race of 2 kms. How much start can A give B in terms of distance?
48. A small ink cartridge has enough ink to print 600 pages. Three small cartridges can print as many as two medium cartridges. Three medium cartridges can print as many pages as two large cartridges. How many pages can be printed using a large cartridge?
49. Find the value of  $x + y$  if  $5^{x-3} \times 3^{2y-7} = 675$ .
50. Two circles touch externally. The sum of their areas is  $58\pi$  cm<sup>2</sup> and the distance between their centers is 10 cm. Find the radius of the bigger circle.

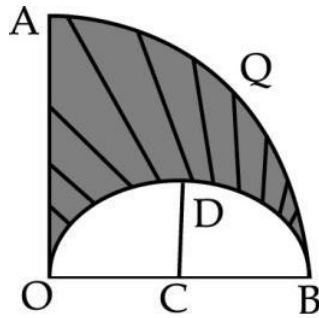
**SECTION - D**

**Write the answer in the answer sheet.**

51. There are two concentric circles of radii 3.5cm and 7cm. A third concentric circle is drawn outside the 7cm circle so that the area enclosed between it and the 7cm circle is same as that between two inner circles. Find the radius of the third circle (correct up to one decimal place).
52. If A and B work together, they will complete a job in 7.5 days. However, if A works alone and completes half the job and then B takes over and completes the remaining half alone, they will be able to complete the job in 20 days. How long will B alone take to do the job if A is more efficient than B?
53. A father left a will of Rs. 35 lakhs between his two daughters aged 8.5 years and 16 years such that they may get equal amounts when each of them reach the age of 21 years. The original amount of Rs. 35 lakhs has been instructed to be invested at 10% p.a. simple interest. How much did the elder daughter get at the time of the will?

**Rough Work**

54. A 20 litre mixture of milk and water contains milk and water in the ratio 3:2. 10 litres of the mixture is removed and replaced with the pure milk and the operation is repeated once more. At the end of the two removals and replacements, what is the ratio of milk and water in the resultant mixture?
55. A golf ball has a diameter equal to 4.1cm. Its surface has 200 dimples each of radius 2mm. Calculate the total surface area which is exposed to the surroundings assuming that the dimples are hemispherical (in terms of  $\pi$ ).
56. Marie and her granddaughter Suzaine both had their birthday yesterday. Today, Marie's age in years is an even number and 15 times that of Suzaine . In 4 year's time Marie's age in years will be square of Suzaine's age. How many years older than Suzaine is Marie today?
57. If the price of petrol increases by 25% and Raj intends to spend only an additional 15% on the petrol, by how much % will he reduce the quantity of petrol purchased?
58. OAQB is a quadrant of a circle with centre O. C is midpoint of OB. CD=CO=7cm. Find the area of the shaded region.



59. How many spherical bullets can be made out of a solid cube of lead whose surface area is 11616 sq cm, each bullet being 4 cm in diameter?(use  $\pi = 22/7$ )
60. A girl of height 90cm is walking away from the base of a lamp-post at a speed of 1.2m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.